XVIII. *The Foraminifera of the Kerimba Archipelago (Portuguese East Africa).*—Part II.

By Edward Heron-Allen, *F.L.S., F.Z.S., F.G.S., F.R.M.S., and* Arthur Earland, *F.R.M.S.*

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(Plates XL.–LIII., and Text-figures 42–44.)

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Note on Species found at Kerimba, recorded by d'Orbigny in 1826 from Madagascar and Mauritius.

As we took occasion to observe in the Introduction, in examining the Kerimba material we have been dealing with what is virtually an untouched area, and it gains an added interest from its comparative proximity to Madagascar and the other islands in the Indian Ocean which supplied d'Orbigny with many forms recorded in his 'Tableau Méthodique de la Classe des Céphalopodes'*, which, as Messrs. Parker, Jones, and Brady have observed, "with all its faults, and they are neither few nor small, must be regarded as the alphabet of the nomenclature of the Foraminifera"†. D'Orbigny examined shore-sands from Madagascar, given to him by the geologist of La Rochelle, Fleuriau de Bellevue, from Mauritius (Ile de France), and similar material from other islands of that group, brought to him by MM. Quoy, Gaimard, and Gaudichaud, the scientific staff that accompanied de Freycinet on his journey round the world, and by M. Lesson, Doctor and Naturalist to the Expedition of Duperrey, all of whose names he

* 'Annales des Sciences Naturelles,' Paris, vol. vii. 1826, pp. 96–169, 245–314, pls. x.–xvii.

† Ann. Mag. Nat. Hist. 1871, ser. 4, vol. viii. p. 145.

has associated with species of doubtful specific value in many genera. It will therefore be not uninteresting to note those species recorded in the TMC. 1826 from those localities, which we have been able to identify from the Kerimba Archipelago.

By the courtesy of Dr. Etienne Loppé (Curator of the Musée Fleuriau de Bellevue at La Rochelle) we have been permitted to examine the bottles of material from Madagascar and from Réunion (Ile de Bourbon) presented to that museum by d'Orbigny himself. These consist of pure gatherings of *Amphistegina lessonii* with a small admixture of *Operculina complanata* and its variety *granulosa*. The varietal differences among the individuals in this material are so great that it is not surprising that d'Orbigny made five different species out of *O. complanata* (TMC. p. 281) and eight species out of *A. lessonii*, all the forms drawn by him for the "Planches inédites" being fully represented. The latter were studied and diagnosed by Dr. Fornasini in a paper to which we have referred in dealing with the genus *Amphistegina*.

1. *Pavonina flabelliformis* (Maur.), TMC. p. 260. no. 1.
2. *Textularia communis* (Maur.), TMC. p. 263. no. 27. A neat form of *T. sagittula*, Defrance, identified by Brady with d'Orbigny's *T. deperdita* (O. 1846, FFV. pl. xiv. figs. 23-25). We have not found the types in Paris or La Rochelle *.
3. *Bulimina madagascariensis* (Mad.), TMC. p. 270. no. 17. The types are not at present forthcoming, but the sketches for the unfinished "Planche inédite" show it to be *Bulimina elegantissima*, var. *seminuda* Terquem.
4. *Rotalia communis* (Mad.), TMC. p. 273. no. 29. The type in Paris appears to be *Pulvinulina repanda* (F. & M.) † (*cf.* F. 1898, RFI. p. 249, fig.).

* It may be observed that the type-specimens of d'Orbigny's 'Tableau Méthodique' in Paris are mounted upon glass slips backed with blue paper and enclosed in small tubes, which in turn are fastened upon wooden slips, and are kept in drawers in the laboratory of the Director of the Musée de Paléontologie. They have evidently been overhauled more than once, and perhaps many of the types have strayed away into the drawers containing the types of the Cuba, Canaries, S. America, and Vienna collections. These we have not yet been able to examine. When therefore we say that the types are not forthcoming, the probability is that they are merely disarranged, and that when we can go through the entire collection we shall be able to restore many strayed TMC. types to their places in the cabinet. The types or co-types at La Rochelle have been mounted in sealed slides by C. Basset, who described them in the 1885 vol. of the Société des Sciences Naturelles de la Charente Inférieure (pp. 153–173) with a poor photograph of the "Modèles." These slides are for the most part overgrown with mycelium and fungus. Several of the Paris types are also fungus-grown. As an "offset" to the missing types we have noted no fewer than thirty-three species of various authors (including d'Orbigny) among the TMC. types, showing that a serious disarrangement has taken place. We grieve to record that the original tubes of d'Orbigny's material, which were kept in the cellars of the Musée de Paléontologie, were flooded in the rising of the Seine in the year 1912 and many of the labels are lost. Fortunately, however, when Prof. Schlumberger went over the collection during his Directorate of the Musée, he put labels inside many of the bottles (including the Madagascar samples), and we owe it to him that the loss to science was not greater than it is.

† [The parentheses around the names of authors placed after specific names in this paper are used in accordance with Article 23 of the International Rules of Nomenclature (Proc. 7th Int. Cong. Boston, 1907, p. 44, 1912).—Editor.]

5. *Calcarina calcar* (Mad. & Maur.), TMC. p. 276. no. 1 = *Rotalia calcar* (d'Orb.).
6. *Calcarina quoyi* (Maur.), TMC. p. 276. no. 6 = *Calcarina hispida* Brady.
7. *Calcarina gaimardii* (Maur.), TMC. p. 276. no. 2 = *Calcarina spengleri* (Linné) (*cf.* F. 1908, SON. pl. iii. figs. 1, 2).
8. *Globigerina globularis* (Maur.), TMC. p. 277. no. 3. The Paris type is a large form of *G. bulloides* near *G. conglobata* Brady.
9. *Truncatulina refulgens* (Mad.), TMC. p. 279. no. 5.
10. *Operculina madagascariensis* (Mad.), TMC. p. 281. no. 4. No types found. The drawing on the finished "Planche inédite" is indistinguishable from *O. complanata*, of which species all the d'Orbignyan types are represented at Kerimba.
11. *Anomalina punctulata* (Maur.), TMC. p. 282. no. 1. The Paris type is obscured, but is apparently a carinate shell which might be a Cristellarian, but the figure on the "Planche inédite" is a beautiful pink test suggesting a regular individual of *A. polymorpha* Costa.
12. *Polystomella angularis* (Mad. & Maur.), TMC. p. 284. no. 2. The Paris type is typical *P. craticulata* (F. & M.), whilst the La Rochelle co-type is typical *P. crispa* (Linné).
13. *Nonionina communis* (Mad.), TMC. p. 294. no. 20. Both at Paris and La Rochelle the type-specimens are intermediate between *N. boueana* d'Orb. and *N. turgida* Williamson.
14. *Quinqueloculina flavescens* (Mad.), TMC. p. 302. no. 30. The type in Paris is intermediate between *M. seminulum* (Linné) and *M. circularis* (Bornemann).
15. *Amphistegina lessonii* (Maur.), TMC. p. 304. no. 3. See Introductory Note.
16. *Amphistegina madagascariensis* (Mad.), TMC. p. 304. no. 5. The Paris type is the high-domed plano-convex form, noted by us sub *A. lessonii*. The La Rochelle specimen is an unrecognisable balsam-mounted shell.

Amphistegina gibba, TMC. p. 304. no. 6, is only recorded by d'Orbigny from the West Indies (see No. 459 *a*, p. 737). Of the other species recorded by d'Orbigny from Madagascar and Mauritius, *Textularia marginata*, TMC. p. 263. no. 17 (no types found) is a carinate form; *Nonionina elyptica*, TMC. p. 294. no. 16 (no types found) a semi-carinate *N. scapha* in the sketches for the unfinished "Planches inédites," and *Sphæroidina bulloides*, TMC. p. 267. no. 1, have not been identified by us in the Kerimba material *.

As illustrative of the fact that the Rhizopodal fauna of the Kerimba Archipelago is probably representative of the shallow waters of the adjacent seas, including Madagascar, we may mention that a very small sample of material from Ngoney (Mad.) shallow-water—probably anchor-mud—which has come into our possession

* We may say in this place that it is our hope and intention in due course to reorganize the d'Orbigny type-specimens in Paris, and to complete as far as possible, and to publish with the co-operation of Prof. Marcelin Boule, Director of the Musée Paléontologique, the whole of the "Planches inédites" of d'Orbigny. Until this is done the great majority of d'Orbigny's names in the TMC. 1826 remain *nomina nuda*. Very few students of the Foraminifera appear to have consulted the "Planches inédites" since they were left unfinished by d'Orbigny, and many of his names have been applied to, and accepted for, species which differ essentially from his figures and from his type-specimens.

yielded, on examination for purposes of comparison, practically all the distinctive forms of the Kerimba dredgings, among which we may call attention to the following :—

Biloculina ringens, var. *striolata* Br.
Spiroloculina crenata Karrer.
Miliolina durrandii Millett.
Miliolina rupertiana Br.
Articulina conico-articulata (Batsch).
Textularia foliacea, sp. n.
Bifarina mackinnonii, Millett.
Pavonina flabelliformis d'Orb.
Bulimina elegantissima, var. *compressa* Millett.
Bolivina limbata Br. (costate forms).
Bolivina simpsoni, sp. n.
Sagrina tessellata Br.
Sagrina striata Br.
Discorbina reniformis, sp. n.
Discorbina pulvinata Br.
Discorbina valvulata, var. *granulosa*, var. n.
Truncatulina glabra, sp. n.
Truncatulina rostrata Br.
Rotalia venusta Br.
Rotalia murrayi, sp. n.
Rotalia erinacea, sp. n.
Nonionina boueana d'Orb.
Polystomella milletti, sp. n.

We may perhaps be permitted to call attention to the mystery surrounding the curious form recorded by d'Orbigny from Mauritius as *Rotalia dubia* (TMC. p. 274. no. 34) which now comes to light again after a period of ninety years. In this respect its history is perhaps even more romantic than that of *Pavonina flabelliformis* (No. 181).

When we first discovered the specimens at Stn. 11 we were unable to assign them to any definite position, although their rhizopodal nature was unquestionable. Subsequent research caused us to associate the forms with Fornasini's published figure, representing d'Orbigny's original sketch of a form to which he gave this name in the 'Tableau Méthodique' (d'O. 1826, TMC. p. 274. no. 34). Fornasini's opinion was that the rhizopodal nature of d'Orbigny's organism was more than doubtful, his opinion, however, being based entirely upon Berthelin's tracing of d'Orbigny's original sketch. We thereupon proceeded to verify Fornasini's figure (F. 1908 SON. p. 46, pl. i. fig. 14), and to compare our specimens with the original type-specimen in Paris, and we had no hesitation in deciding that the two forms were identical, although d'Orbigny's species is only represented by a single water-worn individual, whereas the Kerimba dredgings have furnished us with two or three distinct stages of growth. We have now also identified specimens of the organism from Cebu, Philippine Is. (45 fms.), and the Java Sea (50 fms.), so that it would appear to be widely distributed. The exact affinities of the form are, however, still very obscure, and, pending further investigation and the discovery of further specimens, we merely record it under d'Orbigny's original name in our Table of Species and Varieties. It will almost certainly require the establishment of a new genus.

We have also taken the opportunity afforded us by the generous invitation and encouragement of the Publication Committee of the Zoological Society, and the profusion of the species and varieties of the genus *Peneroplis*, to coördinate the earliest

records and to reduce to order the excessively bewildering nomenclature of the elongate types of this genus (see pp. 594 *et seq.*). The genus *Rhaphidoscene* Vaughan-Jennings is here recorded for the second time.

List of Species and Varieties recorded as new to Science in this Part.

3. *Nubecularia tubulosa.*
5. ,, *lucifuga*, var. *decorata.*
26. *Miliolina circularis*, var. *cribrostoma.*
39. ,, *tricarinata*, var. *serrata.*
51. ,, *exsculpta.*
66. ,, *kerimbatica.*
87. *Massilina secans*, var. *reticulata.*
88. ,, ,, var. *rugosa.*
107. *Fischerina helix.*
111. *Cornuspira charoides.*
143. *Hippocrepina oviformis.*
170. *Textularia foliacea.*
171 *a*. ,, *conica*, var. *corrugata.*
212. *Virgulina schreibersiana*, var. *carinata.*
228. *Bolivina simpsoni.*
229. *Mimosina rimosa.*
232. ,, *echinata.*
281. *Lagena orbignyana*, var. *kerimbatica.*
322. *Sphæroidina corticata.*
333. *Spirillina semidecorata.*
338. *Cymbalopora milletti.*
356. *Discorbina valvulata*, var. *granulosa.*
359. ,, *reniformis.*
393. *Truncatulina tubulifera.*
395. ,, *glabra.*
425. *Rotalia erinacea.*
426. ,, *murrayi.*
457. *Polystomella milletti.*

In Part I.

123. *Iridia diaphana*, gen. et sp. n.
465. *Nouria polymorphinoides*, gen. et sp. n.
465 *a*. ,, *harrisii*, sp. n.
465 *b*. ,, *compressa*, sp. n.

Family MILIOLIDÆ.

Subfamily NUBECULARIINÆ.

NUBECULARIA Defrance.

1. **Nubecularia tibia** Jones & Parker.

Nubecularia tibia Jones & Parker, 1860, FCD. p. 455, pl. xx. figs. 48–51.
„ „ Brady, 1879, etc., RRC. 1879, p. 52, pl. viii. figs. 1, 2.
„ „ Brady, 1884, FC. p. 135, pl. i. figs. 1–4.
„ „ Chapman, 1892, PCT. p. 516, pl. xv. fig. 1.
„ „ Millett, 1898, etc., FM. 1898, p. 261, pl. v. fig. 3.

3 *Stations.*

Single specimens attached to shell-fragments at Stns. 2 *a* and 3 consisting of four or five chambers in a linear series, and a free specimen (imperfect) consisting of one chamber only at Stn. 7. This species appears to be particularly fragile, and is seldom found in the free condition except in fragments. When attached, and therefore less subject to fracture, it often attains considerable proportions; we have specimens from Torres Straits, attached to shell-fragments, attaining a length of 4–5 mm.

2. **Nubecularia depressa** Chapman.

Nubecularia depressa Chapman, 1891, etc., GF. 1891, p. 572, pl. ix. fig. 1.
„ *lucifuga* Gough, 1906, FLL. p. 3, pl. i. figs. 1, 2.
„ *depressa* Heron-Allen & Earland, 1913, CI. p. 19, pl. i. figs. 1–3.

3 *Stations.*

A few small but typical specimens attached to shell-fragments.

3. **Nubecularia tubulosa,** sp. n. (Pl. XL. figs. 1–5.)

4 *Stations.*

Test attached, porcellanous, commencing with a small initial series of chambers arranged in milioline fashion, followed by a more or less compressed and irregularly branching tube of constant diameter extending to great lengths all over the surface of the host-organism, which at Kerimba is usually one of the calcareous algæ. The marginal edges of the tube at the point of attachment to the host are often furnished with a carina so as to present a wider surface of attachment. This is especially the case in the earlier portion of the test. Aperture, usually a simple opening at the end of each branch of the tube, but in some instances the tube expands into a small depressed chamber, the terminal face of which is cribrate. The tube sometimes passes directly across depressions in the surface of the host without attachment. Diameter of tube ·03–·05 mm.

The species was found at Stns. 2 *b*, ? X, and 12, and, in greater quantity and finer than elsewhere, upon a shell-fragment, the precise locus of origin of which was unnoted.

It may be compared with *Sagenina frondescens* Brady, but differs in the nature of its test, which is entirely porcellanous, in the comparatively limited number of branches thrown out from the main tube, and in the absence of inosculation. When the tubes cross each other in the course of their growth they preserve their separate entities, and do not fuse as in *Sagenina*.

4. **Nubecularia lucifuga** Defrance.

Nubecularia lucifuga Defrance, 1825, Dict. Sci. Nat. (Strasburg, 1816–1830), vol. xxxv. p. 210 ; Atlas Zooph. pl. xliv. fig. 3.
„ „ Brady, 1884, FC. p. 134, pl. i. figs. 9–16.
„ „ Millett, 1898, etc., FM. 1898, p. 261, pl. v. fig. 7.
„ „ Chapman, 1900, FLF. p. 168.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 2, pl. ii. figs. 1–4.
„ „ Earland, 1905, FBS. p. 191, pl. xi. figs. 1–3, pl. xiv. fig. 2.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 309 ; 1910, p. 404, pl. vi. figs. 1, 2.

12 *Stations.*

Generally distributed, but never very abundant. The species occurs in all its countless varieties both attached and free, but many of the free specimens show evidence of having lived in the attached condition. Among the variations noticeable the most constant is the plano-convex free form, exhibiting three or more chambers arranged in a discorbine spiral as figured by Sidebottom (RFD. 1904, pl. ii. figs. 1, 2). This variety occurs at Stns. 1, 3, 4, and 7. Another, vertebraline, variety similar to Sidebottom's figs. 3 and 4 occurs at Stn. 9—it is feebly striate. At Stn. 4 a detached form was observed with a number of chambers in an irregular linear series. At Stn. 7 the discorbine variety occurs also with a pustulate surface. At Stn. 10 all the specimens were of the normal labyrinthic type. At Stn. 12 the specimens were attached, and pustulate on the surface.

5. **Nubecularia lucifuga,** var. **decorata,** nov. (Pl. XL. figs. 6, 7.)

4 *Stations.*

Test free or attached, consisting of a number of turgid chambers irregularly disposed in a more or less linear series. One or more apertures on the terminal chamber, sometimes compressed into a slit-like mouth. The surface of the shell is typically milioline, sometimes dull, occasionally highly polished, free from inclusions of sand-grains or foreign matter, and covered with an ornamentation consisting of pustular beads which at times coalesce into irregular verriculations or net-work. In rare instances the surface of the shell is irregularly costate. This handsome variety is rare at Kerimba, where it occurs in the free and attached forms at Stns. 9, 12, ? X, and on the unlocalised shell-fragment before alluded to. It is widely distributed, as we have

records of its occurrence off Barbados (100 fms.), off Cape Byron, N. S. Wales (111 fms., costate), and off the coast of New Zealand, North Island (various depths).

The specimens range between 0·5 and 1·5 mm. in length. Greatest diameter of chamber 0·6 mm.

6. **Nubecularia divaricata** Brady.

Sagrina divaricata Brady, 1879, etc., RRC. 1879. p. 276, pl. viii. figs. 22–24.
Nubecularia divaricata Brady, 1884, FC. p. 136, pl. lxxvi. figs. 11–15.
„ „ Millett, 1898, etc., FM. 1898, p. 261, pl. v. fig. 4.
„ „ Chapman, 1900, FLF. p. 168, pl. xix. fig. 1.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 2, pl. ii. figs. 5–7.

2 *Stations.*

Occurs very rarely, both free and attached to shell-fragments.

7. **Nubecularia bradyi** Millett. (Pl. XL. figs. 8–10.)

Nubecularia inflata Brady, 1884, FC. p. 135, pl. i. figs. 5–8.
„ *bradyi* (*nom. nov.*) Millett, 1898, etc., FM. 1898, p. 261, pl. v. fig. 6.
„ „ Chapman, 1900, FLF. p. 169, pl xix. fig. 3.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 3.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 300.

16 *Stations.*

This typical tropical form occurs at nearly all the Stns. and often in great profusion, but is absent at Stn. 13, and extremely rare at Stns. 5, 7, and 10. The specimens call for little remark; they are quite typical and constant in their irregularity of form and in the characteristic multi-tubular aperture. They attain abnormally large dimensions at Stns. 3 and 9.

Under this species it would seem convenient to record those abnormal nubecularine miliolids, some of which we figure (Plate XL. figs. 8–10), which, while no doubt phylogenetically akin to *Miliolina labiosa* (d'Orbigny, 1839, FC. p. 178, pl. x. figs. 12–14), present no definite plan of growth. They occur in considerable numbers at Stns. 12 and ?X. They are easily separable from the typical *N. bradyi* by the character of the aperture, which is in nearly all cases a comparatively large and irregular terminal orifice.

Subfamily Miliolininæ.

Biloculina d'Orbigny.

8. **Biloculina ringens** (Lamarck).

Miliolites ringens Lamarck, 1804, etc., AM. vol. v. p. 351. no. 1, vol. ix. pl. xvii. fig. 1; Lamarck, 1816, etc., ASV. vol. vii. p. 612; 1835, etc., vol. xi. p. 289. no. 1.
Biloculina ringens d'Orbigny, 1826, TMC. p. 297. no. 2.
„ *canariensis* d'Orbigny, 1839, FIC. p. 139, pl. iii. figs. 10–12.

Biloculina ringens Williamson, 1858, RFGB. p. 79, pl. vi. figs. 169, 170, pl. vii. fig. 71.
„ „ Brady, 1884, FC. p. 142, pl. ii. figs. 7, 8.
„ „ Egger, 1893, FG. p. 220, pl. i. figs. 7–9.
„ „ Chapman, 1900, FLF. p. 170.

4 *Stations.*

One small and elongate specimen was found at Stn. 1, evidently closely allied to the var. *striolata* Brady (which occurs rather more abundantly in the dredgings), but quite free from superficial markings. Also a few small and normal specimens elsewhere.

9. **Biloculina ringens,** var. **denticulata,** Brady. (Pl. XL. figs. 11–13.)

Biloculina alata d'Orbigny, 1826, TMC. p. 298. no. 6.
„ *ringens*, var. *denticulata* Brady, 1884, FC. p. 143, pl. iii. figs. 4, 5.
„ „ „ Millett, 1898, etc., FM. 1898, p. 262.
„ „ „ Fornasini, 1899, La "Biloculina alata" di A. D. d'Orbigny, Riv. Ital. di Palæont. Anno v. p. 23, figs.

8 *Stations.*

Generally distributed and common at some Stns., notably Stns. 6, 11, and 12. This well-marked type, which is a typical coral-sand species, is certainly the dominant *Biloculina* of the Kerimba dredgings, growing to a considerable size and often strongly marked in its characteristic aboral denticulations. At some of the Stns., notably 6 and 12, a few of the specimens are faintly striate, thus combining the particular features of this variety and of var. *striolata* Brady. At Stn. ? B some of the individuals have a wrinkled surface. At Stns. 9 and 12 there is a dehiscent tendency, the ultimate and penultimate chambers separating and forming a distinct groove round the shell.

10. **Biloculina ringens,** var. **striolata** Brady.

Biloculina ringens, var. *striolata* Brady, 1884, FC. p. 143, pl. iii. figs. 7, 8.
„ „ „ Millett, 1898, etc., FM. 1898, p. 262, pl. v. fig. 8.

2 *Stations.*

Extremely rare; of the few specimens found, the most noticeable were at Stn. 11, where the ultimate and penultimate chambers are separated by a deep cleft down the sides of the shell.

11. **Biloculina bulloides** d'Orbigny.

Biloculina bulloides d'Orbigny, 1826, TMC. p. 297. no. 1, pl. xvi. figs. 1–4, Modèle no. 90.
„ „ Brady, 1884, FC. p. 142, pl. ii. figs. 5, 6.
„ „ Schlumberger, 1887, Note sur les *Biloculina bulloides* d'Orb. et *Biloculina ringens* Lam. Bull. Soc. Géol. France, ser. 3, vol. xv. pp. 573–584, pl. xv.
„ „ Egger, 1893, FG. p. 217, pl. i. figs. 16–18.
„ „ Millett, 1898, etc., FM. 1898, p. 263.
„ „ Heron-Allen & Earland, 1913, CI. p. 21.

2 *Stations.*

Occurs very rarely, but small and typical examples were found.

12. **Biloculina elongata** d'Orbigny.

Biloculina elongata d'Orbigny, 1826, TMC. p. 298. no. 4.
Miliola (Biloculina) elongata Parker & Jones, 1865, NAAF. p. 409, pl. xvii. figs. 88, 90, 91.
Biloculina elongata Brady, 1884, FC. p. 144, pl. ii. fig. 9.
" " Schlumberger, 1891, BGF. p. 561, figs. 35, 36, pls. xi. & xii. figs. 87–89.
" " Egger, 1893, FG. p. 220, pl. i. figs. 1–3.
" " Fornasini, 1908, SON. p. 47, pl. iii. figs. 10, 11.
" " Heron-Allen & Earland, 1913, CI. p. 22, pl. i. fig. 4.

3 *Stations.*

Very sparingly distributed. At Stn. 7 the only individual observed was large and microspheric. At the other Stns. they were small and megalospheric.

Spiroloculina d'Orbigny.

13. **Spiroloculina nitida** d'Orbigny.

Spiroloculina nitida d'Orbigny, 1826, TMC. p. 298. no. 4.
" *rotunda* d'Orbigny, ibid. p. 299. no. 14.
" *nitida* Parker, Jones, & Brady, 1859, etc., NF. 1871, p. 248, pl. viii. fig. 24.
" " Brady, 1884, FC. p. 149, pl. ix. figs. 9, 10.
" *complanata* Egger, 1893, FG. p. 225, pl. iii. figs. 7, 8.
" *nitida* Jones, Parker, & Brady, 1866, etc., MFC. 1895, p. 112, pl. v. fig. 3, and text-fig. 6.
" " Millett, 1898, etc., FM. 1898, p. 265, pl. v. figs. 9–13.

8 *Stations.*

Generally distributed, but never abundant. Most of the specimens are of the typical elongate form, the best being at Stn. 9. At Stns. 2 and 6 specimens passing into *S. limbata* d'Orbigny were found. At Stn. 7 the agglutinate type occurs.

14. **Spiroloculina grata** Terquem.

Spiroloculina grata Terquem, 1878, FIR. p. 55, pl. v. figs. 14 *a*–15 *b*.
" " Brady, 1884, FC. p. 155, pl. x. figs. 16, 17, 22, 23.
" *nitida* d'Orbigny (striate var.); Millett, 1898, etc., FM. 1898, p. 266.
" *grata* Egger, 1893, FG. p. 224, pl. i. fig. 39.
" " Chapman, 1900, FLF. p. 171.
" " Heron-Allen & Earland, 1913, CI. p. 24, pl. i. fig. 7.

14 *Stations.*

Generally distributed, especially at the southern Stns., and often abundant. Terquem's specific name is used to designate sulcate Spiroloculinæ of many different types. At Kerimba, as elsewhere, most of the specimens are referable to sulcate or striate forms of the simple type *S. nitida*, but at several Stns., especially Stns. 10 and 12, many specimens might equally well have been treated as sulcate varieties of *S. excavata* and *S. planulata*. At other Stns., notably Stns. 1, 9, and 11, specimens were common in which the sutural lines were so deeply excavate that the shell was

perforated at its two extremities, as shown in Brady's figs. 16, 17, a feature which is more commonly observed in the species *S. acutimargo*. At Stn. 11 the costæ in a few specimens were produced into broad ribs.

In many of the Kerimba specimens the costæ are obliquely set or even undose: this variety passes gradually into *S. foveolata*.

15. **Spiroloculina foveolata** Egger.

Spiroloculina foveolata Egger, 1893, FG. p. 224, pl. i. figs. 33, 34.
„ *nitida* (reticulate variety) Millett, 1898, etc., FM. 1898, p. 266.
„ *foveolata* Heron-Allen & Earland, 1908, etc., SB. 1909, p. 311, pl. xv. fig. 2.
„ *nitida*, var. *foveolata* Chapman, 1900, FLF. p. 171, pl. xix. fig. 4.

7 *Stations*.

Typical specimens are rare in the dredgings, but occur occasionally at many Stns. There is a great range in the nature of their markings, some being regularly reticulate, while others are, in strictness, merely specimens of *S. grata* in which adjacent sulci have become fused together at irregular intervals.

16. **Spiroloculina limbata** d'Orbigny. (Pl. XL. figs. 14–17.)

"Frumentaria *Sigma* et *Rhombos*" Soldani, 1798, Testaceographia, vol. ii. p. 54, pl. xix. fig. *m*.
Spiroloculina limbata d'Orbigny, 1826, TMC. p. 299. no. 12.
„ „ Parker, Jones, & Brady, 1859, etc., NF. 1871, p. 248, pl. viii. fig. 22.
„ *excavata* Jones, Parker, & Brady, 1866, etc., MFC. 1895, p. 107.

13 *Stations*.

The Soldanian figure selected by d'Orbigny as the type of his species *S. limbata* represents an excavate *Spiroloculina* of a particularly well-marked type, which is one of the characteristic forms of the Kerimba dredgings. Regularly oval in shape, with a short produced neck, and bilaterally concave in section, it consists of four to six pairs of inflated chambers with excavate sutural lines. The peripheral edges are highly convex, the highest point of each chamber being on its inner edge, where it dips sharply down into the sutural depression between the two chambers. Occasionally the chambers are rounder in section, so that a sectional view of the shell shows a series of rounded curves. This round-chambered form represents the transition towards *S. nitida*; d'Orbigny's species *S. limbata* may, in fact, be regarded as intermediate between his *S. excavata* and his *S. nitida*. The surface of the test in the Kerimba specimens is always rather rough and unpolished. *S. limbata* occurs at most Stns., generally in considerable numbers, the best being at Stn. 12. At Stns. 2*a*, 6, and 7 it passes gradually into *S. nitida*. At Stn. 13 it passes gradually into *S. excavata* by the flattening of the peripheral margins.

Specimens range between ·7 and 1·1 mm. in length, ·5–1·0 mm. in breadth, and ·3–·5 mm. in thickness of final chamber.

17. **Spiroloculina excavata** d'Orbigny.

Spiroloculina excavata d'Orbigny, 1846, FFV. p. 271, pl. xvi. figs. 19–21.
„ „ Brady, 1865, RFND. p. 93, pl. xii. fig. 1.
„ „ Terquem, 1875, etc., APD. 1875, p. 38, pl. v. fig. 17.
„ *angulosa* Terquem, 1878, FIR. p. 53, pl. x. (v.) fig. 7.
„ *excavata* Brady, 1884, FC. p. 151, pl. ix. figs. 5, 6.
„ „ Jones, Parker, & Brady, 1866, etc., MFC. 1895, p. 106, pl. v. fig. 2, and text-fig. 2.
„ „ Schlumberger, 1893, MGM. p. 59, pl. iii. fig. 68 and text-fig. 1.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 310; 1910, p. 404, pl. vi. fig. 3.

16 *Stations.*

Universally distributed and often abundant. There is an extraordinary range of variation in the Kerimba specimens. The typical *S. excavata* has a nearly flat peripheral edge, but the bulk of our specimens are very rounded, resembling in this respect the specimens figured by Terquem under the name *S. angulosa* d'Orbigny. Terquem's specimens represent a typical *S. excavata*, and, according to Fornasini, with whom we agree (F. 1904, SOF. p. 5, pl. i. fig. 8), differ considerably from the "Planche inédite" of d'Orbigny's *S. angulosa*. This round-edged variety occurs at many Stns. At Stn. 7 specimens intermediate between *S. excavata* and *S. limbata* d'Orbigny occur. At Stn. 11 a specimen was found with a sub-arenaceous investment. Feebly costate individuals occur at many Stns., notably at Stn. 3, and at Stns. ? X and 13, where the peripheral edges were marked by many secondary keels; such specimens may be compared with the *S. bicarinata* and *tricarinata* of the "Planches inédites" (F. 1904, SOF. p. 4, pl. i. figs. 4, 5) and the *S. ornata* of Cuba (d'Orbigny, 1839, FC. p. 167, pl. xii. figs. 7, 7 *a*). At Stn. 11 a typically square-edged specimen with strongly reticulate or foveolate markings was found.

18. **Spiroloculina impressa** Terquem.

Spiroloculina impressa Terquem, 1878, FIR. p. 52, pl. v. (x.) fig. 8.
„ „ Brady, 1884, FC. p. 151, pl. x. figs. 3, 4.
„ „ Millett, 1898, etc., FM. 1898, p. 264.

5 *Stations.*

Very poorly represented, and none of the specimens very typical except at Stn. 1. Terquem's species may be described as an elongate type of *S. excavata* with rounded periphery and limbate sutural lines.

19. **Spiroloculina dorsata** Reuss.

Spiroloculina limbata Bornemann, 1855, FSH. p. 348, pl. xix. fig. 1.
„ *depressa* Williamson, 1858, RFGB. p. 82, pl. vii. fig. 177; var. *rotundata*, ibid. fig. 178; and var. *cymbium*, ibid. fig. 179.
Miliola (*Spiroloculina*) *limbata* Parker & Jones, 1865, NAAF. p. 409, pl. xvii. fig. 83.

Spiroloculina dorsata Reuss, 1870, FSP. p. 464; von Schlicht, 1870, FSP. p. 97, pl. xxxvii. figs. 24–32.
„ *depressa* Terquem, 1875, etc., APD. 1875, p. 38, pl. v. fig. 18.
„ *limbata* Brady, 1884, FC. p. 150, pl. ix. figs. 15–17.
„ *dorsata* Jones, Parker, & Brady, 1866, etc., MFC. 1895, p. 110, text-figs. 4 & 8.

7 *Stations.*

This species, in which the sutural lines are strongly limbate, is poorly represented in the dredgings, very few typical specimens being obtained, the best at Stn. 10. At Stn. 11 individuals passing into *S. limbata* d'Orbigny were found. At Stn. 1 specimens occur of an elongate type resembling Williamson's *S. depressa*, var. *cymbium* (*ut supra*).

The synonymy of this species is unfortunately very confusing. As already explained (under *S. limbata*), d'Orbigny's species of that name is based on a somewhat uncommon type figured by Soldani, which does not really deserve the characteristic description conveyed by its specific name, but is an inflated type midway between *S. nitida* and *S. excavata*. Bornemann (*ut supra*) figured a planulate form with strongly limbate sutures under the same specific name as d'Orbigny. Bornemann's type being of wide distribution, his specific name was used for many years in defiance of the laws of priority, as may be seen in the above synonymy. Reuss (*ut supra*) figured a similar planulate form under the name *dorsata*, and, as Bornemann's name lapses under the rules of priority, Reuss's name must take its place.

20. **Spiroloculina planulata** (Lamarck).

Miliolites planulata Lamarck, 1804, AM. p. 352. no. 4; Lamarck, 1816, etc., ASV. vol. vii. p. 613. no. 4.
Spiroloculina depressa d'Orbigny, 1826, TMC. p. 298. no. 1, Modèle no. 92*.
„ *badenensis* d'Orbigny, 1846, FFV. p. 270, pl. xvi. figs. 13–15.
„ *planulata* Brady, 1884, FC. p. 148, pl. ix. fig. 11.
„ „ Goës, 1894, ASF. p. 107, pl. xviii. fig. 836.
„ „ Parker, Jones, & Brady, 1866, etc., MFC. 1895, p. 103, pl. iii. figs. 37, 38, woodcut fig. 1.

12 *Stations.*

Generally distributed and often abundant, but good typical specimens of the flat parallel-faced type resembling the *S. depressa* of d'Orbigny are not very abundant. The tendency is to pass into excavate forms such as *S. angulosa* d'Orbigny (q. v. sub *S. excavata*, No. 17). There is also a marked tendency at certain Stns. (especially 1, 4, 7, 9, and 12) to develop surface-markings varying from a few scattered and irregular costæ to a generally irregular costation comparable with Terquem's *S. costigera*

* D'Orbigny has identified Modèle no. 92 with his no. 2 (p. 298), *S. perforata*. This appears to be a misprint, the correct reference of the Modèle being to no. 1, *S. depressa*, which = *S. planulata* (see P. J. & B. 1859, etc. NF. 1865, p. 33).

(T. 1882, FEP. p. 159, pl. xvi. (xxiv.) fig. 24). At Stns. 1 and 2 abnormal specimens were found in which the axis of growth changed radically at an intermediate stage, proceeding at a right angle to the original plane.

21. **Spiroloculina planissima** (Lamarck). (Pl. XLI. figs. 1–5.)

Miliolites planulata, var. *planissima* Lamarck, 1816, etc., ASV. 1822, p. 613. no. 4 *c*.
„ „ Parker, Jones, & Brady, 1859, etc., NF. 1860, p. 470, no. 25.
Spiroloculina planulata Jones, Parker, & Brady, 1866, etc., MFC. 1895, pp. 103, 104.
„ *compressiuscula* Karrer, 1867, FO. p. 28, pl. ii. fig. 4.
„ *tenuirostra* Karrer, ibid. fig. 5.
„ *planissima* Wiesner, 1912, AM. p. 209.

9 *Stations.*

Lamarck divides his species *Miliolites planulata* into three forms (*a*, *b*, and *c*)—the first (*a*) being typical *S. planulata*, the second (*b*) apparently *S. nitida*, the third (*c*) var. *planissima* described as "*margine carinata.*" This description, short as it is, seems quite sufficient to identify the form with a type which is abundant in many of the Kerimba dredgings, and which we now figure. The shell is of a normal *planulata* type, with, in the young specimens, a sharp marginal keel to both of the peripheral chambers. With an increase in size the final chamber tends to become bicarinate, thus passing into the normal *S. planulata*. This bicarination of the final chamber is easily traced in our specimens by a number of examples, of which we figure one in which the second carina extends over only half the length of the shell. This second carina begins sometimes at the oral and sometimes at the aboral end of the shell. The texture is porcellanous, but seldom highly polished. The form may in its extreme tenuity be compared with the *S. compressiuscula* of Karrer (*ut supra*), which, however, differs in having a rounded edge to the peripheral chambers, and with the same author's *S. tenuirostra* (*ut supra*), which has a sharp edge but involute chambers, and is thicker at the middle of the shell than at the periphery. The *S. papyracea* of Burrows, Sherborn, and Bailey (B. S. & B. 1890, RC. p. 551, pl. viii. fig. 1) is a similarly compressed form and apparently identical with Karrer's *S. compressiuscula*.

The type is not very generally distributed, but occurs in considerable numbers at some Stns., especially at Stns. 3 & 9.

Specimens average 1·0–1·7 mm. in length, ·5–1·0 mm. in breadth, and ·1–·2 mm. in thickness.

22. **Spiroloculina tenuis** (Czjzek).

Quinqueloculina tenuis Czjzek, 1848, FWB. p. 149, pl. xiii. figs. 31–34.
„ „ Reuss, 1849–50, FOT. p. 385, pl. v. (1.) fig. 8.
Spiroloculina tenuis Brady, 1884, FC. p. 152, pl. x. figs. 7–11 (References).
Miliolina tenuis Brady, 1887, SBRF. p. 882.
Spiroloculina tenuis Egger. 1893, FG. p. 222, pl. i. figs. 46, 47.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 310.

5 *Stations.*

This beautiful little species occurs very sparingly at a few Stns., but the specimens are very characteristic. At Stn. 3 a specimen was observed presenting the peculiar sigmoid curve and compressed form characteristic of the species, but with a finely striate test.

22 *a*. **Spiroloculina acutimargo** Brady.

Spiroloculina acutimargo Brady, 1884, FC. p. 154, pl. x. figs. 12–15.
„ „ Balkwill & Wright, 1885, DIS. p. 323, fig. 1 *a–c*.
„ „ Egger, 1893, FG. p. 222, pl. i. figs. 26–28.
„ „ Heron-Allen & Earland, 1913, CI. p. 24, pl. i. fig. 8.

1 *Station.*

A very finely-developed specimen at Stn. 11, exhibiting the characteristic lacunæ at the extremities of the chambers.

23. **Spiroloculina crenata** Karrer. (Pl. XLI. figs. 6–8.)

Spiroloculina crenata Karrer, 1868, MFKB. p. 135, pl. i. fig. 9.
„ „ Brady, 1884, FC. p. 156, pl. x. figs. 24–26.
„ „ Egger, 1893, FG. p. 225, pl. i. figs. 42, 43.
„ „ Millett, 1898, etc., FM. 1898, p. 265.

9 *Stations.*

Generally distributed, but never abundant except at Stn. 6. Nearly all the specimens found represent the milioline form of the shell, spiroloculine specimens occurring at a few Stns. only, and in very small numbers. It is noticeable that the milioline form, which we figure, is always very much larger than the spiroloculine, which, at Kerimba, is always very small. This would appear to show that the two forms represent the dimorphic conditions of the species. If so, it is probable that the milioline form, which is presumably microspheric, never assumes a spiroloculine condition.

Miliolina Williamson.

(Group of *M. circularis.*)

24. **Miliolina circularis** (Bornemann).

Triloculina circularis Bornemann, 1855, FSH. p. 349, pl. xix. fig. 4.
„ „ Jones, Parker, & Brady, 1866, etc., MFC. 1895, p. 121, pl. v. fig. 4.
Miliolina circularis Brady, 1884, FC. p. 169, pl. iv. fig. 3, pl. v. figs. 13, 14 (?).
„ „ Egger, 1893, FG. p. 235, pl. ii. figs. 61–63.
„ „ Millett, 1898, etc., FM. 1898, p. 499, pl. xi. figs. 1–3.
„ „ Heron-Allen & Earland, 1913, CI. p. 26.

16 *Stations.*

Almost universally distributed and often abundant, presenting as usual great range of variation from Bornemann's neat original type into outspreading forms linking

the species with *M. subrotunda*. Biloculine, triloculine, and quinqueloculine specimens occur. As Millett has pointed out (*ut supra*), the biloculine form is the *Biloculina ventruosa* of Reuss (R. 1867, FSW. p. 69, pl. i. fig. 9), whilst the quinqueloculine form is hardly distinguishable from *M. subrotunda* (Montagu). He also identifies the species with *Triloculina enoplostoma*, var. *grammostomum* Reuss (*op. cit.* p. 72, pl. ii. fig. 5).

25. **Miliolina circularis,** var. **sublineata** Brady. (Pl. XLI. figs. 9–11.)

Miliolina circularis, var. *sublineata* Brady, 1884, FC. p. 169, pl. iv. fig. 7.
" " " Millett, 1898, etc., MFM. 1898, p. 501, pl. xi. fig. 4.
" " " Egger, 1893, FG. p. 237, pl. ii. figs. 78, 79.
" " " Heron-Allen & Earland, 1913, CI. p. 26.

10 *Stations.*

Generally distributed and often very abundant, especially a large thick-shelled type with coarse sulci, not always extending over the whole shell, recalling *M. seminuda* (Reuss). Specimens with cribrate apertures were found at Stns. 6, 10, and ? A, all belonging to a small thin-shelled type closely resembling Millett's figure (*ut supra*) except in their small size as compared with the normal specimens. Millett states that his cribrate specimens considerably exceeded in size the specimens of *M. circularis* with which they were associated.

26. **Miliolina circularis,** var. **cribrostoma,** nov. (Pl. XLI. figs. 12–16.)

3 *Stations.*

At three Stns. specimens of a Miliolid of the *circularis* type, but having a large and projecting cribrate aperture, were found. They are all of a very inflated triloculine type, and the cribrate shell-mass closing the aperture forms an inflated cushion projecting from the top of the shell and extending down the sutural lines on both faces of the test as far as the point of intersection of the chambers. Millett figures a somewhat similar but more regular type of aperture as *M. circularis*, var. *sublineata* (M. 1898, etc., FM. 1898, p. 501, pl. xi. fig. 4).

Cribrate apertures are of rare occurrence in the recent Miliolinæ, but of more frequent occurrence in fossil species. Munier-Chalmas and Schlumberger have dealt at some length with the fossil forms (Bull. Soc. Géol. France, 1885 and 1905). They attribute a structural importance to this character of aperture which does not appear to be borne out by more general research. It seems probable that the cribrate aperture may be assumed at times by many species which do not invariably present it (*vide sub* No. 25). Among species characterised by this pronounced form of aperture are *Q. fabularoides* Karrer and *Miliolina alveoliniformis* Brady. Compare also *Massilina alveoliniformis* Millett (*post* No. 90).

The length and breadth of the specimens are about equal, averaging ·3–·4 mm.

27. **Miliolina valvularis** (Reuss).

Triloculina valvularis Reuss, 1851, FSUB. p. 85, pl. vii. fig. 56.
Miliolina valvularis Brady, 1884, FC. p. 161, pl. iv. figs. 4, 5.
„ „ Goës, 1894, ASF. p. 115, pl. xxii. fig. 871.
„ „ Millett, 1898, etc., FM. 1898, p. 501, pl. xi. figs. 5–7.
„ „ Flint, 1899, RFA. p. 299, pl. xliv. fig. 5.
„ „ Chapman, 1900, FLF. p. 172.

4 *Stations.*

Sparingly distributed, but fairly abundant, especially at Stn. ? X. The shells are all thin-walled and very variable, biloculine, triloculine, and quinqueloculine specimens all occurring, the triloculine being the most abundant.

28. **Miliolina dilatata** (d'Orbigny).

Quinqueloculina dilatata d'Orbigny, 1839, FC. p. 192, pl. xi. figs. 28–30.
„ „ Schlumberger, 1893, MGM. p. 75, text-figs. 29, 30, pl. iii. figs. 70–74, pl. iv. figs. 87–90.
Miliolina dilatata Wiesner, 1912, AM. p. 231.

3 *Stations.*

Good examples of this compressed form of *M. subrotunda* occur at Stns. 2 *b*, 8, and ? X, in company with the type. In material containing such wide variations of the type-species, it appears to be desirable, for purposes of taxonomy, to separate such a distinctive form.

29. **Miliolina labiosa** (d'Orbigny).

Triloculina labiosa d'Orbigny, 1839, FC. p. 178, pl. x. figs. 12–14.
Miliolina labiosa Brady, 1884, FC. p. 170, pl. vi. figs. 3–5.
„ „ Millett, 1898, etc., FM. 1898, p. 502, pl. xi. figs. 8, 9.
„ „ Flint, 1899, RFA. p. 299, pl. xlv. fig. 3.
„ „ Chapman, 1900, FLF. p. 173.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 10.

12 *Stations.*

Generally distributed and often fairly abundant. As usual, the specimens are very variable, often only separable from *Nubecularia bradyi* Millett, by the character of their aperture. The best specimens were at Stns. 8, 9, 12, and ? X.

30. **Miliolina subrotunda** (Montagu).

Vermiculum subrotundum Montagu, 1803, TB. pt. 2, p. 521.
„ „ Fleming, 1822, OSGV. p. 565, pl. xv.
Quinqueloculina subrotunda d'Orbigny, 1826, TMC. p. 302, no. 36.
Miliola (*Quinqueloculina*) *subrotunda* Parker & Jones, 1865, NAAF. p. 411, pl. xv. fig. 38 *a*, *b* (28 *a* & *b* on plate).
Miliolina subrotunda Brady, 1884, FC. p. 168, pl. v. figs. 10, 11.
„ „ Jones, Parker, & Brady, 1866, etc., MCF. 1895, p. 120, text-fig. 9.
„ „ Goës, 1894, ASF. p. 109, pl. xix. figs. 846, 847.

16 *Stations.*

Universally distributed, but never abundant. Good and typical specimens at Stns. 7, 9, 13, and ? X. At the other Stns. the specimens are, as a rule, weak, passing into the allied forms *M. valvularis* (Reuss) and *M. dilatata* (d'Orbigny).

31. **Miliolina seminuda** (Reuss).

Quinqueloculina seminuda Reuss, 1866, FABS. p. 125, pl. i. fig. 11.
„ „ Terquem, 1878, FIR. p. 76, pl. ix. (xiv.) fig. 8.
Miliolina subrotunda (Montagu), var., Wright, 1885–6, BLP. p. 319, pl. xxvi. fig. 5.
„ *seminuda* Earland, 1905, FBS. p. 195.
„ „ Heron-Allen & Earland, 1913, CI. p. 27.

6 *Stations.*

Poorly represented and none of the specimens very typical, most of them being nearer to *M. circularis* and *M. rotunda* than to the *subrotunda* group. Some confusion has arisen in the synonymy of the species, owing to the fact that Terquem claimed its authorship in 1878, ignoring Reuss's earlier figure and description.

32 (*a*). **Miliolina webbiana** (d'Orbigny).

Triloculina webbiana d'Orbigny, 1839, FIC. p. 140, pl. iii. figs. 13–15.
Miliolina fichteliana Brady, 1884, FC. p. 169, pl. iv. fig. 9.
Quinqueloculina suborbicularis Schlumberger, 1893, MGM. p. 73, pl. ii. figs. 63, 64, pl. iii. fig. 67, text-figs. 26–28.
Miliolina suborbicularis Millett, 1898, etc., FM. 1898, p. 502, pl. xi. fig. 13.

33 (*b*). **Miliolina fichteliana** (d'Orbigny).

Triloculina fichteliana d'Orbigny, 1839, FC. p. 171, pl. ix. figs. 8–10.

34 (*c*). **Miliolina suborbicularis** (d'Orbigny).

Triloculina suborbicularis d'Orbigny, 1826, TMC. p. 300. no. 12.
„ „ d'Orbigny, 1839, FC. p. 177, pl. x. figs. 9–11.
Miliolina suborbicularis Heron-Allen & Earland, 1908, etc., SB. 1911, p. 304.

10 *Stations.*

These three species, all described and figured in the same year by d'Orbigny, are so closely related that the question of their specific separation can only be entertained for purposes of taxonomy and convenience when dealing with material which contains all three types in considerable quantities.

Taking *M. webbiana* as the strongest and most characteristic form, it may briefly be described as a sulcate form of *M. subrotunda*. *M. fichteliana* is characterised by much more turgid chambers and feebler striation, nearer, in fact, to *M. circularis*. *M. suborbicularis* is, as it were, midway between the two, but very faintly striate, the chambers being but slightly turgid and markedly embracing. The synonymy of the

three species, as might be expected, becomes highly involved when the figures of different authors are compared with the original type. Schlumberger's figures of *M. suborbicularis* are typical *M. webbiana*. Millett's *M. suborbicularis* is *M. webbiana* as regards the coarseness of its striation, while nearer d'Orbigny's type in the embracing character of the chambers.

All three types occur at Kerimba, but *M. webbiana* is by far the most abundant, as in our experience it is elsewhere. This species is generally distributed, but the number of specimens at any particular Stn. is never large; it is best and most abundant at Stn. 11. *M. fichteliana* is extremely limited, but is the sole representative of the group at Stns. ? B and 13, and is well developed and moderately abundant at Stn. ? X, where the other forms are rare and poor. *M. suborbicularis* is extremely rare, but typical specimens were found at a few Stns.

With regard to the reference to Schlumberger, 1893, MGM., *supra*, the author, in referring his specimens to *Quinqueloculina suborbicularis*, on account of their presenting five visible chambers instead of the three represented in d'Orbigny's type, *Triloculina suborbicularis*, appears to have overlooked the fact that d'Orbigny had already utilized this specific name for an entirely different quinqueloculine miliolid *Quinqueloculina suborbicularis* (TMC. p. 302, no. 29), which is a smooth-shelled form, apparently in no way related to the triloculine striate form. An inspection of the types both at La Rochelle and in Paris entirely bears this out.

(Group of *M. trigonula*.)

35. **Miliolina trigonula** (Lamarck).

Miliolites trigonula Lamarck, 1804, etc., AM. 1804, vol. v. p. 351. no. 3.
„ „ Lamarck, 1816, etc., ASV. vol. vii. p. 612 ; 1835, etc. vol. xi. p. 290. no. 3.
Triloculina trigonula d'Orbigny, 1826, TMC. p. 299. no. 1, pl. xvi. figs. 5–9, Modèle no. 93.
Miliolina trigonula Williamson, 1858, RFGB, p. 84, pl. vii. figs. 180–182.
„ „ Brady, 1884, FC. p. 164, pl. iii. figs. 14–16.
„ „ Goës, 1894, ASF. p. 115, pl. xxii. fig. 870.

17 *Stations.*

Universally distributed, and at most Stns. showing considerable variation, the species running imperceptibly into *M. tricarinata*. The difficulty of separating the two forms is greatest at those Stns. (*e. g.*, 5, 6, 7, 10, and 12) where the species reaches its maximum development in size, the young specimens in both species being, as a rule, more typical than the larger ones. At Stns. 2, 3, and 13 the species exhibits a dehiscent tendency, very marked in occasional specimens, in which the final chambers are separated by deep grooves from the earlier ones, suggesting the *Triloculina plicata* of Terquem (T. 1878, FIR. p. 61, pl. vi. (xi.) fig. 2). At Stns. 1, 8, and 9 specimens irregularly sulcate in the neighbourhood of the aboral extremity of the final chamber occurred. At Stn. 13, where the species was very variable,

specimens near *T. marioni* Schlumberger (S. 1893, MGM. p. 62, pl. i. figs. 38–41, text-figs. 7, 8) were seen, and also a single specimen resembling *M. rotunda* in the character of its aperture. Specimens referable to *T. gibba* d'Orbigny (d'O. 1846, FFV. p. 274, pl. xvi. figs. 22–24) occurred at many Stns. At Stn. 9 a specimen in which the final chamber divided into two, each furnished with a normal aperture side by side at the same extremity of the shell, was found.

36. **Miliolina insignis** Brady.

Miliolina insignis Brady, 1879, etc., RRC. 1881, p. 45.
„ „ Brady, 1884, FC. p. 165, pl. iv. figs. 8, 10.
„ „ Wright, 1885–6, BLP. p. 319, pl. xxvi. fig. 4.

4 *Stations.*

Occurs at a few Stns. only, the best at Stn. 11. All the Kerimba specimens belong to a somewhat inflated type, with a more elongated axis than is shown in Brady's figure.

37. **Miliolina tricarinata** (d'Orbigny).

Triloculina tricarinata d'Orbigny, 1826, TMC. p. 299, no. 7, Modèle no. 94.
Cruciloculina triangularis d'Orbigny, 1839, FAM. p. 72, pl. ix. figs. 11, 12.
Triloculina tricarinata Brady, 1864, RFS. p. 466, pl. xlviii. fig. 3.
Miliolina tricarinata Brady, 1884, FC. p. 165, pl. iii. fig. 17.
„ (*Triloculina*) *tricarinata* Egger, 1893, FG. p. 234, pl. ii. figs. 35–37.
„ *tricarinata* Goës, 1894, ASF. p. 114, pl. xxi. figs. 866–869.
„ „ Chapman, 1907, TFV. p. 18, pl. ii. fig. 31.

15 *Stations.*

Generally distributed, but, on the whole, less abundant than the allied species *M. trigonula*. Two very distinct forms occur in the material, not usually at the same Stns. : (i.) the typical *M. tricarinata*, characterised by a somewhat long shell with acute marginal edges, resembling d'Orbigny's model (*ut supra*) and his species *T. angularis* (d'O. 1826, TMC. p. 299, no. 6), occurs abundantly and of very fine dimensions at Stns. 11 and 12, less frequently at Stns. 5 and 6, and rarely at Stns. 2 *a* and 7 ; (ii.) a shorter, broader form with rounded marginal keels as figured by Chapman (*ut supra*), and generally attaining a larger size than the typical *M. tricarinata*, is much more generally distributed, but does not occur at all at Stns. 11 and 12. At Stn. 2 *a* a single individual of the elongate type was observed with rounded keels. The short round-edged type, at all Stns. where it occurs, has a tendency to pass imperceptibly into *M. trigonula*.

38. **Miliolina tricarinata,** var. **plicata** (Terquem). (Pl. XLI. figs. 17–22.)

Triloculina plicata Terquem, 1878, FIR. p. 61, pl. vi. (xi.) fig. 2.

13 *Stations.*

At nearly all the Stns. *M. tricarinata* shows a tendency to separation of the later

chambers, which in the most advanced cases (especially at Stns. 2 *a* and 4) are separated from their predecessors by deep sutural clefts. Such specimens may, for purposes of classification, be separated under the name of Terquem's species; they probably represent a passage-form between *M. tricarinata* and *M. contorta*. Karrer's *Triloculina intermedia* (K. 1868, MFKB. p. 138, pl. i. fig. 11) represents this dehiscent form in a less advanced degree, as also does Costa's figure of *Triloculina decipiens* Reuss (C. 1853, etc., PRN. 1856, pl. xxiv. figs. 13 & 16), which, however, differs greatly from the original figure of that species as given by Reuss (R. 1849–50, FOT. p. 382, pl. iv. (xlix.) fig. 8).

39. **Miliolina tricarinata,** var. **serrata,** nov. (Pl. XLI. figs. 23–25.)

2 *Stations.*

At Stns. 7 and ?X a few specimens were found of a very beautiful little variety (which we figure), in which the marginal edges of the chambers were furnished with regular serrate processes. They represent a somewhat dehiscent type of *M. tricarinata*, in which four chambers are exposed round the circumference of the test. Somewhat similar forms are figured by Brady, Parker, & Jones (B. P. & J. 1888, AB. p. 215, pl. xl. fig. 33) under the name *M. excisa*, and by Millett (M. 1898, etc., FM. 1904, p. 607, pl. xi. fig. 4), but these specimens are quinqueloculine instead of triloculine as are ours.

Length averages ·25–·35 mm., breadth ·18–·25 mm.

40. **Miliolina terquemiana** Brady. (Pl. XLI. figs. 26–31.)

Miliolina terquemiana Brady, 1884, FC. p. 166, pl. cxiv. fig. 1.
„ *tricarinata* (striate var.) = *M. terquemiana* Millett, 1898, etc., FM. 1898, p. 503, pl. xi. figs. 10, 11.
„ „ var. *terquemiana* Chapman, 1900, FLF. p. 174.
„ *terquemiana* Dakin, 1906, FC. p. 230, pl. figs. 9, 10.

5 *Stations.*

Scantily represented, most abundant at Stn. 1. This is only a sulcate condition of *M. tricarinata*, and bears the same affinity to that species as does *M. insignis* to *M. trigonula*.

Two forms occur, one a long narrow form with acute marginal periphery recalling the *M. funafutiensis* of Chapman, the other resembling Brady's figure, but with more inflated chambers, *i. e.* presenting a general conformation intermediate between *M. tricarinata* and *M. trigonula*.

41. **Miliolina bertheliniana** Brady. (Pl. XLI. figs. 32–35.)

Miliolina bertheliniana Brady, 1884, FC. p. 166, pl. cxiv. fig. 2.
„ *tricarinata* (reticulated form) = *M. bertheliniana* Millett, 1898, etc., FM. 1898, p. 503, pl. xi. fig. 12.
„ „ var. *bertheliniana* Chapman, 1900, FLF. p. 174.

9 *Stations.*

Generally distributed, frequent at a few Stns. and very common at Stn. 11. The specimens throughout are generally identical with Brady's figure, but at Stn. 11 there is a considerable amount of variation. The majority of the specimens are of the short regularly tricarinate type, but here, and at Stn. ? B, a few specimens of a very elongate type were found. Brady recorded the species from Madagascar and Algoa Bay, and Millett as "very rare" in the Malay Seas. It occurs rarely in dredgings from Cebu, Philippine Islands, 45 and 120 fathoms, and is probably of wide distribution in tropical shallow seas.

(Group of *M. cultrata* [edentate].)

42. **Miliolina cultrata** Brady. (Pl. XLII. figs. 1–10.)

Miliolina cultrata Brady, 1879, etc., RRC. 1881, p. 45.
„ „ Brady, 1884, FC. p. 161, pl. v. figs. 1, 2.
„ „ Egger, 1893, FG. p. 231, pl. ii. figs. 29–31.
„ „ Millett, 1898, etc., FM. 1898, p. 269, pl. vi. figs. 11, 12.

16 *Stations.*

Universally distributed and often abundant. In Brady's original figure and in the subsequent authorities (*supra*) the early chambers are shown as vertical or but slightly oblique. In the Kerimba specimens a complete series can be obtained at many Stns. in which the early chambers range from vertical to very oblique [as in *M. bosciana* (d'Orbigny)]. Wiesner (W. 1912, AM. pp. 220–222, fig. 2) has separated the Malay specimens of *M. bosciana* (d'Orb.), figured by Millett, under the new specific name *M. milletti* on account of "the narrow build, the strongly-marked oblique setting of the middle chambers, the large aperture with prominent lip, the frequently produced aperture-neck, the deeper sutures, its slighter polish, and the greater inclination to build cornered and keeled varieties." He has further separated under the varietal name of *M. milletti*, var. *carinata*, keeled specimens identical with the series found at Kerimba, and which appear to us to agree in all essential characteristics, except the oblique setting of the chambers, with Brady's *M. cultrata*. In view of the complete range of variations in the axis of the early chambers, it does not seem to us possible or desirable to differentiate between Wiesner's varieties and Brady's type, and we have therefore dealt with the whole group under the above heading.

At nearly all the Stns. where the species occurs, decorated varieties are abundant, ranging between specimens feebly sulcate at the aboral extremity to specimens strongly sulcate all over. These latter represent Wiesner's variety *M. milletti*, var. *carinata-striata*, with specimens of which he has been so courteous as to supply us.

43. **Miliolina durrandii** Millett. (Pl. XLII. figs. 11–16.)

Miliolina durrandii Millett, 1898, etc., FM. 1898, p. 268, pl. vi. figs. 7–10.

9 *Stations.*

Generally distributed and often quite common, the finest specimens at Stns. 5, 6, and 7, where it was abundant. There is a certain amount of variation in this species, especially in the degree of development of the keel, but none of the costate specimens referred to and described by Millett occur at Kerimba. The development of the keel appears to be dependent on the stage of growth, the younger shells having a much more rounded edge than the older ones, a feature that is particularly noticeable in the smallest specimens, in which the keel is almost entirely absent, except near the aperture. In very young shells there is a rapid increase in the length of the chamber, with the result that the ultimate chamber is often more than double the entire length of the preceding chamber.

M. durrandii is one of the species first recorded from the Malay Seas by Millett, but it is probably very widely distributed in shallow tropical waters. We have records from the coasts of Burmah, Queensland, Java, and Macassar in the eastern seas, and in the Pacific it is very abundant and typical at Tahiti. Owing to the absence of any tooth to the aperture, the internal arrangement of the shell is strikingly monothalamous or cornuspirine. This internal arrangement is quite similar to that described and figured by Schulze in his *Spiroloculina hyalina* (S. 1874, etc., R. no. 3, 1875, p. 132, pl. vi. figs. 14–16), and is clearly brought out in Millett's fig. 10. We have specimens (which are being figured elsewhere) showing ingested diatoms and small specimens of other foraminifera (H-A. 1915, RPF. p. 232, pl. xiv. figs. 5, 6).

44. **Miliolina rupertiana** Brady.

Miliolina rupertiana Brady, 1879, etc., RRC. 1881, p. 46.
„ „ Brady, 1884, FC. p. 178, pl. vii. figs. 7–12 and text-fig.
„ „ Millett, 1898, etc., FM. 1898, p. 269, pl. vi. fig. 13.

10 *Stations.*

This highly specialised type is generally distributed over the area and fairly plentiful at some of the Stns., notably Stns. 1 and 13. The specimens often attain a very large size, and, as a rule, are of a narrower and more inflated type than that figured by Brady, the marginal edge being at most of the Stns. quite round and smooth, thus more nearly resembling Millett's figure. At several Stns., however, specimens were found exhibiting a tendency to a compressed and carinate form, which was, in a few instances, quite as strongly developed as in Brady's figs. 7 and 9. *M. rupertiana* is extremely common at Perim in the Red Sea. It also occurs in the Torres Straits and on the Queensland coast. Brady records it as plentiful from Madagascar.

(Group of *M. oblonga*.)

45. **Miliolina bosciana** (d'Orbigny).

Quinqueloculina bosciana d'Orbigny, 1839, FC. 191, pl. xi. figs. 22–24.
Miliolina bosciana Millett, 1898, etc., FM. 1898, p. 267, pl. vi. fig. 1.
„ „ Chapman, 1900, FLF. p. 177, pl. i. fig. 7.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 7.

10 *Stations.*

This very variable species is almost universally distributed and often very common. At most of the Stns. the specimens are of the smooth typical form, but agglutinate tests were found at Stn. 1, feebly striate at Stn. 2 *a*, and a single punctate specimen at Stn. 7. These varieties have been admirably figured and described by Millett (*loc. cit. ut supra*).

46. **Miliolina transversestriata** Brady. (Pl. XLII. figs. 17–20.)

Miliolina transversestriata Brady, 1879, etc., RRC. 1881, p. 45.
„ „ Brady, 1884, FC. p. 177, pl. iv. fig. 6.
„ „ Millett, 1898, etc., FM. 1898, p. 268, pl. vi. fig. 5.

12 *Stations.*

Generally distributed and often common, especially at Stns. 1, 3, 4, and 6. The specimens exhibit very little variation, except in the strength of their markings. Records of the species appear to be few: Brady gives Raine Island and Mauritius, but we have specimens from Havana and from the Great Barrier Reef, so that it is probably widely distributed in tropical shallow waters.

47. **Miliolina funafutiensis** Chapman. (Pl. XLII. figs. 21, 22.)

Miliolina funafutiensis Chapman, 1900, FLF. p. 178, pl. xix. fig. 6.
„ „ Chapman, 1902, CKA. p. 231.

1 *Station.*

A single specimen from Stn. 11, which we figure, suggests this species, but differs in some particulars from Chapman's description. It is nearly oval in section instead of triangular, but resembles the type in the character of its oblique markings and produced aperture. Chapman's types were from the Lagoon at Funafuti ($7\frac{1}{2}$–12 fms.) and Cocos Keeling Atoll (outside the reef). The species is common and typical in a dredging from Apia Harbour, Samoa (7 fms.).

48. **Miliolina oblonga** (Montagu).

Vermiculum oblongum Montagu, 1803, TB. p. 522, pl. xiv. fig. 9.
„ „ Fleming, 1822, OSGV. p. 565.
Triloculina oblonga d'Orbigny, 1826, TMC. p. 300. no. 16, Modèle no. 95.
„ „ d'Orbigny, 1839, FC. p. 175, pl. x. figs. 3–5.

Miliolina seminulum, var. *oblonga* Williamson, 1858, RFGB. p. 86, pl. vii. figs. 186, 187.
,, *oblonga* Jones, Parker, & Brady, 1866, etc., MFC. 1895, p. 120, pl. iii. figs. 31 & 32, and pl. v. fig. 5.
,, ,, Terrigi, 1880, SGP. p. 173, pl. i. fig. 2.
,, ,, Goës, 1894, ASF. p. 110, pl. xx. figs. 850, *a–f*.
,, ,, Millett, 1898, etc., FM. 1898, p. 267, pl. v. fig. 14.

16 *Stations.*

Universally distributed and often abundant, but never attaining any large size or development. The best specimens at Stn. 3. At Stns. 9 and 12 the specimens were large and showed signs of superficial markings linking the species with *M. striata*.

49. **Miliolina gracilis** (d'Orbigny).

Triloculina gracilis d'Orbigny, 1839, FC. p. 181, pl. xi. figs. 10–12.
Miliolina gracilis Brady, 1884, FC. p. 160, pl. v. fig. 3.
,, ,, Egger, 1893, FG. p. 231, pl. ii. figs. 32–34.
,, ,, Sidebottom, 1904, etc., RFD. 1904, p. 14, pl. iv. figs. 10–12.

2 *Stations.*

A single typical specimen at Stn. 10 and a few at Stn. ? B.

50. **Miliolina pygmæa** (Reuss).

Quinqueloculina pygmæa Reuss, 1849–50, FOT. p. 384, pl. v. (l.) fig. 3.
,, *lucida* Karrer, 1868, MFKB. p. 147, pl. ii. fig. 7.
Miliolina pygmæa Brady, 1884, FC. p. 163, pl. cxiii. fig. 16.
,, ,, Egger, 1893, FG. p. 230, pl. ii. figs. 23–25.
,, ,, Sidebottom, 1904, etc., RFD. 1904, p. 13, pl. iv. figs. 4–6.
,, ,, Heron-Allen & Earland, 1908, etc., SB. 1909, p. 312.

5 *Stations.*

Very poorly represented in the material; all the specimens differ somewhat from Reuss's figure in having a produced neck, and are, perhaps, more related to the allied *M. lucida* (Karrer), which is cited by Brady as a synonym of Reuss's species. According to Brady the species is a rather deep-water form.

51. **Miliolina exsculpta,** sp. n. (Pl. XLII. figs. 23–26.)

6 *Stations.*

Test free, minute, thin-walled, often opalescent, having three chambers visible on one face and four or more on the other. Sutural lines deeply excavate and undercut, especially at the extremities of the shell. Chambers embracing, and crescentic in section, the individual chambers being narrow at the oral extremity and very broad and embracing at the aboral end of the shell. Furnished with a somewhat produced neck, sometimes lipped, and terminating in a toothless aperture regularly and constantly crescentiform. Surface highly polished, peripheral edges rounded. The chambers are

set somewhat obliquely, so that the general arrangement is on the same plan as in *M. bosciana*. In young specimens the chambers are often divided from each other at the oral and aboral extremities by an open space between them, which perforates the entire test as shown in Brady's figures of *Spiroloculina acutimargo* Brady and *S. grata* Terquem.

The appearance of this little shell is strikingly constant and characteristic, the sutures, which in most miliolids are marked by slight depressions or by flush or even limbate sutural lines, being entirely absent. The whole shell suggests a simple tube of crescentiform section, invariably narrowing towards the apertural end of each chamber, and coiled on itself in milioline fashion. It is this narrowing which gives the transverse arrangement of the early chambers as compared with the final pair. Our species is to some extent isomorphous with *Spiroloculina acutimargo* Brady, but differs from that form in the rounded and embracing character of its chambers, the entire absence of any keel, and the milioline plan of growth. Its affinities in the milioline group are with *M. gracilis* (d'Orb.).

The species is fairly generally distributed, but never very abundant, the best and most numerous examples being found at Stn. 5. It also occurs at Vavau, Friendly Is., Pacific, 16 fms.

Length averages ·3–·55 mm., breadth ·18–·24 mm.

52. **Miliolina rotunda** (d'Orbigny). (Pl. XLII. figs. 27–30.)

Triloculina rotunda d'Orbigny, 1826, TMC. p. 299. no. 4.
„ „ Schlumberger, 1893, MGM. p. 64, pl. i. figs. 48–50; text-figs. 11, 12.
Miliolina rotunda Millett, 1898, etc., FM. 1898, p. 267, pl. v. figs. 15, 16.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 8.
„ „ Heron-Allen & Earland, 1913, CI. p. 25.
„ „ Wiesner, 1912, AM. p. 225.

11 *Stations.*

Not very common except at Stns. 3, 12, and ? X, where the specimens were large, typical, and very abundant. At Stns. 1 and 11 a smaller type occurs similar to Millett's Malay figures, and, like those, very variable, both biloculine and triloculine specimens (but chiefly the former) occurring. This small and variable type differs considerably from the large d'Orbignyan type in its shell-texture. The large type has a smooth, thick, and highly polished surface; while the shell in the small type is thin, irregular in surface, or marked with lines of growth, and often matt or even sclerotic.

53. **Miliolina anconensis** (Schultze).

Miliola anconensis Schultze, 1854, OP. p. 58, pl. ii. figs. 12, 13.

10 *Stations.*

This rather well-marked type, with its triloculine test and large gaping mouth,

usually furnished with a recurved lip, is universally distributed in the dredgings. There is great variation in the shells, some of which are almost biloculine. The texture is almost invariably rather uneven, but polished. The species appears to occupy an intermediate position between *M. rotunda* and *M. seminulum*; it was specially noted at the Stns. indicated in the table as being typical and perfect, but it occurs almost universally in company with the type-forms of *M. seminulum*.

53 *a*. **Miliolina cuneata** (Karrer).

Triloculina cuneata Karrer, 1867, FO. p. 359, pl. ii. fig. 8.
„ „ (Biloculine form), Brady, 1884, FC. p. 139, pl. i. figs. 19, 20.

3 *Stations.*

At three Stns. biloculine specimens, similar to those figured by Brady, occur. They agree in all respects with Brady's specimens in the collection at Cambridge.

54. **Miliolina vulgaris** (d'Orbigny).

Quinqueloculina vulgaris d'Orbigny, 1826, TMC. p. 302. no. 33.
„ „ Terquem, 1878, FIR. p. 66, pl. vi. (xi.) figs. 20, 21.
„ „ Schlumberger, 1893, MGM. p. 65, pl. ii. figs. 65, 66, & woodcuts 13, 14.
„ „ Fornasini, 1902, FLR. p. 21, text-fig. 13.
Miliolina vulgaris Heron-Allen & Earland, 1913, CI. p. 28.

5 *Stations.*

Very poorly represented. At. Stn. 6 the specimens are agglutinate.

(Group of *M. seminulum*.)

55. **Miliolina seminulum** (Linné). (Pl. XLII. fig. 31.)

Serpula seminulum Linné, 1767, SN. (ed. xii.) p. 1264. no. 791; Linné, 1788, SN. (ed. xiii.), p. 3739. no. 2.
Quinqueloculina seminulum d'Orbigny, 1826, TMC. p. 303. no. 44.
„ *lævigata* d'Orbigny, 1839, FIC. p. 143, pl. iii. figs. 31–33.
Miliolina seminulum Williamson, 1858, RFGB. p. 85, pl. vii. figs. 183–189.
Quinqueloculina seminulum Jones, Parker, & Brady, 1866, etc., MFC. 1866, p. 9, pl. iii. figs. 35, 36.
Miliolina seminulum Brady, 1884, FC. p. 157, pl. v. fig. 6 (References).
Quinqueloculina seminulum Schlumberger, 1893, MGM. p. 66, pl. iv. figs. 80, 81; text-figs. 15, 16.
Triloculina lævigata Schlumberger, ibid. p. 63, pl. i. figs. 45–47; text-figs. 9, 10.

16 *Stations.*

. The species is universally distributed and at some Stns. fairly common, but it is not one of the typical Kerimba forms. There is, as usual, an immense range of variation

according to the degree of compression, the length of the test, and the angularity of the sectional view.

Specimens resembling the *Quinqueloculina lamellidens* of Reuss (R. 1863, KTF. p. 41, pl. i. fig. 7) are common at several Stns., and at Stns. 1, 2, 7, and 13 we have met with specimens resembling *M. lamellidens*, var. *obliqua* (Wiesner MS. in course of publication), of which, by the courtesy of the author, we possess specimens from Cap Promontore in the Adriatic.

At Stn. 12 an abnormal specimen was obtained, which we figure, in which the final chamber is added at the apex of the shell, and is furnished with a large gaping mouth devoid of teeth. It suggests superficially the abnormal specimens to which Pearcey has given the specific name *M. dentistoma* (Trans. Roy. Soc. Edinburgh, vol. xlix. 1914, p. 994, pl. ii. figs. 17–19).

56. **Miliolina seminulum,** var. **cornuta** Sidebottom.

Miliolina seminulum, var. *cornuta* Sidebottom, 1904, etc., RFD. 1904, p. 11, pl. iii. figs. 11, 12, text-fig. 3.

1 *Station.*

At Stn. 9 a good many specimens which we think are referable to Sidebottom's variety, although there is a tendency to an excess of growth and marking not suggested by his figure and the surface of the test is generally rather rough instead of being polished. The processes or horns from which the variety obtains its name, and which in the Delos specimens are simple protuberances on the marginal edges of the shell, are in most of the Kerimba specimens continued across the sides of the chambers, so as to give a radially furrowed aspect to the test somewhat as in *M. parkeri* Brady. This cornute type of ornament is not common in the miliolids, but similar processes are seen on d'Orbigny's *Biloculina aculeata* (d'O. 1826, TMC. p. 298. no. 3, Modèle no. 31), and on *Miliolina excisa* Brady, Parker, and Jones (B. P. & J. 1888, AB. p. 215, pl. xl. fig. 33), and in *Miliolina cristata* Millett (M. 1898, etc., FM. 1898, p. 506, pl. xii. fig. 3).

57. **Miliolina candeiana** (d'Orbigny).

Quinqueloculina candeiana d'Orbigny, 1839, FC. p. 199, pl. xii. figs. 24–26.
" " Brady, 1870, FTR. p. 286, pl. xi. fig. 1.
Miliolina candeiana Brady, 1887, SBRF. p. 882.
" " Heron-Allen & Earland, 1913, CI. p. 29, pl. ii. figs. 1–4.

4 *Stations.*

A few specimens referable to the form figured by us under the above name in the Clare Island monograph.

58. **Miliolina auberiana** (d'Orbigny).

Quinqueloculina auberiana d'Orbigny, 1839, FC. p. 193, pl. xii. figs. 1–3.
„ *ungeriana* d'Orbigny, 1846, FFV. p. 291, pl. xviii. figs. 22–24.
Miliolina auberiana Brady, 1884, FC. p. 162, pl. v. figs. 8, 9.
„ „ Goës, 1894, ASF. p. 109, pl. xix. fig. 844.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 312.

15 *Stations.*

Universally distributed and generally abundant, the best at Stns. 6 and 12, notably at the latter. There is considerable variation at most Stns., the species merging through specimens referable to d'Orbigny's *M. ungeriana* (*ut supra*) and *M. akneriana* (d'O. 1846, FFV. p. 290, pl. xviii. figs. 16–21) towards *M. seminulum*. There is also considerable difference in the shell-texture. Normally highly polished, it also occurs with a matt surface, becoming first finely, and ultimately somewhat coarsely, agglutinate. At Stn. 2 *a* a specimen was found with a cribrate aperture.

59. **Miliolina auberiana,** var. **stenostoma** (Karrer). (Pl. XLII. fig. 32.)

Quinqueloculina ungeriana, var. *stenostoma* Karrer, 1868, MFKB. p. 141, pl. ii. fig. 3.

1 *Station.*

At Stn. 11 we found a single example of this beautifully decorated variety of *M. auberiana* which differs from Karrer's figure only in the greater extent of the radial grooves, which in the Kerimba specimen extend right across the face of the chambers. Karrer's specimens were from the Miocene of Kostej.

60. **Miliolina cuvieriana** (d'Orbigny). (Pl. XLII. figs. 33–36.)

Quinqueloculina cuvieriana d'Orbigny, 1839, FC. p. 190, pl. xi. figs. 19–21.
„ *lamarckiana* d'Orbigny, ibid. p. 189, figs. 14, 15.
Miliolina cuvieriana Brady, 1884, FC. p. 162, pl. v. fig. 12.
„ „ Egger, 1893, FG. p. 234, pl. ii. figs. 47–49, pl. iv. figs. 22–24.
„ „ Jones, Parker, & Brady, 1866, etc., MCF. 1895, p. 119, pl. vi. fig. 4 (not 3).
„ „ Millett, 1898, etc., FM. 1898, p. 505, pl. xii. fig. 2.

6 *Stations.*

Very poorly represented. Hardly any characteristic specimens, most of them varying in the direction of *M. auberiana*. At Stn. ? X a small variety with a dull subagglutinate appearance occurs. At Stn. 11 a few specimens were found which we figure, which probably represent a pauperate and undulate form of this species. There is great variation among the few specimens found, some being regularly triangular in section with prominent marginal edges of the chambers as in the type, while in others the chambers are very broad and ribbon-like in section and twisted upon themselves.

60 *a*. **Miliolina crassa** (d'Orbigny). (Pl. XLII. figs. 37–41.)

Quinqueloculina crassa d'Orbigny, 1826, TMC. p. 301. no. 14.
„ „ Terquem, 1882, FEP. p. 186, pl. xx. (xxviii.) figs. 20, 21.
„ „ Fornasini, 1905, SOM. p. 65, pl. iii. fig. 5.

1 *Station.*

At Stn. 11 a good many specimens of a handsome Miliolid which appears to be nearer to d'Orbigny's species than to Brady's *M. insignis*, which in many points it resembles. D'Orbigny's description in the "Prodrome" (d'O. 1850, etc., PP. vol. ii. p. 409. no. 1369), "espèce suborbiculaire, renflée, striée" is scanty but sufficient. The Kerimba specimens are nearly all roughly triangular in section with rounded edges and the surface of the chambers entirely covered with coarse rounded sulci strictly parallel. In a few instances the shell is more compressed and regularly like *M. auberiana* in outline, but with the same characteristic costæ. All the specimens are distinctly quinqueloculine.

61. **Miliolina bicostata** (d'Orbigny). (Pl. XLII. figs. 42–45.)

Quinqueloculina bicostata d'Orbigny, 1839, FC. p. 195, pl. xii. figs. 8–10.
Miliolina bicostata Goës, 1894, ASF. p. 112, pl. xx. fig. 855.
„ „ Goës, 1896, DOA. p. 83, pl. viii. figs. 19–21.

6 *Stations.*

Generally distributed, but very rare. The specimens agree much more closely with d'Orbigny's original figure than with those of Goës. Goës states that d'Orbigny's specimen was probably a young shell, but it appears to be a fully developed individual in the d'Orbignyan figure. The Kerimba specimens all differ in certain well-marked features; the marginal carinæ are generally more or less undose, and the surface of the chambers, although usually smooth, is often irregularly and feebly costate. But the most essential point of difference is in the aperture. D'Orbigny states that the aperture is small, round, furnished with a small simple and short tooth. In the Kerimba specimens, however, the aperture is invariably fitted with a flat plate, attached to the penultimate chamber and fitting the aperture like an operculum, leaving only a very narrow slit open round its edge. D'Orbigny's specimens are also described as milky-white, but the Kerimba specimens are dull and matt in texture, the carinal ridges standing out prominently by reason of their whiteness as contrasted with the walls of the chambers.

62. **Miliolina undosa** (Karrer). (Pl. XLIII. figs. 1–4.)

Quinqueloculina undosa Karrer, 1867, FO. p. 361, pl. iii. fig. 3.
Miliolina undosa Brady, 1884, FC. p. 176, pl. vi. figs. 6–8.
„ „ Egger, 1893, FG. p. 237, pl. ii. figs. 41, 42.
„ „ Millett, 1898, etc., FM. 1898, p. 506, pl. xii. fig. 5.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 304.

12 *Stations.*

Almost universally distributed in one or other of many divergent varieties. Fairly typical forms were observed at many Stns., especially Stns. 1, 2 *b*, and 10. At other Stns. the specimens are less typical, and might perhaps be more strictly described as undose varieties of other recognised species, especially *M. linnœana*, *M. contorta*, and *M. ferrussacii*.

63. **Miliolina undulata** (d'Orbigny). (Pl. XLIII. figs. 5–8.)

Quinqueloculina undulata d'Orbigny, 1826, TMC. p. 302. no. 27.
„ „ Schlumberger, 1893, MGM. p. 71, pl. i. figs. 53, 54, pl. ii. figs. 60, 61 ; text-figs. 23, 24.
„ „ Tempère, 1897, FCF. p. 21, pl. iv. fig. 9.
Miliolina undulata Sidebottom, 1904, etc., RFD. 1904, p. 13.
„ „ Wiesner, 1912, AM. p. 218.

6 *Stations.*

A finely striate form with broad and gaping aperture occurs at many of the Stns. which appears to be referable to d'Orbigny's *M. undulata*, although the majority of the specimens do not exhibit very marked curvature of the chambers. This undulation is however, exhibited strongly at Stn. 9, and in a less degree in occasional specimens from other Stns. The character of the aperture and section of the test seem to suggest the close affinity of the species with *M. nussdorfensis* (d'O. 1846, FFV. p. 295, pl. xix. figs. 13–15) and *M. brongniartii*.

64. **Miliolina reticulata** (d'Orbigny). (Pl. XLIII. figs. 9, 10.)

Triloculina reticulata d'Orbigny, 1826, TMC. p. 299. no. 9.
Quinqueloculina reticulata Karrer, 1861, FWB. p. 449, pl. ii. fig. 5.
Triloculina reticulata Parker, Jones, & Brady, 1859, etc., NF. 1871, p. 249, pl. viii. fig. 18.
Miliolina reticulata Brady, 1884, FC. p. 177, pl. ix. figs. 2–4.
„ „ Egger, 1893, FG. p. 239, pl. ii. figs. 83, 84.
Quinqueloculina reticulata Schlumberger, 1893, MGM. p. 72, fig. 25, and pl. ii. fig. 62.

11 *Stations.*

Generally distributed and often plentiful. The bulk of the specimens are of the normal quinqueloculine type as figured by Brady, but more elongate and delicate, being nearer Karrer's figure. At some of the Stns. other reticulate varieties occur, notably at Stns. 11 and 13, where a broad and angular quinqueloculine type near d'Orbigny's *Quinqueloculina affinis* occurs (d'O. 1826, TMC. p. 302. no. 41 ; see F. 1902, FLR. p. 23, fig. 17). At Stn. 11 a long and very pretty quinqueloculine form was found with regular markings and suggesting Terquem's *Q. pertusa* in the neatness and regularity of its reticulations, which he compares to a " trellis of very fine oblique striæ, forming regular lozenges " (T. 1882, FEP. p. 183, pl. xx. (xxviii.) fig. 5). At Stn. 11 a very beautiful form occurs, which we figure. It has angular chambers excavate at the periphery and

suggests the *Q. sagra* of d'Orbigny (d'O. 1839, FC. p. 188, pl. xi. figs. 16–18), except that in that species the reticulate markings are confined to the broad peripheral ridges of the chambers, the sides being excavated in grooves.

65. **Miliolina parkeri** Brady. (Pl. XLIII. figs. 11, 12.)

"Quinqueloculina with oblique ridges," Parker, 1858, MIS. p. 53, pl. v. fig. 10.
Miliolina parkeri Brady, 1879, etc., RRC. 1881, p. 46.
" " Brady, 1884, FC. p. 177, pl. vii. fig. 14.
" " Chapman, 1900, FLF. p. 175.
" " Chapman, 1902, CKA. p. 231.

5 *Stations.*

Typical specimens of *M. parkeri* are curiously rare in the material, considering the fact that it is an essentially coral-reef species. True individuals corresponding exactly with Brady's figure occur at Stn. 11 only, weaker specimens at Stns. 6 and 9. At many other Stns. specimens occur intermediate between *M. parkeri* and the very characteristic form figured by Millett under the name *M. parkeri*. This form, so common at Kerimba, is so distinctive and different from the typical *M. parkeri* that we have separated it under the name *M. kerimbatica*. Both Millett and Chapman have expressed the opinion that *M. parkeri* is closely allied to, and is a robust form of *M. undosa*, but it appears to us more likely that "*undosa*" is merely a condition of growth affecting many different species rather than a true specific form, and that *M. parkeri*, like other types, is subject to "undose" forms of growth.

66. **Miliolina kerimbatica,** sp. n. (Pl. XLIII. figs. 13–23.)

Miliolina parkeri Brady ; Millett, 1898, etc., FM. 1898, p. 507, pl. xii. fig. 4.

13 *Stations.*

Test free, quinqueloculine. The walls of the chambers thick, irregularly furrowed in all directions with broad deeply gouged-out channels, running obliquely and irregularly across the face of each chamber and generally connecting with a deeper straight furrow excavated down the peripheral edge. This straight peripheral furrow, when exposed on an earlier chamber in the centre of the test by the quinqueloculine arrangement of the shell, affords a very striking appearance by contrast with the transverse furrows on the surface of the surrounding chambers. Aperture large and furnished with a prominent tooth. The oral end is usually but slightly produced, but in some individuals the aperture is situated on a produced neck. The ridges between the furrows are flat on the top, *i. e.*, the furrows are cleanly gouged out of the shell-substance.

This rather protean form is one of the dominant features of the material, occurring at nearly every Stn., and at some, notably Stns. 3, 9, 11, and 12, in great abundance and attaining a very large size. Hardly any two individuals are alike in detail of

ornamentation, but the general character of the markings (*e. g.*, the deeply channelled grooves, with their prominent and flat-topped dividing ridges, arranged in strongly contorted and almost reticulated patterns on the shell-surface) is a constant and readily recognisable feature. Millett's figure of *M. parkeri* is an admirable illustration of the broader types of our species, but at Kerimba it presents an enormous range of form which we have attempted to illustrate.

The affinities of the form appear to lie between *M. linnæana* and *M. reticulata*, with both of which species *M. kerimbatica* is joined by a series of intermediate examples.

The size is very variable, ranging between ·5 and 1·75 mm. in length and ·4–1·1 mm. in breadth.

(Group of *M. contorta* and *M. bicornis*.)

67. **Miliolina anguina** (Terquem), var. **agglutinans** Wiesner MS.

Quinqueloculina anguina Terquem, 1878, FIR. p. 78, pl. ix. (xiv.) fig. 20.

5 *Stations.*

Terquem (*ut supra*) figures a little quinqueloculine miliolid with an elongated porcellanous test. No typically porcellanous specimens referable to Terquem's figure and description occur at Kerimba, but occasional examples with sclerotic tests occur, and at a few Stns. specimens with a distinctly subarenaceous investment were found agreeing with co-type specimens kindly furnished us by Herr Wiesner (whose work on the Miliolidæ is in course of publication), and which he proposes to describe under the above varietal name. They may be compared with the "Planche inédite" of *Quinqueloculina aspera* d'Orbigny, published by Fornasini (F. 1905, SOM. p. 65, pl. iii. fig. 1), but differ in having a produced neck, similar to Terquem's original type.

68. **Miliolina agglutinans** (d'Orbigny).

Quinqueloculina agglutinans d'Orbigny, 1839, FC. p. 195, pl. xii. figs. 11–13.
Miliola (*Quinqueloculina*) *agglutinans* Parker & Jones, 1865, NAAF. p. 410, pl. xv. fig. 37.
Miliolina agglutinans Terrigi, 1880, SGP. p. 172, pl. i. fig. 1.
" " Brady, 1884, FC. p. 180, pl. viii. figs. 6, 7.
" " Balkwill & Wright, 1885, DIS. p. 325, pl. xiii. figs. 1–3.
" " Egger, 1893, FG. p. 239, pl. ii. fig. 55.
" " Goës, 1894, ASF. p. 110, pl. xix. fig. 848; pl. xx. fig. 849.

16 *Stations.*

Universally distributed and very common at some Stns., especially in the Northern Area, often attaining considerable size. The specimens are coarsely built and, as a rule, typical; but at some Stns., notably Stn. 3, there was a tendency to variation, specimens linking the species with *M. contorta* and *M. trigonula* being found. At many Stns., notably Stns. 7 and 9, there was a tendency towards a complanate or compressed type of shell, the last two chambers being abnormally large and set on opposite sides of the longitudinal axis, so as to give a concave surface on one side of the shell. This may

be compared with d'Orbigny's *Q. enoplostoma* (d'O. 1839, FC. p. 196, pl. xii. figs. 14–17), but in that species one of the earlier chambers is displayed as a ridge running down the concave side of the shell. Adelosine specimens showing typical agglutination of sand-grains upon the primordial chamber were observed at several Stns. (these are figured in H.-A. 1915, RPF. p. 241, pl. xv. fig. 22).

69. **Miliolina fusca** Brady.

Quinqueloculina fusca Brady, 1870, FTR. p. 286, pl. xi. fig. 2.
Miliolina fusca Brady, 1887, SBRF. p. 883.
Quinqueloculina fusca Schulze, 1874, etc., R. 1875, p. 134, pl. vi. figs. 19, 20.
Miliolina agglutinans Goës, 1894, ASF. p. 110, pl. xix. fig. 848 *h*.
„ *fusca* Earland, 1905, FBS. p. 197.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 316.

5 *Stations.*

Very sparingly distributed, the best being at Stn. 13, where the individuals had the typical *M. fusca* tint. At the remaining Stns. the tests, though otherwise characteristic, were composed of very fine white sand-grains without any coloured cement, which, as we have elsewhere observed, may represent an intermediate stage linking the species with *M. contorta* (H.-A. and E. 1913, CI. p. 31).

70. **Miliolina contorta** (d'Orbigny).

Quinqueloculina contorta d'Orbigny, 1846, FFV. p. 298, pl. xx. figs. 4–6.
Miliolina contorta Brady, 1887, SBRF. p. 881.
„ „ Halkyard, 1889, RFJ. p. 60, pl. i. fig. 4.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 13, pl. iv. figs. 7–9.
„ „ Earland, 1905, FBS. p. 195.
„ „ Heron-Allen & Earland, 1913, CI. p. 30.

16 *Stations.*

Almost universally distributed, abundant and attaining very fine proportions at some Stns., especially at Stns. 9, 12, and ? X. There is, as usual, a considerable number of specimens passing into *M. sclerotica*, the essential difference between these two species being the nature of the superficial test. At Stn. 1 the individuals all closely resemble the figure of *Quinqueloculina rugosa* given by Fornasini from the "Planches inédites" (F. 1905, SOM. pl. iii. fig. 13), but they have a porcellanous texture, although like all other specimens of *M. contorta* the surface is matt. The nature of the shell of *Q. rugosa* must remain purely speculative, the species having its origin in a *nomen nudum*, the "Planche inédite" giving practically no guide to the texture. Schlumberger has identified d'Orbigny's specific name *rugosa* with specimens from Marseilles (S. 1893, MGM. p. 68, pl. iv. (not ii.) figs. 91–93, text-figs. 18, 19) which differ considerably from the "Planche inédite" in external characteristics, but which are described as having a rough surface ("têt d'apparence rugose"); they appear therefore to be a form of *M. sclerotica*.

71. **Miliolina sclerotica** (Karrer). (Pl. XLIV. figs. 1–4.)

Quinqueloculina sclerotica Karrer, 1868, MFKB. p. 152, pl. iii. fig. 5.
Miliolina sclerotica Balkwill & Millett, 1884, FG. p. 24, pl. i. fig. 2.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 14.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 304.
„ „ Heron-Allen & Earland, 1913, CI. p. 30.

10 *Stations.*

Less widely distributed than *M. contorta*, but often very abundant and presenting a considerable range of external form. Karrer's figures are somewhat confusing, for, whereas the side view shows a test with angular edges, the end view portrays a round-edged shell. It would therefore appear that Karrer did not attribute any special importance to the sectional outline of the chambers in his species, and this would appear to be a sound diagnosis, for, wherever the species occurs in any abundance, both round and angular specimens are to be found. Such is the case at Kerimba, where *M. sclerotica* is a fairly common species. At some Stns. the angular and round forms occur in company, but the angular form is the more abundant and occurs alone at Stns. 1 and 4. At Stn. ? B only the round form is found; at Stn. 12 the specimens are exceptionally large. A very noticeable feature at Kerimba is the nature of the test. The specimens found may be separated into two groups according to the coarseness of the arenaceous investment. At most of the Stns. the tests are very coarsely arenaceous, but at Stns. 2 and 10 a very finely agglutinate test occurs in company with the coarsely arenaceous individuals.

One abnormal specimen occurred at Stn. 1 in which the last chamber became trifid in mid-growth, and separated into three divisions which continued to grow and terminated in three separate apertures.

72. **Miliolina disparilis** (d'Orbigny).

Quinqueloculina disparilis d'Orbigny, 1826, TMC. p. 302. no. 21.
„ „ Schlumberger, 1893, MGM. p. 70, pl. ii. figs. 55–57; text-figs. 21, 22.
„ „ Fornasini, 1905, SOM. p. 66, pl. iii. fig. 10.
Miliolina disparilis Wiesner, 1912, AM. p. 216.

3 *Stations.*

Very scantily represented, but large and typical specimens were found at Stns. 5 and 9. At Stn. 12 a specimen with reticulate markings between the ridges occurred.

73. **Miliolina limbata** (d'Orbigny). (Pl. XLIV. figs. 5–8.)

Quinqueloculina limbata d'Orbigny, 1826, TMC. p. 302. no. 20.
„ „ Fornasini, 1905, SOM. p. 66, pl. iii. fig. 9.

14 *Stations.*

The "Planche inédite" of d'Orbigny representing specimens found in the Red Sea appears to afford the best, if not the only, illustration of a small quinqueloculine

Miliolid which occurs very generally in the Kerimba dredgings. The species is evidently closely allied to *M. linnæana*, and passes into it by almost imperceptible gradations in the strength of the costæ. The best specimens occur at Stns. 1, 2 *a*, 5, and 7, where it is especially abundant. At Stn. 11 the individuals are nearly all of a coarsely sulcate type very near *M. linnæana*, from which, however, it is distinguishable by the highly polished surface of its test, and its invariably small size. The texture of *M. linnæana* is invariably matt to rough.

74. **Miliolina ferussacii** (d'Orbigny).

Quinqueloculina ferussacii d'Orbigny, 1826, TMC. p. 301. no. 18, Modèle no. 32.
„ *polygona* d'Orbigny, 1839, FC. p. 198, pl. xii. figs. 21–23.
Miliolina bicornis, var. *angulata* Williamson, 1858, RFGB. p. 88, pl. vii. fig. 196.
Miliola (*Quinqueloculina*) *ferussacii* Parker, Jones, & Brady, 1865, NAAF. p. 411, pl. xv. fig. 36.
Miliolina ferussacii Brady, 1884, FC. p. 175, pl. cxiii. fig. 17 (References).
„ „ Balkwill & Wright, 1885, DIS. p. 325, pl. xii. figs. 10–12.
„ *contorta* Goës, 1894, ASF. p. 111, pl. xx. figs. 851, 852.
„ „ Millett, 1898, etc., FM. 1898, p. 507, pl. xii. figs. 6, 7.

9 *Stations.*

Not widely distributed, but very fine and typical examples occur at several Stns., though not in any numbers. At Stn. 8 a specimen, otherwise typical, was found with a sub-arenaceous investment. D'Orbigny's Model represents a compressed and almost spiroloculine type with two strong marginal carinæ and an extra carina on the face of the last chamber; the neck is produced and the chambers sigmoid in shape. Brady's fig. 17 (FC. 1884, pl. cxiii.) represents a type which is of much more frequent occurrence in tropical gatherings, having long narrow chambers with little curvature, produced tubular neck, and strong to acute marginal and facial carinæ. Of the two slides labelled *M. ferussacii* in the Brady Collection at Cambridge, one contains the 'Challenger' form in different stages of development, the other, from the Seychelles, contains various Miliolids, but no real *M. ferussacii* referable to either d'Orbigny's or Brady's types.

75. **Miliolina pulchella** (d'Orbigny).

Quinqueloculina pulchella d'Orbigny, 1826, TMC. p. 303. no. 42.
„ „ Parker, Jones, & Brady, 1859, etc., NF. 1871, p. 250, pl. viii. fig. 19.
„ „ Terquem, 1878, FIR. p. 68, pl. vii. (xii.) figs. 11–14.
Miliolina pulchella Brady, 1884, FC. p. 174, pl. vi. figs. 13, 14; pl. iii. figs. 10–13.
„ „ Goës, 1894, ASF. p. 114, pl. xxi. figs. 862–864.
„ „ Jones, Parker, & Brady, 1866, etc., MFC. p. 13, pl. iv. fig. 3; 1895, p. 123, pl. vi. fig. 3.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 15, pl. iv. fig. 15.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 314.

7 *Stations.*

Sparingly distributed and never common. The species attains a large size, especially at Stn. 3, where some of the specimens were feebly reticulate between the costæ. Adelosine specimens were obtained from most of the Stns. where the type was present.

76. **Miliolina linnæana** (d'Orbigny).

Triloculina linneiana d'Orbigny, 1839, FC. p. 172, pl. ix. figs. 11–13.
Quinqueloculina josephina d'Orbigny, 1846, FFV. p. 297, pl. xix. figs. 25–27.
„ „ Costa, 1853, etc., PRN. 1856, p. 321, pl. xxv. fig. 4.
Miliolina linnæana Brady, 1884, FC. p. 174, pl. vi. figs. 15–20.
„ „ Millett, 1898, etc., FM. 1898, p. 509.
„ „ Chapman, 1907, TFV. p. 20, pl. ii. fig. 37.

12 *Stations.*

Generally distributed, but never very abundant; well-grown and large specimens were found at many Stns., especially Stns. 1 and 5.

77. **Miliolina costata** (d'Orbigny). (Pl. XLIV. figs. 9–12.)

Quinqueloculina costata d'Orbigny, 1826, TMC. p. 301. no. 3.
„ *poeyana* d'Orbigny, 1839, FC. p. 191, pl. xi. figs. 25–27.
„ *costata* Karrer, 1867, FO. p. 362, pl. iii. fig. 4.
„ „ Terquem, 1878, FIR. p. 63, pl. vi. (xi.) figs. 3–5.
„ „ Terquem, 1882, FEP. p. 183, pl. xx. (xxviii.) figs. 8, 9.
„ „ Fornasini, 1905, SOM. p. 62, pl. ii. fig. 6.

8 *Stations.*

Generally distributed, but somewhat rare, except at Stn. 1. All our specimens have a produced neck with everted rim, and in this feature approach d'Orbigny's drawing as published by Fornasini (*ut supra*) much more closely than do Terquem's figures. The Terquem and Karrer forms are apparently much nearer to d'Orbigny's allied species *Q. poeyana*. The Kerimba specimens all have a very characteristic shell-texture, being biscuit-like in colour and matt, without any trace of porcellanous enamel. There is, however, no tendency to incorporate sand-grains.

This species occurs also at Vavau, Friendly Is., 16 fms.

78. **Miliolina striata** (d'Orbigny). (Pl. XLIV. figs. 13–17.)

Quinqueloculina striata d'Orbigny, 1826, TMC. p. 301. no. 4.
„ „ Terquem, 1882, FEP. p. 184, pl. xx. (xxviii.) figs. 10–12.
„ „ Fornasini, 1905, SOM. p. 63, pl. ii. fig. 7.

11 *Stations.*

The "Planche inédite" of d'Orbigny, as amplified by Terquem, serves to identify a form which is somewhat sparingly distributed in the dredgings, but occurs in considerable abundance at a few Stns. The original "Planche" represents a finely striate and edentate quinqueloculine form of compressed outline, but Terquem figures

a series of specimens ranging between compressed and cylindrical in section, and both toothed and edentate. The presence of a tooth does not therefore seem to be an essential specific feature. The Kerimba specimens exhibit considerable range in the degree of compression and in the breadth of the shell, but, on the whole, they approach more nearly to Terquem's fig. 12 than to the original "Planche," and they are all furnished with a prominent lamellar tooth. The surface of the shell is highly polished and covered with delicate longitudinal costæ. D'Orbigny's "Planche" of *Triloculina cylindrica* (d'O. 1826, TMC. p. 300. no. 19—the type-specimen in Paris is quite typical) represents a similar form with prominent aperture furnished with a tooth, but is markedly triloculine. The Kerimba specimens are very like the figure of d'Orbigny's *Q. costata* given by Schlumberger (S. 1893, MGM. p. 69, pl. iii. figs. 75, 76), which, however, represents a somewhat more sulcate form and differs very strongly from the original "Planche" of *Q. costata* d'Orbigny, which has a much longer and more delicate shell. Specimens resembling the "Planche" of *Q. costata* occur at Kerimba and are dealt with and figured sub *M. costata*.

D'Orbigny's "Planche" of *Q. parisiensis* (F. 1905, SOM. p. 63, pl. ii. fig. 9) is also practically identical with *M. striata*, but the specific name *parisiensis* has become identified with Terquem's fossils from the Eocene of Paris, in which the surface of the shell between the sulci is finely punctate. The reasons for the identification of Cuvier's figure of *Q. striata* (Henderson's Edn., London, 1834, pl. vi. fig. 10) with d'Orbigny's *nomen nudum* appear to us to be obscure, and the figure is not satisfactory.

79. **Miliolina bicornis** (Walker & Jacob).

Serpula bicornis Walker & Jacob, 1798, AEM. p. 633, pl. xiv. fig. 2.
Quinqueloculina flexuosa d'Orbigny, 1839, FAM. p. 73, pl. iv. figs. 4–6.
Miliolina bicornis Williamson, 1858, RFGB. p. 87, pl. vii. figs. 190–198.
,, ,, Brady, 1884, FC. p. 171, pl. vi. figs. 9, 11, 12 (References).
Adelosina bicornis Schlumberger, 1886, GA. p. 546, pl. xvi. figs. 10–15, text-figs. 1–5, 7, 8.
Miliolina bicornis Egger, 1893, FG. p. 237, pl. ii. figs. 73, 74.
,, ,, (and *M. elegans*) Goës, 1894, ASF. p. 112, pl. xx. fig. 857, and p. 113, pl. xxi. figs. 860, 861.
,, ,, Heron-Allen & Earland, 1913, CI. p. 32, pl. ii. figs. 5, 6.

7 *Stations.*

Very poorly represented, no typical specimens. Weak specimens are abundant at Stn. 5, and it appears in the adelosine stage at Stn. 9.

80. **Miliolina brongniartii** (d'Orbigny).

Triloculina brongniartii d'Orbigny, 1826, TMC. p. 300. no. 23.
,, ,, Parker, Jones, & Brady, 1859, etc., NF. 1871, p. 250, pl. viii. fig. 9.
Quinqueloculina brongniartii Jones, Parker, & Brady, 1866, etc., MFC. 1866, p. 14, pl. iii. figs. 41, 42; pl. iv. fig. 2.
Miliolina brongniartii Heron-Allen & Earland, 1913, CI. p. 33.
(See Brady, 1884, FC. sub *M. bicornis*.)

3 *Stations.*

Very rare, but specimens of the typical circular form occur.

81. **Miliolina boueana** (d'Orbigny).

Quinqueloculina boueana d'Orbigny, 1846, FFV. p. 293, pl. xix. figs. 7–9.
„ „ Costa, 1853, etc., PRN. 1856, p. 329, pl. xxv. fig. 15.
„ „ Terquem, 1875, etc., APD. 1876, p. 84, pl. xii. fig. 1.
Miliolina boueana Brady, 1884, FC. p. 173, pl. vii. fig. 13.
„ „ Chapman, 1900, FLF. p. 177.

2 *Stations.*

A few specimens, fairly typical.

82. **Miliolina scrobiculata** Brady. (Pl. XLIV. figs. 18–21.)

Miliolina scrobiculata Brady, 1884, FC. p. 173, pl. cxiii. fig. 15.
„ „ Egger, 1893, FG. p. 238, pl. ii. figs. 75–77.
„ „ Chapman, 1900, FLF. p. 178.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 314.

4 *Stations.*

Frequent at Stn. 11 and occurring less abundantly, but typical, elsewhere. The aperture in the Kerimba specimens is always much more strongly marked than in Brady's figure, being surrounded with a massive collar. Brady records it from Madagascar and from Nares Harbour (Admiralty Islands) and nowhere else. We have found it in considerable numbers in the Eocene clays of Selsey Bill (*ut supra*).

83. **Miliolina triquetra** Brady. (Pl. XLIV. figs. 22, 23.)

Miliolina triquetra Brady, 1879, etc., RRC. 1879, p. 268.
„ „ Brady, 1884, FC. p. 181, pl. viii. figs. 8–10.

2 *Stations.*

One poor specimen at Stn. 4 and an excellent one at Stn. 9. This appears to be an extremely rare form, the 'Challenger' records being all from the seas round Australia, but it also occurs very finely developed off Cebu, Philippine Islands (120 fms.). Both the Kerimba specimens are characterised by a somewhat roughly agglutinate test, and an aperture very large as compared with Brady's figures.

84. **Miliolina alveoliniformis** Brady.

Miliolina alveoliniformis Brady, 1879, etc., RRC. 1879, p. 268.
„ „ Brady, 1884, FC. p. 181, pl. viii. figs. 15–20.
„ „ Egger, 1893, FG. p. 232, pl. ii. figs. 17–19.
„ „ Millett, 1898, etc., FM. 1898, p. 510.
„ „ Chapman, 1900, FLF. p. 177.

8 *Stations.*

Generally distributed, but never abundant, although at some of the Stns. the specimens are exceptionally large and finely developed, notably at Stns. 1, 6, and 9. The individuals are of the arenaceous type, no porcellanous specimens being observed excepting at Stn. 4, where immature tests with a sub-arenaceous investment were found. The aperture when perfect is invariably cribrate.

Subgenus MASSILINA Schlumberger *.

85. **Massilina secans** (d'Orbigny). (Pl. XLIV. figs. 24–27.)

Quinqueloculina secans d'Orbigny, 1826, TMC. p. 303. no. 43, Modèle no. 96.
„ *planciana* d'Orbigny, 1839, FC. p. 186, pl. x. figs. 24, 25 ; pl. xi. figs. 4–6.
Miliolina seminulum, var. *disciformis* Williamson, 1858, RFGB. p. 86, pl. vii. figs. 188, 189.
Quinqueloculina secans Parker, Jones, & Brady, 1859, etc., NF. 1865, p. 34, pl. i. fig. 10.
Miliolina secans Brady, 1884, FC. p. 167, pl. vi. figs. 1, 2.
Massilina secans Schlumberger, 1893, MGM. p. 76, woodcuts figs. 31–34, pl. iv. figs. 82, 83.
Miliolina secans Goës, 1894, ASF. p. 112, pl. xx. fig. 856.
Massilina secans Heron-Allen & Earland, 1908, etc., SB. 1910, pp. 693 *et seq.*

6 *Stations.*

Sparingly distributed and very rare, most numerous at Stns. 7 and 9. The large compressed form is not represented at all in the dredgings, all the specimens being of the long thick type of *Quinqueloculina peregrina* d'Orbigny (d'O. 1846, FFV. p. 292, pl. xix. figs. 1–3). The specimens, although few in number, exhibit considerable diversity in the shell-texture, which varies from polished porcellanous to sclerotic. Many of the specimens, especially at Stns. 1 and 7, have a prominently recurved lip. We figure one of these.

86. **Massilina secans,** var. **tenuistriata** Earland. (Pl. XLIV. figs. 28–31.)

Massilina secans, var. *tenuistriata* Earland, 1905, FBS. p. 198, pl. xi. fig. 5.
„ „ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 317, and 1910, p. 693.
„ „ „ Heron-Allen & Earland, 1913, CI. p. 34.

3 *Stations.*

Occurs in some numbers and quite characteristic, the best being at Stn. ?X.

87. **Massilina secans,** var. **reticulata,** nov. (Pl. XLV. figs. 1–4.)

10 *Stations.*

The character of the test and arrangement of the chambers are as in *M. secans* and equally variable, but the entire surface is covered with a regularly reticulate or engine-turned marking, due to the intersection of two series of radial costæ. These reticulations vary very greatly in development from a very feeble to a pronounced

* The subgenera *Massilina* and *Sigmoilina* have been included in the genus *Miliolina* instead of among the Hauerininæ, their affinities being, in our opinion, near to the typical Miliolids. In the Clare Island report we followed Schlumberger, but we have now reconsidered the matter.

network, but they never result in deep pits such as are seen in *Miliolina reticulata*. *M. secans*, as known to European Rhizopodists, is singularly normal in the character of its shell-surface, even striate varieties being very rare, but in the Malay Archipelago, according to Millett, the species appears to be subject to great superficial variations, ranging from smooth to papillate. The papillate form figured by him, which strongly suggests our var. *reticulata*, except that the ornamentation is raised instead of being depressed, proves on examination of the types, which are now in our collection, to be distinctive, and nearer to *M. macilenta*.

Almost universally distributed, and most abundant at Stns. 1, 5, 6, 9, and 13, the best specimens being at Stn. 9. The individuals are, as a rule, very compressed, but some are of normal thickness. The Kerimba specimens are all toothless, a feature which appears from Millett's drawing to be also characteristic of his Malay specimens.

Length averages ·75–·95 mm., breadth ·62–·92 mm., thickness ·1 mm.

88. **Massilina secans,** var. **rugosa,** nov. (Pl. XLV. figs. 5–12.)

6 *Stations.*

The construction of the test is as in the type, but the entire surface is covered with a firmly agglutinated layer of very fine sand-particles and mud, embedded in the superficial layer of the calcareous test. This adventitious layer does not penetrate the test to any appreciable depth, and can be scraped off with a needle-point, revealing the normal white test underneath. The sand-grains project very slightly, owing to the small size of the particles habitually used. The colour varies at different Stns., probably owing to the percentage and nature of the incorporated mud, ranging from a very light grey to a dusky or even brown tint.

This form, although not universally distributed, is quite one of the characteristic Miliolids of the Kerimba gatherings, and is usually a predominant type at the Stns. where it occurs, attaining a very large size. At Stn. 12 there is a tendency in the large specimens to become wild-growing, the final chamber being thrown off at abnormal angles from the axis. Two distinct forms occur in company at nearly every Stn.—one roughly triangular in section, the other much more complanate. These no doubt correspond with the forms *b* and *a* of Schlumberger's *M. secans* (S. 1893, MGM. p. 77), as demonstrated by him in his sections of the type.

Size very variable—average length 1·0–2·0 mm., breadth ·8–1·5 mm.

89. **Massilina macilenta** (Brady). (Pl. XLV. figs. 13, 14.)

Miliolina macilenta Brady, 1884, FC. p. 167, pl. vii. figs. 5, 6.
Massilina secans, var. *macilenta* Millett, 1898, etc., FM. 1898, p. 609, pl. xiii. fig. 4.

2 *Stations.*

Extremely rare, the records depending upon a few individuals, none very strongly costate.

90. **Massilina alveoliniformis** Millett. (Pl. XLV. fig. 15.)

Massilina alveoliniformis Millett, 1898, etc., FM. 1898, p. 609, pl. xiii. figs. 5–7.

2 *Stations.*

A single young specimen, resembling Millett's fig. 6, at Stn. 6, and another at Stn. ? A. The shell is rather more coarsely agglutinate than in the Malay types, which are now in our collection and are composed of very fine sand-grains.

Fornasini (F. 1905, SOM. p. 65, pl. iii. figs. 6, 7) figures his usual reproductions of d'Orbigny's original outlines of the species *Quinqueloculina variabilis*, made for the "Planche inédite" (which latter, however, was not finished by him). These represent a quinqueloculine form, which Fornasini refers to *M. alveoliniformis* Brady, and a spiroloculine form which he refers to *Spiroloculina arenaria* Brady. He suggests that the former is a young stage of the latter, and thus by his suggestion of bimorphism properly relegates the species to the genus *Massilina*. If Fornasini's view is correct, d'Orbigny's species *Q. variabilis* probably represented Millett's *M. alveoliniformis*, and its tropical habitat (*Mer Sud et Rawack*) would bear out this identification, but the type-specimens which we have inspected at La Rochelle and in Paris are so damaged as to be useless for purposes of identification. The Paris fragment suggests a *Spiroloculina* or *Planispirina*. It seems desirable, therefore, that Millett's name should be perpetuated and d'Orbigny's definitely abandoned.

Subgenus Sigmoilina Schlumberger.

91. **Sigmoilina ovata** Sidebottom. (Pl. XLV. figs. 16–18.)

Sigmoilina ovata Sidebottom, 1904, etc., RFD. 1904, p. 6, pl. ii. figs. 12, 13, text-fig. 1.
(See B. 1887, SBRF. Postscript, p. 927.)

9 *Stations.*

Generally distributed and often very abundant. The specimens are, as a rule, large and well developed, but at Stns. 8 and ? A (at the latter of which it was very common) the individuals were of a very small and starved type. The species is very closely related to the *S. edwardsi* of Schlumberger, from which, however, it differs in its more cylindrical contour and lesser number of chambers visible externally. *S. ovata* has normally five visible chambers, *S. edwardsi* having seven.

92. **Sigmoilina edwardsi** (Schlumberger). (Pl. XLV. figs. 19–21.)

Planispirina (*Sigmoilina*) *edwardsi* Schlumberger, 1887, P. p. 483 (113 *), text-fig. 8, pl. vii. figs. 15–18.

* This is correct (*fide* Sherborn), but it is the page in the series of reprints issued by Schlumberger, which were repaginated consecutively as the various articles appeared, and has introduced terrible confusion into all references to his work.

6 *Stations.*

Less widely distributed than the closely allied *S. ovata*, but occurring in company with that species at many Stns. There are numerous transition-forms characterized by an intermediate number of chambers, viz., six. Sidebottom states that his species *S. ovata* has occasionally six visible chambers. When, as is usually the case, these six-chambered specimens have a compressed sectional outline, it becomes doubtful whether they should be assigned to one or the other species, and even whether *S. ovata* is not merely a variety of Schlumberger's earlier species.

Subfamily HAUERININÆ.

ARTICULINA d'Orbigny.

93. **Articulina sulcata** Reuss.

Articulina sulcata Reuss, 1849–50, FOT. p. 383, pl. iv. (xlix.) figs. 13–17.
„ „ Brady, 1884, FC. p. 183, pl. xii. figs. 12, 13.
„ „ Brady, Parker, & Jones, 1888, AB. p. 215, pl. xl. fig. 11.
„ „ Egger, 1893, FG. p. 243, pl. iii. fig. 5.
„ „ Millett, 1898, etc., FM. 1898, p. 510.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 16, pl. iv. figs. 16, 17; text-fig. 5.

11 *Stations.*

Occurrence rare to frequent, but never abundant. At Stns. 1 and ?B the species attains its maximum development of frequency and size.

It seems not improbable that Reuss's species may represent merely an arrested or young form of *A. sagra*, as the few specimens of *A. sagra* found at Kerimba are of a diminutive type as compared with the normal development of the species, and in their initial milioline portion agree in size with the specimens of *A. sulcata* occurring in the same dredging.

94. **Articulina sagra** d'Orbigny. (Pl. XLV. figs. 22–25.)

Articulina sagra d'Orbigny, 1839, FC. p. 183, pl. ix. figs. 23–26.
Vertebralina mucronata d'Orbigny, 1846, FFV. p. 120, pl. xxi. figs. 18, 19.
Articulina sagra Brady, 1884, FC. p. 184, pl. xii. figs. 22–24.
„ „ Millett, 1898, etc., FM. 1898, p. 511.
„ „ Sidebottom, 1904, etc., RFD. 1904, p. 17, pl. iv. figs. 18–20; text-fig. 6.

6 *Stations.*

A few small individuals only, and at Stn. 5 a broken terminal chamber which, from its very large size, can hardly have belonged to *A. sulcata*. At Stn. ?B a number of individuals were found which seem to represent a transition-stage between *A. sulcata* and *A. sagra*, the terminal chamber being added to a normal *A. sulcata* shell, but being formed in the normal *A. sagra* manner, except that it is much more produced

and tubular than usual, and only compressed at the oral extremity. Such individuals raise the question whether *A. sagra* is anything more than an advanced bimorphous form of *A. sulcata*.

95. **Articulina conico-articulata** (Batsch). (Pl. XLV. figs. 26–33.)

Nautilus conico-articulatus Batsch, 1791, CS. p. 3, pl. iii. fig. 11.
Articulina nitida d'Orbigny, 1826, TMC. p. 300, no. 1, Modèle no. 22.
,, ,, Parker, Jones, & Brady, 1859, etc., NF. 1865, p. 22, pl. i. fig. 2.
Vertebralina (*Articulina*) *elongata* Karrer, 1868, MFKB. p. 155, pl. iii. fig. 10.
Articulina conico-articulata Brady, 1884, FC. p. 185, pl. xii. figs. 17, 18; pl. xiii. figs. 1, 2.
,, ,, ,, Millett, 1898, etc., FM. 1898, p. 511, pl. xii. figs. 9, 10.
,, ,, ,, Lister, 1903, F. p. 93, fig. 28.

17 *Stations.*

This very variable species occurs at every Stn. in one or other of its forms, and at most Stns. nearly all the varieties occur together.

Batsch's original figure is of the many-chambered type with cylindrical chambers, regularly increasing in diameter, but the specimen from which he drew his figure is broken and the initial portion is not shown. D'Orbigny, under the name *A. nitida* (d'O. 1826, TMC. p. 300. no. 1, Modèle no. 22), issued a Model which represents the same type, but has somewhat more turgid chambers constricted at the sutural joints, and with a prominent milioline initial portion. Both Batsch's figure and d'Orbigny's Model represent shells circular in section. Yet a third type is the *A. elongata* of Karrer, which may best be described as a curved or dentaline variety of Batsch's form; the initial portion is not shown by Karrer, but the chambers are circular in section. A fourth form is figured by Brady (pl. xiii. fig. 1) which may be briefly described as a dentaline and elongated form of d'Orbigny's Model. Millett figures yet another type which may be regarded as a modification of d'Orbigny's Model, characterized by the fusiform shape of the chambers and the great constriction of the apertural end of each chamber, as compared with its inflated base. Millett's specimens were apparently straight.

The Kerimba specimens cover the whole of the foregoing varieties and present some further modifications. Dealing first with the Batsch type, which is the most abundant and furnishes the largest specimens, there is a distinct tendency at some Stns., notably 1, 2, 4, 5, 6, 9, 10, and 12, towards compression of the later chambers, which then become oval in section, passing in extreme cases into a compressed final chamber, practically indistinguishable from *A. sagra* d'Orbigny. The circular type occurs at every Stn. except four, usually in abundance; at Stns. 5, 6, and 10 it attains a comparatively large size, but at Stn. 9, where it is a common species, all the specimens are small.

Of the dentaline varieties, Karrer's type is very rare, but Brady's occurs at all Stns. except 3 and 11. The only Stn. at which it is very common is Stn. 7, common at

4 and 5, and frequent to rare at the remainder. The specimens from Stn. 9 are, as in the case of the other varieties, small in size.

The initial chambers, as pointed out by Millett, are of two types, resembling respectively *Miliolina* and *Orbitolites*. Lister suggests that these variations represent the megalo- and microspheric forms, but an examination of a long series of specimens of both kinds has not thrown any light on this point. The primordial chambers in the two forms do not present any noticeable difference in size. It may, however, be observed that at Kerimba the "*Orbitolites*" initial portion is confined to the dentaline type of shell and the "*Miliolina*" variant to the telescopic, or Batsch and d'Orbigny types.

96. **Articulina funalis** Brady.

Articulina funalis Brady, 1884, FC. p. 185, pl. xiii. figs. 6–11.
„ „ Egger, 1893, FG. p. 50, pl. iii. fig. 1.
„ „ Millett, 1898, etc., FM. 1898, p. 513.
„ „ Chapman, 1909, SNZ. p. 323, pl. xiv. fig. 3.

2 *Stations.*

A single characteristic specimen was found at Stn. 1 and another at Stn. 11. Rhumbler has instituted a new genus, *Tubinella*, for the species *A. funalis* and its allies (R. 1906, FLC. p. 25) on what appear to us to be insufficient grounds.

Vertebralina d'Orbigny.

97. **Vertebralina striata** d'Orbigny.

Vertebralina striata d'Orbigny, 1826, TMC. p. 283. no. 1, Modèle no. 81.
„ „ Parker, Jones, & Brady, 1859, etc., NF. 1865, p. 32, pl. i. fig. 1.
„ „ Brady, 1884, FC. p. 187, pl. xii. figs. 14–16.
„ „ Egger, 1893, FG. p. 243, pl. iii. figs. 33, 34.
„ „ Millett, 1898, etc., FM. 1898, p. 607, pl. xiii. fig. 1.

14 *Stations.*

Universally distributed and well developed in the coarse siftings at nearly every Stn. Most of the large specimens are of the long type represented by d'Orbigny's Model, but the short nearly circular type figured by Egger and Millett occurs in company with this at most Stns., though never attaining such a large size. At Stns. 10 and ?B specimens with a reticulate instead of a striate surface were observed. At Stn. 3 an abnormal specimen was found in which the shell became bifurcate at the oral end.

Hauerina d'Orbigny.

98. **Hauerina fragilissima** (Brady). (Pl. XLVI. figs. 1, 2.)

Spiroloculina fragilissima Brady, 1884, FC. p. 149, pl. ix. figs. 12–14.
Hauerina fragilissima Millett, 1898, etc., FM. 1898, p. 610, pl. xiii. figs. 8–10.

8 *Stations*.

Generally distributed, but never more than an occasional specimen, except at Stns. 6 and 10, and very rare at them. The individuals vary greatly in size, being generally very small, the largest and best at Stn. 12. The original allocation of this form to the genus *Spiroloculina* seems open to great objection; the earlier chambers are invariably arranged on a quinqueloculine plan giving a thickened central portion to the shell. The aperture is also invariably cribrate. It would appear to be little more than a starved and spiroloculine form of *Hauerina compressa* d'Orb.

99. **Hauerina compressa** d'Orbigny.

Hauerina compressa d'Orbigny, 1846, FFV. p. 119, pl. v. figs. 25–27.
" " Brady, 1884, FC. p. 190, pl. xi. figs. 12, 13.
" " Egger, 1893, FG. p. 244, pl. iii. figs. 9, 10, 23, 24.
" " Millett, 1898, etc., FM. 1898, p. 610, pl. xiii. fig. 11.
" " Sidebottom, 1904, etc., RFD. 1904, p. 19, pl. v. figs. 7, 8; text-fig. 8.
" " Rhumbler, 1906, FLC. p. 52, pl. iii. fig. 39.

15 *Stations*.

Occurs at nearly all the Stns., often very abundantly.

H. compressa appears to be a very variable form. D'Orbigny's original figure and description represent a shell having four chambers in the final convolution and somewhat inflated, so that the earlier chambers are depressed and visible in the umbilical region on either side of the shell. The marginal edge is subcarinate, and the aperture is described as an oval opening surrounded with numerous tubercles. These tubercles were, however, probably perforations misinterpreted by the author.

Karrer (K. 1868, MFKB. p. 154, pl. iii. fig. 9) figures, under the name *Peneroplis aspergilla*, a species which appears to us to be the same form, although he contrasts it with d'Orbigny's species largely on the ground that the aperture is cribrate and not a simple opening. In Karrer's figure the four chambers of the terminal whorl are more inflated than in d'Orbigny's species; the edge is rounded, the early chambers are hardly visible, and the aperture is a large and rounded cribrate extension to the terminal chamber.

Brady (B. 1884, FC. p. 190, pl. xi. figs. 12, 13) figures yet another very different type, which is compressed, has three chambers visible in the final whorl and two or three complete whorls visible in the inner portion, which, however, is sunk below the level of the final chambers. The aperture is large and cribrate, covering the whole of the end of the terminal chamber.

The Kerimba specimens, although varying considerably among themselves, are, on the whole, different from any of these three types, inasmuch as the central portion is nearly always the thickest part of the shell and exhibits hardly any visible segmentation. The final convolution in nearly all cases consists of three chambers only, but in a few instances, especially in small individuals, there are only two chambers in

the final convolution. Specimens with four chambers visible in the final convolution are of very rare occurrence.

At most of the Stns. all the larger specimens and most of the smaller ones are typically milioline in the texture of their shells, but at some Stns., notably Stns. 3 and 10, all the individuals have walls of such extreme tenuity that they are of a delicate blue opalescent tint. The *H. complanata* figured and described by Dakin as a new species (D. 1906, FC. p. 231, fig. 7) would appear to be no more than one of these thin compressed shells, with an abnormally large number of visible chambers. At Stn. 4 *H. compressa* is represented by large and very thick-walled specimens with embracing chambers, closely approaching *H. circinata*. A specimen was found at one of the Stns., which we are figuring elsewhere (H.-A., 1915, RPF. pl. xv. fig. 31), in which the hauerine shell is followed by a peneropline extension.

100. **Hauerina circinata** Brady.

Hauerina circinata Brady, 1879, etc., RRC. 1881, p. 47.
„ „ Brady, 1884, FC. p. 191, pl. xi. figs. 14–16.
„ „ Rhumbler, 1906, FLC. p. 52, pl. iii. fig. 40.

5 *Stations.*

Brady separates *H. circinata* from *H. compressa* by its "more regularly nautiloid form, the larger number of chambers in each circuit and its embracing segments, and their diaphanous shell." He does not refer to another feature, which, however, is clearly indicated in Hollick's figure, and which we think is, if anything, a more distinctive feature, viz. the markings at the septa on the produced edge of the septal lines. These markings, which bear some superficial resemblance to the retral processes of *Polystomella*, indicate the position of the cribrate aperture of each chamber inside the shell. They are never visible in *H. compressa*, but nearly always in *H. circinata*, however thick and robust the shell may be.

Apart from these features, it seems very doubtful whether *H. circinata* can be regarded as anything more than an advanced growth-stage of *H. compressa*. At Kerimba the specimens of *H. circinata* are confined to a relatively small number of Stns. The best specimens were observed at Stns. 9 and 11; at Stn. 3 they were extremely translucent, as was the case at this Stn. with *H. compressa*. At Stn. 4 the shells were all thick and stoutly built. Speaking generally, similar variations occur in these two so-called species at comparatively adjacent Stns., which probably confirms the near relationship of the two forms. The number of chambers, which Brady makes a specific feature, is not always in excess of the chambers of *H. compressa* from the same locality. The embracing character of the chambers in the final whorl is the only invariable feature separating the two forms.

101. **Hauerina ornatissima** (Karrer).

Quinqueloculina ornatissima Karrer, 1868, MFKB. p. 151, pl. iii. fig. 2.
Hauerina ornatissima Brady, 1876, LC. p. 406.
" " Brady, 1884, FC. p. 192, pl. vii. figs. 15–22.
" " Millett, 1898, etc., FM. 1899, p. 610.
" " Chapman, 1900, FLF. p. 178.

14 *Stations.*

Occurs sparingly at most of the Stns., and nearly always in a small compressed form with the later chambers arranged in a more or less spiroloculine manner. Large and typical specimens were found only at Stns, 1, 4, 9, and 12.

PLANISPIRINA Seguenza.

102. **Planispirina auriculata** Egger. (Pl. XLVI. figs. 3–7.)

Planispirina auriculata Egger, 1893, FG. p. 245, pl. iii. figs. 13–15.

12 *Stations.*

Generally distributed and sometimes common. The best and most typical examples at Stns. 6 and 11. At Stns. 12 and ?X it was rare and very small. Practically the only variation observed is in the relative length of the long axis of the shell, two forms being found in company at several Stns., one with a very much broader shell than the other, otherwise externally identical. Viewed as a transparent object in balsam the difference is found to be associated with the development of the initial chambers. The shell commences its growth as an unseptate spiral tube. In the broad specimens this spiral growth continues to as much as two complete convolutions before assuming the spiroloculine arrangement; in the narrow form the spiroloculine method of growth is assumed after a single convolution. Possibly these two forms represent the megalospheric and microspheric generations of the organism. As we pointed out in our Clare Island monograph, our species *P. cliarensis* possesses close affinities to *P. auriculata*, and may perhaps be a depauperated northern form of the tropical species, which differs from *P. cliarensis* in the greater strength and convexity of its test and its larger aperture.

103. **Planispirina exigua** Brady.

Hauerina exigua Brady, 1879, etc., RRC. 1879, p. 267.
Planispirina exigua Brady, 1884, FC. p. 196, pl. xii. figs. 1–4, woodcut fig. 5 *b*, p. 194.
" " Brady, Parker, & Jones, 1888, AB. p. 216, pl. xl. fig. 4.
" " Egger, 1893, FG. p. 245, pl. iii. figs. 11, 12.
" " Millett, 1898, etc., FM. 1898, p. 611, pl. xiii. fig. 13.

9 *Stations.*

Generally distributed, but never very abundant. The best specimens at Stn. 6, where it was most frequent. Two varieties were noticed at this Stn., one a thin-walled

circular type, the other roughly triangular in outline owing to the presence of three definitely marked chambers in the outer whorl. Both varieties are figured by Brady, and they probably represent the micro- and megalospheric forms of the species.

104. **Planispirina communis** Seguenza. (Pl. XLVI. figs. 8, 9.)

Planispirina communis Seguenza, 1879–80, FTR. p. 310, pl. xvii. fig. 18.
„ „ Brady, 1884, FC. p. 196, pl. cxiv. figs. 4–7.
„ „ Cat. Mus. Normanianum, pt. viii. 1892, Rhizopoda no. 145.

1 *Station.*

Two specimens at Stn. 11, noteworthy owing to the extremely limited distribution of the form as at present recorded. Seguenza's original fossils were from the Pliocene of Messina, and the only other record, as far as we know, is Norman's (published by Brady) from the Faroe Channel (170 fms.). The species occurs frequently in many of the 'Goldseeker' dredgings in the Shetland-Faroe Channel.

Subfamily FISCHERININÆ.

FISCHERINA Terquem.

105. **Fischerina rhodiensis** Terquem.

Fischerina rhodiensis Terquem, 1878, FIR. p. 80, pl. ix. (xiv.) fig. 25.

2 *Stations.*

A single specimen from Stn. 3 and several from Stn. 11, agreeing in all respects with Terquem's figure and description, except that the number of convolutions in our individuals rarely exceeds two or three and that the umbilical depression on the inferior side is less pronounced. The sutural lines in the Kerimba specimens are equally distinct on both faces of the shell.

106. **Fischerina pellucida** Millett.

Fischerina pellucida Millett, 1898, etc., FM. 1898, p. 611, pl. xiii. figs. 14, 15.

6 *Stations.*

Occurs at several Stns., but, as a rule, only one or two specimens at each. They agree generally with Millett's figure and description, except in the aperture, which is, as a rule, a simple opening occupying the whole of the extremity of the final chamber and furnished with a thickened and inverted lip, not constricted and everted as in Millett's specimens. At Stn. 2 *b* a single specimen was found having only three chambers in the final whorl instead of the normal five.

107. **Fischerina helix,** sp. n. (Pl. XLVI. figs. 10–14.)

1 *Station.*

Test delicate, opalescent, and extremely fragile, consisting of four to five convolutions

regularly increasing in diameter and arranged in a rounded helicoid spiral. The primordial chamber large, appearing as a clear vesicle at the apex of the spire. About three chambers to each convolution, the lines between the convolutions being somewhat depressed, while the septal lines between the chambers are flush with the surface and conspicuous only by the greater density of the material at this point in contrast with the opalescent wall of the chambers. Inferior surface nearly flat, slightly depressed in the umbilicus, showing four chambers, the aperture being a rounded and slightly lipped opening on the marginal edge of the final chamber. The shell-substance on the inferior side appears to be covered with a network of faint striæ, apparently caused by minute scratches in the shell-substance; these markings are not visible on the superior surface of the test. Breadth at base ·23–·36 mm. Height ·20 mm.

This species, which is evidently the most highly developed type of the genus, occurs, a few specimens only, at Stn. 11. It bears some external resemblance to minute shells of the Pteropod *Limacina*, and might easily be overlooked.

A single specimen of *F. helicina* has been identified by us on a type-slide mounted by R. L. Mestayer, F.R.M.S., from a dredging made off the "Poor Knights" Is., Hauraki Gulf, New Zealand, depth 60 fathoms. *F. pellucida* Millett also occurs in the same gathering.

Subfamily Peneroplidinæ.

Cornuspira Schultze.

108. **Cornuspira foliacea** (Philippi).

Orbis foliaceus Philippi, 1844, EMS. p. 147, pl. xxiv. fig. 25 (error for 26).
Operculina ammonitiformis Costa, 1853, etc., PRN. 1856, p. 209, pl. xvii. fig. 16.
Spirillina foliacea Williamson, 1858, RFGB. p. 91, pl. vii. figs. 199–201.
Cornuspira foliacea Möbius, 1880, FM. p. 76, pl. ii. fig. 3.
" " Brady, 1884, FC. p. 199, pl. xi. figs. 5–9.
" " Egger, 1893, FG. p. 247, pl. iii. figs. 20, 21.
" " Heron-Allen & Earland, 1908, etc., SB. 1911, p. 305, pl. ix. figs. 5, 6.
" " Heron-Allen & Earland, 1913, CI. p. 36.

5 *Stations.*

Rarely occurring at the Stns. All the specimens are small and of the true Philippi type; none of the broad divergent type first figured by Costa as *Operculina ammonitiformis*, after him by Williamson (*ut supra*), and following them by all later writers as *C. foliacea*, were found at Kerimba. In our experience the evolute Costa and Williamson type is confined to the colder areas of the ocean or deep water.

109. **Cornuspira selseyensis** Heron-Allen & Earland.

Cornuspira? Earland, 1905, FBS. p. 199, pl. xiii. figs. 2–4.
" *selseyensis* Heron-Allen & Earland, 1908, etc., SB. 1909, p. 319, pl. xv. figs. 9–11.
" " Heron-Allen & Earland, 1913, CI. p. 37.

12 *Stations.*

Of frequent occurrence at most of the Stns. The individuals are generally rather smaller than the British specimens upon which we founded the species, and pass imperceptibly into *C. foliacea* (Philippi) of the original narrow-tubed circular type as figured by its author.

110. **Cornuspira involvens** Reuss.

Operculina involvens Reuss, 1849–50, FOT. p. 370, pl. i. (xlvi.) fig. 20 (not 30).
Cornuspira involvens Reuss, 1861, Model no. 15.
„ „ Reuss, 1863, KTF. p. 39, pl. i. fig. 2.
„ „ Brady, 1884, FC. p. 200, pl. xi. figs. 1–3.
„ „ Egger, 1893, FG. p. 246, pl. iii. figs. 18, 19.
„ „ Millett, 1898, etc., FM. 1898, p. 612.
„ „ Chapman, 1900, FLF. p. 178.
„ „ (Arcornuspirum, vu.–involutum Reuss ! m. ! !) Rhumbler, 1909, etc., FPE. 1913, p. 425, pl. v. fig. 4.

14 *Stations.*

Generally distributed, and usually of moderately frequent occurrence. All the specimens are small, but two or three distinct types occur:—(i.) The normal thin type of *C. involvens* (*cf.* Brady, fig. 2); (ii.) a type with fewer whorls, like Brady's fig. 3, but both megalo- and microspheric; (iii.) a type in which the tube is of practically even diameter throughout, the two faces being practically parallel. The spiral depression between the whorls is very slight and sometimes only apparent in a portion of the terminal whorl. The specimens suggest *C. pachygyra* Gumbel (G. 1869, FStC. p. 178, pl. v. figs. 9, 10), but the spiral line, on the obscurity of which Gumbel lays stress, is more clearly indicated in his figure than in the Kerimba specimens. These individuals may be compared as regards the sectional shape of their chambers, the parallel disposition of the two faces of the test, and the obscurity of the superficial features with *Spirillina tuberculata* Brady (B. 1884, FC. p. 631, pl. lxxxv. figs. 12–16), but in that species the surface is still further obscured by a secondary deposit of tubercles. The Kerimba specimens may owe their appearance to a secondary deposit of shell-matter, but, if so, it is uniformly distributed over the surface of the test, which is thick and of typically milioline texture.

111. **Cornuspira charoides,** sp. n. (Pl. XLVI. fig. 15.)

1 *Station.*

Test consisting of an unseptate tube coiled at first in a trochoid spiral consisting of six or seven convolutions, followed by two convolutions in a different plane and enveloping the initial portion of the test in the same manner as in *Ammodiscus charoides* Jones & Parker. The tube is crescentic in section and of normal milioline texture, translucent as regards the early portion of the test.

A single specimen from Stn. 7.

Diameter in all directions: circa ·18 mm., diameter of tube in final convolution ·02 mm.

This curious little form is chiefly interesting on account of its isomorphism with *Ammodiscus charoides* (Jones & Parker).

Peneroplis Montfort.

Introductory Note.—As is usually the case in a series of gatherings from such shallow waters in tropical seas, the genus *Peneroplis* figures prominently in the Kerimba Archipelago material and presents practically all the variations hitherto recorded and separated in the costate group, the smooth and polished forms alone being absent. Regard being had to the large size attained by many of the specimens, notably among those of the type of *P. planatus*, the shell-development observed in the dredgings is rather poor, the individuals found being nearly all translucent and thin-walled, though otherwise well-grown and characteristic. As might be expected in such a mass of material, abnormal and deformed specimens (especially of the *P. planatus* and *P. pertusus* types), in which the plane of growth frequently changes, and in which the growth becomes wild (as shown in d'Orbigny's "Planche inédite" and, more elaborately, in Dreyer's work upon the genus *), are of frequent occurrence. A case of fusion was observed at Stn. 10, where two individuals of *P. carinatus* were found associated, their initial chambers being at opposite poles of the combined mass. Instances of the *Spaltungsmonstra* figured and described by Rhumbler †, however, were not found.

In attempting to discriminate between specimens of the elongate, terminally uncoiled, or "Spirolina" group, the Rhizopodist is at once confronted with an almost insuperable difficulty in identifying the types referred to by the early authors, upon whose confusing figures and very insufficient diagnoses subsequent writers have attempted to separate such species as *P. arietinus*, *P. cylindraceus*, and *P. lituus*. It may be observed that the available material has been very efficiently marshalled and discussed by Dreyer in the work above referred to *, and his plates are of exceptional completeness and excellence.

This difficulty has been increased by Brady, who, in his analysis of the genus, has definitely separated the figure 15 *c* (text-fig. 42, A), *Nautilus arietinus*, in Batsch's extremely rare work ‡, as the type of *P. arietinus*, whilst relegating his three figures,

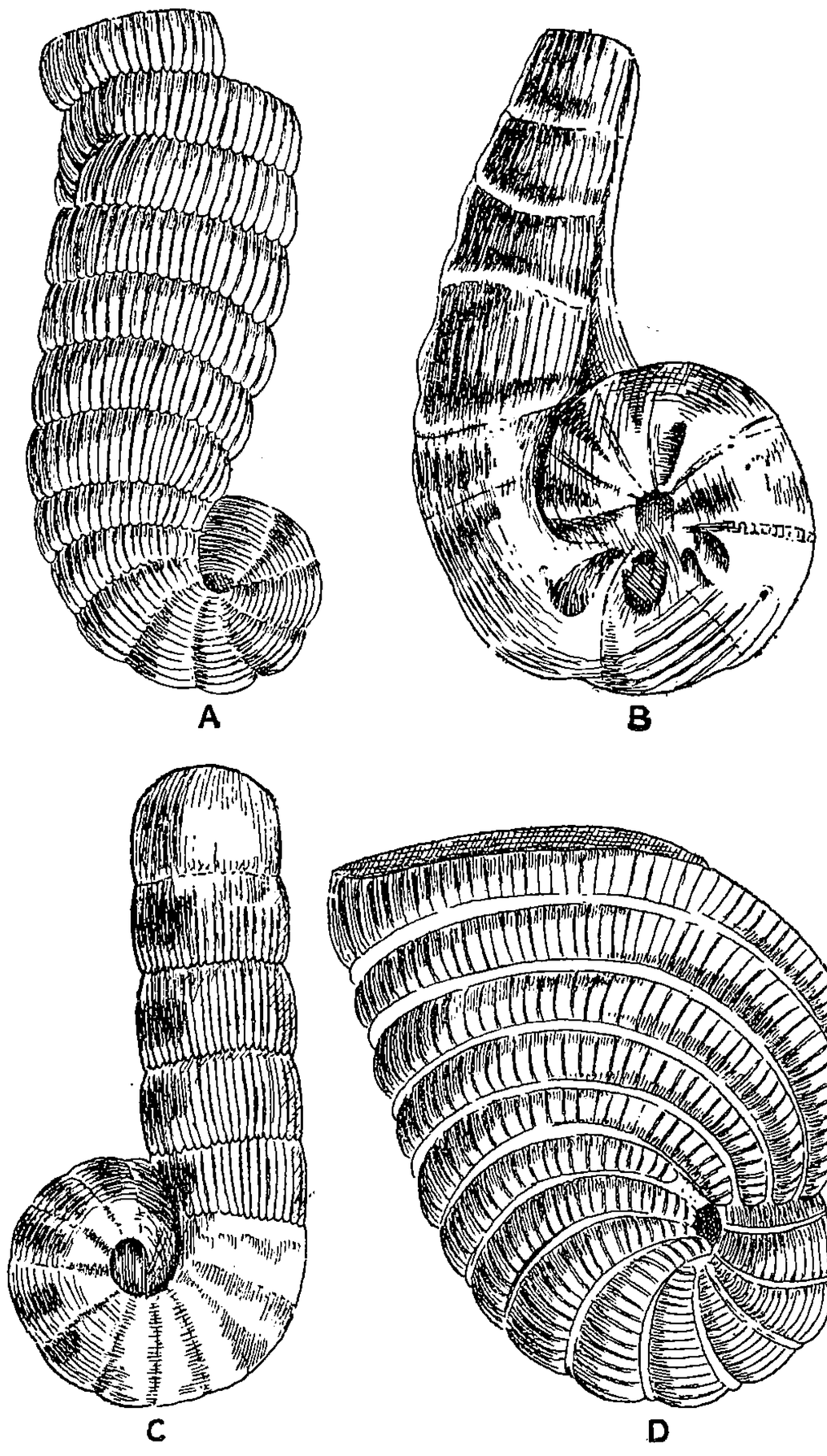
* F. Dreyer, '*Peneroplis*: eine Studie zur biologischen Morphologie und zur Speciesfrage' (Leipzig, 1898).

† R. 1909, etc., FPE. 1909, p. 193, pl. xii. fig. 13.

‡ B. 1791, CS. Of this work there exists a perfect copy of the German Edition in the Library of the Royal Society. The copy in the British Museum (Bloomsbury) lacks the covers and the descriptive letter-press. Of the Latin Edition 'Testaceorum Arenulæ Marinæ, Tabulæ sex priores' (Jena, 1791), referred to in C. Davies Sherborn's 'Bibliography of the Foraminifera' (London, 1888, see p. 9), apparently the only two copies in existence are in our own library (see J. R. M. S. 1914, p. 596).

15 *d*, *e*, *f* (text-fig. 42, B, C), to Lamarck's species *P.* (*Spirolinites*) *cylindraceus* *, apparently on the ground that fig. 15 *c* (text-fig. 42, A) is complanate in section, whilst

Text-figure 42.



A. *Nautilus arietinus* Batsch, 1791, fig. 15 *c*.
B, C. „ „ „ „ figs. 15 *d* & *f*.
D. „ „ „ „ fig. 15 *a*.

figs. 15 *d* & *f* (text-fig. 42, B, C) (15 *e* is merely a section of 15 *d*) are circular in the section of the later chambers.

But if compression of the shell is to be taken as the basis for separation between

* L. 1804, AM. vol. v. p. 237 ; vol. viii. (1806) p. 387, pl. viii. fig. 15. This plate is reproduced (reprinted) in Lamarck's ' Recueil de Planches des Coquilles Fossiles des Environs de Paris ' (Paris, 1823).

the groups, we are confronted by the fact that Batsch's fig. 15 *c* (text-fig. 42, A) is very much more closely allied to his figs. 15 *a* & *b* (text-fig. 42, D) (fig. 15 *b* is merely a section of fig. 15 *a*), which Brady adopted as the basis of *P. planatus* and *P. pertusus*, than Batsch's figs. 15 *d* & *f* (text-fig. 42, B, C), which Brady referred to Lamarck's *P.* (*Spirolinites*) *cylindraceus*. It would seem, therefore, that Batsch's name *P.* (*Nautilus*) *arietinus* should have been retained for all uncoiled (Spiroline) specimens, whether circular or sub-oval, in the section of the later chambers, and should take precedence over Lamarck's later specific name *cylindraceus*—excepting as hereinafter used. This separation would be borne out by the actual affinities which exist between the species *planatus* (text-fig. 42, D, Batsch fig. 15 *a*) and *arietinus* (text-fig. 42, A, Batsch fig. 15 *c*), which merge into one another by a series of intermediate forms in any gathering in which the genus occurs in abundance, whereas specimens intermediate between the elongate compressed form (text-fig. 42, A, Batsch fig. 15 *c*) and the elongate circular-sectioned forms (text-fig. 42, B, C, Batsch figs. 15 *d*, *f*) are practically non-existent.

On the other hand, taking Batsch's figs. *d*, *f* (text-fig. 42, B, C) as a basis for specific distinction, there occurs a continuous diminution in the size and development of the spiroline commencement, and linear development of the later chambers until we arrive at the *P.* (*Spirolinites*) *cylindraceus* of Lamarck (text-fig. 43, E), which is identical with the *Nautilus acicularis* of Batsch, figs. 16 *a*, *b* (text-fig. 43, F) (fig. 16 *b* is merely a section of fig. 16 *a*). In this type the spiroline commencement has become almost suppressed. We have taken the trouble to examine d'Orbigny's specimens of *Spirolina cylindracea* (Lamarck) both in Paris and at La Rochelle, and in all of these the spiroline commencement does not exceed in breadth the diameter of the terminal, or oral, chamber.

It would seem desirable, therefore, that in future the specific name *P. arietinus* should be confined to those specimens having a spiral commencement and a produced series of later chambers whether oval or circular in section, irrespective of the relative proportions attained by the spiral commencement, the specific names *P. cylindraceus* being superfluous excepting as presently suggested for taxonomic purposes, and *P. lituus* being superfluous altogether.

The name *P. lituus* appears in Gmelin's 1788 edition of Linnæus * on the strength of two references, one to Spengler and the other to Klein, which, however, as we shall see, refer to entirely different organisms, and the name should therefore lapse as being (to use a legal phrase) "void for uncertainty." But in the 'Challenger' Monograph † Brady figures, under the varietal name *P. lituus*, certain forms consisting of a number of chambers, circular in section and arranged in a rectilinear series, without any trace of a spiral commencement or initial portion of the shell (text-fig. 43, G).

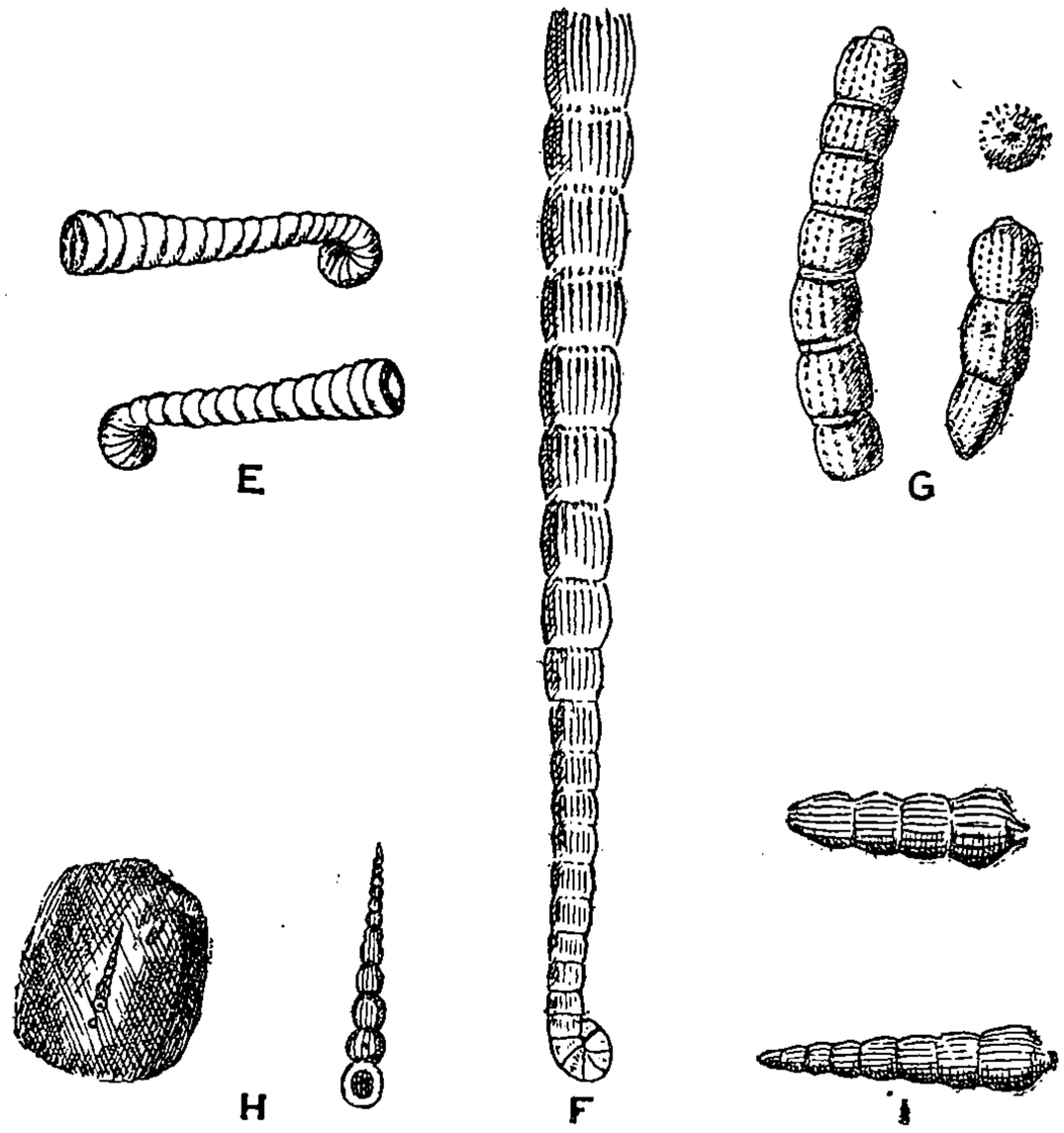
* L. 1788, SN. p. 3372, no. 13.

† B. 1884, FC. p. 205, pl. xiii. figs. 24, 25.

Such forms are abundant in the Kerimba dredgings, as in many tropical gatherings all round the world. Their association (by Brady) with the *Nautilus lituus* of Gmelin is based entirely upon a supposition that the objects thus figured are fragments of an organism of which the initial *spiral* portion (a feature especially insisted upon by Gmelin in the definition of *N. lituus*) had become broken away.

Now Gmelin identifies *N. lituus* with certain previously published figures in the

Text-figure 43.



E. *Spirolinites cylindracea* Lamarck, 1804–6, fig. 15.
F. *Nautilus acicularis* Batsch, 1791, fig. 16 *a*.
G. *Peneroplis lituus* (Gmelin)?, after Brady, 1884.
H. Klein's fig. 1 *a*, *b*, 1753–4.
I. Plancus, "*Cornu hammonis*," 1738, fig. 6 E, G.

works of Klein * and of Spengler †. But Klein's figure (text-fig. 43, H) appears to us indubitably to represent *Nodosaria obliqua* (Linné) or *Nodosaria raphanus* (Linné), an

* Theodor Klein, "Vom Bau, dem Wachstum und der Schilderung der Schneckenschalen" in 'Versuche und Abhandlungen der Naturforschenden Gesellschaft in Danzig,' Theil II. (Dantzig and Leipzig, 1754), no. 1, pp. 1–68. See p. 47 & pl. i. fig. 1, *a* & *b*. The figure appears as a vignette on p. 44 of the "Lucubratiuncula" appended to Klein's 'Tentamen Methodi Ostracologicæ' (Leyden, 1753) as an illustration to § xxxii. p. 28.

† L. Spengler, "Beskrivelse over nogle i Havsandet nylig opdagede Kokillier med forstorrede Afbildninger" in 'Nye Samling af d. Kong. Danske Videnskabers Selskabs Skrifter,' vol. i. (Copenhagen, 1781), pp. 373–383. See p. 380, pl. ii. fig. 10, *d–g*.

identification which is supported by the fact that Klein himself associated his specimens with the figures of "*Cornu hammonis erectum, vulgare, striatum, siliquam raphanistrum perfectissime referens*" of the earlier author Plancus *, which are unquestionably *Nodosaria raphanus* (Linné) (text-fig. 43, I), and were actually identified with *N. raphanus* by Gmelin himself in another place. Spengler's figure, on the other hand (text-fig. 44, K), represents a very elongate *Peneroplis* of the type of *Nautilus aciculatis* (text-fig. 43, F, Batsch fig. 16 *a*), and is, in fact, the earliest figure of that elongate type with a small spiroline commencement. The same elongate type was subsequently figured by Lamarck (*ut supra*) as *Spirolinites cylindracea* in 1804 and 1823 (text-fig. 43, E), and in 1826 was renamed by d'Orbigny *Spirolina pedum* †, and figured by him in the "Planches inédites," in Paris. Typical specimens are preserved in d'Orbigny's collections, which we have studied both in Paris and at La Rochelle. The spiral portion, though very small, is distinctly shown in Spengler's figure (text-fig. 44, K), who, however, referred his form to Klein's figure (text-fig. 43, H), expressing the opinion that his own specimens were perfect, and that Klein's were damaged specimens which had lost their initial spiral portion, or which were so imbedded in the "hard sandstone" material in which they were found as to have that portion hidden from view. It was this observation of Spengler's that led Gmelin into the confusion found (*ut supra*) in his edition of the 'Systema Naturæ.'

Further confusion has been introduced by Blainville and d'Orbigny. Blainville's figure ‡ (text-fig. 44, L) and d'Orbigny's Modèle no. 24 of *Spirolina* (*sic* in 1811) *cylindracea* Lamarck (text-fig. 44, M) both represent the shorter and stouter form shown in Batsch's fig. 15 *f* (text-fig. 42, C), which, for reasons given above, we identify with *P. arietinus* proper. The elongate form of *Spirolinites* (*sic* in 1804) *cylindracea* Lamarck, which is in all respects identical with *Nautilus aciculatis* Batsch §, *Spirolina pedum* d'Orbigny, *Spirolina longissima* Costa ‖, and *Peneroplis laubii* Karrer ¶, is very rare, and though in the analysis which follows we have separated very elongate forms of *P. arietinus* under the name *P. cylindraceus* (Lamarck), we have not found at Kerimba, and but very rarely elsewhere, the ultra-elongate and minutely spiroline form in its typical aspect, such as are preserved in the d'Orbigny collections at Paris and La Rochelle.

It will thus be seen that the real confusion arises from the fact that both the thin elongate, and the stout forms have been indiscriminately figured as *P.* (*Spirolinites*) *cylindraceus* (Lamarck), whereas the elongate form is the Spengler (text-fig. 44, K) and Batsch (fig. 16, text-fig. 43, F) type, whilst the stout form is the typical and direct

* Janus Plancus, 'De conchis minus notis' (Venice, 1738), p. 15, pl. i. fig. 6, E, G.

† d'O. 1826, TMC. p. 287, no. 5. For a tracing of d'Orbigny's original sketch for his "Planche inédite" see F. 1904, SOF. pl. ii. figs. 4, 5.

‡ H. M. D. de Blainville, 'Manuel de Malacologie' (Paris, 1825), p. 382, and Plates (1827), pl. v. fig. 1.

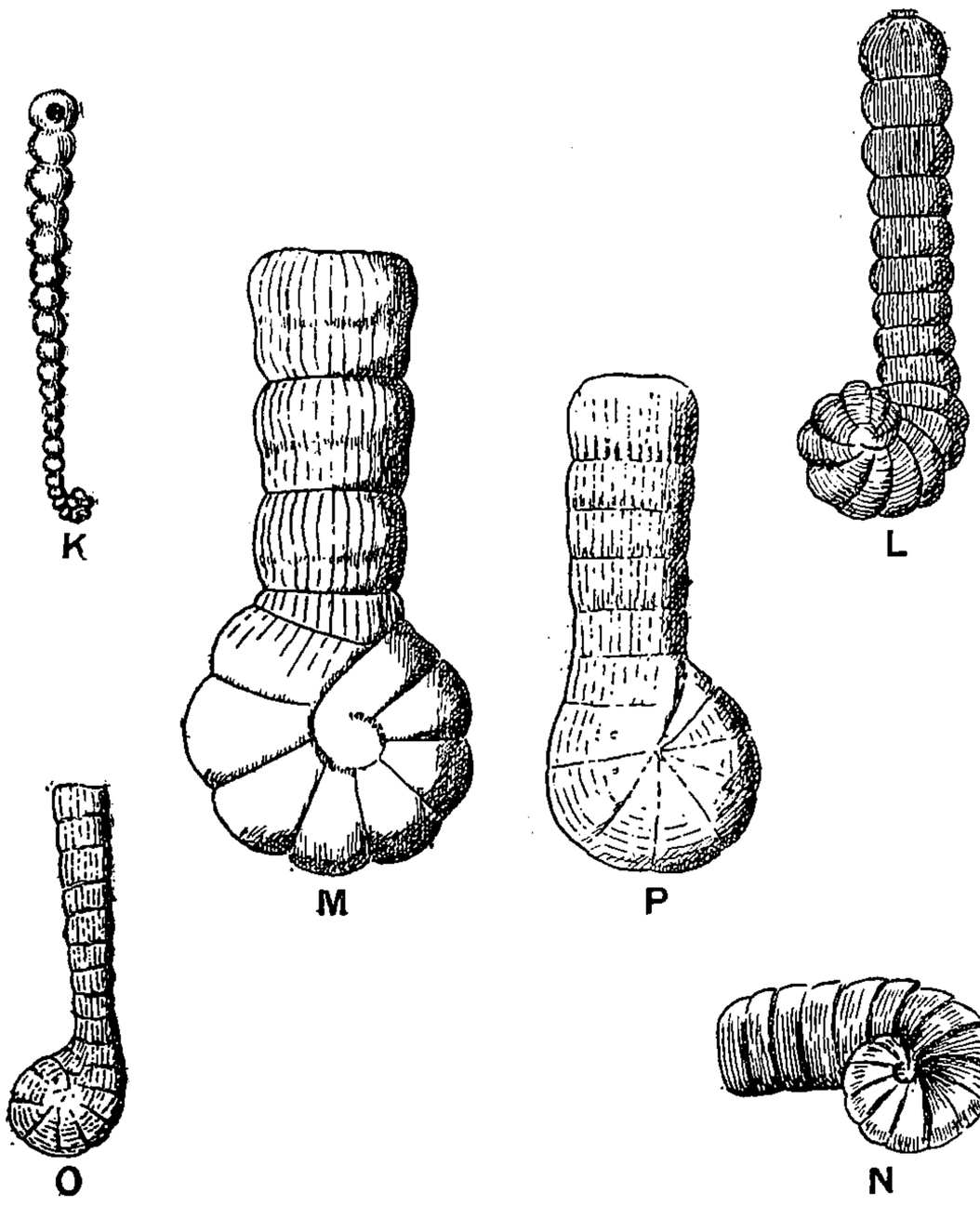
§ B. 1791, fig. 16 *a*.

‖ C. 1853, etc., PRN. 1856, p. 225, pl. xx. fig. 11.

¶ K. 1868, MFKB. pl. iii. fig. 8.

descendant of the "Cornu Hammonis" called *Nautilus semilituus* by Plancus. This latter, which made its first appearance in Plancus' Appendix to the 'Phytobasanos' of Fabio Colonna * in 1794 (text-fig. 44, N), appears again in the second edition of

Text-figure 44.



K. *Nautilus rectus* Spengler, 1781, fig. 10 *e*.
L. *Spirolina cylindracea* Blainville, 1825, pl. v. fig. 1.
M. „ „ d'Orbigny, 1826, Modèle no. 24.
N. *Nautilus semilituus* Plancus, 1744, pl. 38. fig. D.
O. *Spirolina clavata* Lamarck, *fide* Crouch, 1827, pl. xx. fig. 8.
P. *Spirolina austriaca* Reuss, 1861–65, Model no. 25.

'De Conchis minus notis' in 1760 †, and again in Martini's and Chemnitz's great work ‡ in 1769 §.

* 'C. Fabii Columnæ Lyncei ΦΥΤΟΒΑΣΑΝΟΣ cui accessit Vita Fabii, etc.,' Jano Planco Auctore (Florence. 1744), Appendix, p. ii, § 2, pl. xxxviii. fig. D.

† Janus Plancus, 'De conchis minus notis' (Rome, 1760), Appendix II. cap. 1, pl. i. fig. x (o).

‡ F. H. Martini and J. H. Chemnitz, 'Neues systematisches Conchylien Cabinet' (Nuremberg, 1769–1788), 10 vols. Text, vol. 1, p. 265; Plates, pl. xx. fig. 186.

§ The distinction was clear to Spengler, who figures this stout form also in his plate 1, fig 4, and to Schröter, who figures a typical specimen in his 'Neue Literatur und Beyträge zur Kenntniss der Naturgeschichte, etc.' (Leipzig, 1784), on pl. i. fig. 7.

Gmelin's species *Nautilus lituus*, were it not for the fact that it must lapse "for uncertainty," should therefore stand *sensu restricto* for the long spiroline forms, and the specific name *cylindraceus* of Lamarck might be retained to cover the shorter and stouter forms, intermediate between the less elongate *P. arietinus* and Spengler's form, *i. e.* the form figured by Blainville (text-fig. 44, L), and in d'Orbigny's Modèle no. 24 (text-fig. 44, M), to which (to add to the confusion), Lamarck, as figured by Crouch * (text-fig. 44, O), gave the further name *Spirolina clavata*, and d'Orbigny in 1846 (FFV. p. 137, pl. vii. figs. 7–9) called it *Spirolina austriaca*, which name Reuss adopted in 1861–65, making it his Model no. 25 in the Catalogue (text-fig. 44, P).

Parker and Jones in their 'Nomenclature' † were in a sense right, therefore, in saying that *Nautilus lituus* (Gmelin) was identical with *Spirolina cylindracea* Lamarck (text-fig. 43, E), if they referred only to the elongate spiroline type [which Lamarck should have named *Spirolinites acicularis* (Batsch)] and *not* to the *Spirolina cylindracea* Lamarck, as figured by Blainville (text-fig. 44, L) and represented by d'Orbigny's Modèle no. 24 (text-fig. 44, M). We do not advocate this correction in accordance with the strict rules of priority, for the reason that the specific name *cylindraceus* has now been used by a great number of authors for nearly a hundred years, and to substitute *acicularis* for it now, on the strength of Batsch's almost unattainable work, would lead to very great confusion.

The conclusion that we have arrived at, therefore, is that the shorter and stouter spiroline forms must be called *P. arietinus* (Batsch), the name *P. cylindraceus* (Lamarck) must be given to all very narrow and elongate forms with small spiroline commencement, and the name *P. lituus* must lapse, Brady's specimens figured under this name coming, as we shall now see, into Chapman's subgenus *Monalysidium*.

Brady's identification of his specimens of *P. lituus* with Spengler's original figure is, as we have seen, based upon the supposition that the specimens which he figured were fragments of an organism of which the initial spiral was lost—an inversion of Spengler's views as to the identity of *his* specimens with Klein's. The identification is, in our opinion, untenable, regard being had to the numerous specimens which we have seen, both at Kerimba and elsewhere, none of which has ever exhibited any trace of an initial spiral portion. They are nearly always characterized by a definite aperture at both ends, and present normally little, if any, variation throughout the diameter of the shell. Millett, who adopts Brady's identification for these forms, observes ‡, "although there are numerous examples of the fragile form *P. lituus*, not one of them possesses the initial chambers."

Chapman § has suggested a new subgenus, *Monalysidium*, to include "the long, delicate, crozier-shaped specimens of which *Nautilus lituus* (Gmelin) is the type."

* E. A. Crouch, 'An Illustrated Introduction to Lamarck's Conchology' (London, 1827), p. 40, pl. xx. fig. 8. We cannot trace that Crouch had any authority for making Lamarck responsible for this new name.

† P. J. & B. 1859, etc., NF. 1859, p. 481 (J.).

‡ M. 1898, etc., FM. 1898, p. 613.

§ C. 1899, FFA. pp. 3, 4, pl. i. figs. 5, 6.

He makes two species, *M. sollasi*, which he figures with a compressed spiral initial portion, followed by a series of subglobular chambers, and a terminal orifice with everted margin ; and another species, *M. polita*, which he describes as "test imperfect, but probably similar in general outline to *M. sollasi*," with the exception that the segments are more irregular in form. The rectilinear portion of the shell, "the only part discovered at present," consists of six subcylindrical and irregular segments, aperture with an everted margin. From this description it would appear that Chapman also believed his specimens to be merely fragments of a spirally commencing shell. The Kerimba individuals agreeing in all other respects with Chapman's diagnosis, and occurring in considerable quantity, leave no doubt in our minds that the organism is specifically devoid of any spiral commencement whatever.

We therefore consider that Chapman's subgenus *Monalysidium* should be modified to include these rectilinear forms only, and that the spirally commencing *M. sollasi* should be referred to the genus *Peneroplis*.

112. **Peneroplis pertusus** (Forskål).

Nautilus pertusus Forskål, 1775, Descriptio animalium, p. 125. no. 65.
„ *planatus*, var. *α*, Fichtel & Moll. 1798, TM. p. 91, pl. xvi. *a*, *b*, *c*.
Peneroplis proteus Schacko, 1883, UF. p. 443, pl. xii.
„ *pertusus* Brady, 1884, FC. p. 204, pl. xiii. figs. 16, 17.
„ „ Möbius, 1880, FM. p. 78, pl. iii. figs. 9–12.
„ „ Egger, 1893, FG. p. 247, pl. iii. fig. 30.
„ „ Rhumbler, 1894, PP.
„ „ Chapman, 1900, FLF. p. 179.
„ „ Winter, 1907, PP.

15 *Stations*.

Occurs at nearly every Stn., but does not attain any very large size and is seldom as abundant as its more outspread relative, *P. planatus*. The best specimens were at Stns. 2 *a* and 6. Good specimens and some deformities at Stn. 1. Poorly developed at Stn. 4 and very rare at Stns. 5, 7, 9, ? X and ? B. Both the involute and evolute types occur, generally together.

113. **Peneroplis planatus** (Fichtel & Moll.).

Nautilus (*Lituus*) *arietinus* (*pars*) Batsch, 1791, CS. p. 4, pl. vi. fig. 15 *a*, *b*.
„ *planatus*, var. *β*. Fichtel & Moll. 1798, p. 91, pl. xvi. fig. 1.
Peneroplis lanatus * Montfort, 1808–10, CS. vol. i. p. 258, 65*me* genre.
„ *planatus* d'Orbigny, 1826, TMC. p. 285, no. 1, Modèle no. 16.
„ „ Brady, 1884, FC. p. 204, pl. xiii. fig. 15.
„ „ Tempère, 1897, FCF. p. 23. pl. iv. fig. 17.

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* Doubtless a misprint for *planatus*, as Montfort gives the F. & M. reference. His French equivalent, *Penerople aumusse*, refers to the ecclesiastical fur cap or bonnet (suggested by the shape of the shell), which has survived to the present day, though the *amice*, properly speaking, was more in the nature of a hood and collar, and is now represented as a short vestment.

15 *Stations.*

Universally distributed, often very common and attaining splendid dimensions, the best and largest being at Stns. 3, 9, and ? X. Deformities at Stn. 1. Very rare at Stns. 7 and 8.

114. **Peneroplis carinatus** d'Orbigny.

Peneroplis carinatus d'Orbigny, 1839, FAM. p. 33, pl. iii. figs. 7, 8.
„ *dubius* d'Orbigny, 1839, FC. p. 62, pl. vi. figs. 21, 22.
„ *carinatus* Brady, 1884, FC. p. 205, pl. xiii. fig. 14.

14 *Stations.*

Less generally distributed and, as a rule, small and poorly developed as compared with the other varieties. At Stn. ? B a specimen was observed with punctate surface. This punctation of the surface is not uncommon in some of the varieties, notably in *P. cylindraceus* and in the subgenus *Monalysidium*, but we have not noticed it before in *P. carinatus*, which has usually a thick and polished surface.

115. **Peneroplis arietinus** (Batsch).

Plancus, 1744, op. cit. (Note, p. 599) pl. xxxviii. fig. D.
Plancus, 1760, op. cit. (ibid.) pl. i. fig. X (O).
Spengler, 1781, op. cit. (Note, p. 597) p. 370, pl. i. fig. 4 *a–d*.
Schröter, 1784, op. cit. (Note, p. 599) p. 317, pl. i. fig. 9.
Batsch, 1791, CS. p. 4, pl. vi. fig. 15 *d–f*.
Blainville, 1825, op. cit. (Note, p. 598) p. 382, pl. v. (1827) fig. 1.
d'Orbigny, 1826, TMC. p. 286, No. 1. *Spirolina cylindracea*, Modèle no. 24.
Peneroplis planatus Parker, Jones, & Brady, 1859, etc., NF. 1865, p. 26, pl. i. fig. 18.
„ *arietinus* Brady, 1884, FC. p. 204, pl. xiii. figs. 18, 19, 22.
„ „ Chapman, 1900, FLF. p. 179.

14 *Stations.*

Fairly generally distributed, but never very abundant, the best specimens being at Stn. 9. Very small at Stn. 3 and very rare at Stns. 7, 8, ? X, and ? B. At Stn. 4 only one typical example, but a variety occurred in which the last few chambers suddenly expanded in width so as to form a bell-shaped expansion at the end of the normally parallel-sided test. The species passes almost imperceptibly into *P. cylindraceus*. (*Vide* Introductory Note.)

116. **Peneroplis cylindraceus** (Lamarck).

Spengler, 1781, op. cit. p. 380, pl. ii. figs. *d–f*.
Nautilus acicularis Batsch, 1791, CS. p. 4, pl. vi, fig. 16 *a*, *b*.
Spirolinites cylindracea Lamarck, 1804, AM. vol. v. p. 245, vol. viii. 1806, pl. lxii. fig. 16.
„ „ Lamarck, 1823, Recueil des Planches, pl. xiv. fig. 15.
Spirolina pedum d'Orbigny, 1826, TMC. p. 287, no. 5.
„ *longissima* Costa, 1853, etc., PRN. 1856, p. 225, pl. xx. fig. 11.
Peneroplis cylindraceus Brady, 1884, FC. p. 205, pl. xiii. figs. 20, 21.

15 *Stations.*

Fairly generally distributed, and frequent at some Stns., attaining its finest development at Stns. 3 and 9. At Stn. 1 a specimen was observed in which the final chambers were triangular in section instead of round. The variety passes almost imperceptibly into *P. arietinus*.

Subgenus Monalysidium Chapman.

117. **Monalysidium polita** Chapman. (Text-fig. 43, G.)

Peneroplis lituus Brady, 1884, p. 205, pl. xiii. figs. 24, 25 (?).
„ (*Monalysidium*) *polita* Chapman, 1899, FFA. p. 4, pl. i. fig. 5 (*see* Millett, 1898, etc., FM. 1898, p. 613).

12 *Stations.*

Generally distributed, and of quite frequent occurrence at many Stns. The largest and best specimens were at Stn. 3, and those at Stns. 1, 4, and 5 were not much inferior. At Stn. ?X the variety was represented by a single very small and curved specimen, the walls of which were quite transparent and feebly punctate. At many of the Stns. the specimens exhibited a sudden change in the size of the chambers, sometimes increasing and at others decreasing rapidly in dimensions. Occasionally a decrease in size of chambers was followed immediately afterwards by renewed increase.

The majority of the specimens were flush at both extremities, which were furnished with a central aperture, but at most Stns. some of the individuals were furnished at one or both extremities with a produced neck bearing the aperture. This would seem to show that growth can proceed equally at either extremity. Chapman has instituted the subgenus *Monalysidium* for the Peneroplids of the *lituus* type, and, so far as the specimens which he separates under the name of *M. sollasi* are concerned, on what appears to be insufficient grounds. There appears to us to be no reason for separating these specimens, which have a spiral initial portion, from the genus *Peneroplis*, the variation from type not being much greater than is to be found in many other lines of variation exhibited by that genus. As regards the moniliform tests previously recorded and figured by Brady under the specific name *P. lituus*, and for which Chapman proposes the name *Monalysidium polita*, we agree with the wisdom of the separation, there being no evidence whatever in our minds of these forms ever being furnished with a spiral initial portion such as *Peneroplis* must possess. The Kerimba dredgings furnish numerous specimens comparable with his figure and description of *Monalysidium polita* as figured in C. 1899, FFA. (*ut supra*), but we must admit that Chapman has introduced an element of confusion by figuring in a later paper (C. 1900, FLF. p. 180, pl. xix. fig. 8), under the name *Peneroplis* (*Monalysidium*) *politus* (sic)?, an entirely different form having a well-marked involute spiral test, not followed by any rectilinear series of chambers but ending in a some-

what inflated terminal chamber. This figure does not appear to bear much external resemblance to the original figure of either *M. sollasi* or *M. polita*, although he suggests that it is a specimen of the (hypothetical) initial spiral of the latter species. In the Brady Collection at Cambridge a slide labelled "Peneroplis-Spirolina : *P. cylindraceus* Lam., *P. lituus* Gmel.," contains the typical *P. cylindraceus* (*Nautilus acicularis* Batsch) and specimens of *Monalysidium polita* Chapman.

Orbitolites Lamarck.

118. **Orbitolites marginalis** Lamarck.

Orbulites marginalis Lamarck, 1816, etc., ASV. vol. ii. p. 196, no. 1*.
Orbitolites marginalis Carpenter, 1856, etc., RF. 1856, p. 192, pl. ix. figs. 1–4 etc.
" " Carpenter, 1883, RGO. p. 20, pl. iii. figs. 1–7 ; pl. iv. figs. 1–5.
" " Brady, 1884, FC. p. 214, pl. xv. figs. 1–5.
" " Egger, 1893, FG. p. 248, pl. iii. figs. 46, 47.
" " Chapman, 1900, FLF. p. 180, pl. xx. figs. 1–3.

16 *Stations.*

Universally distributed and often abundant, occasionally attaining exceptionally fine proportions and growth, especially at Stns. 9 and ?X ; most abundant at Stns. 1, 2 *a*, and 9.

The difficulty of separating this species from *O. duplex* is often considerable, especially in an advanced stage of growth. The typical features of *O. marginalis* rest upon the researches of Carpenter, and in a lesser degree of Brady, for the original description of Lamarck, "Utrinque plana, margine porosa," is useless for purposes of specific identification. The usual features associated with the species are the presence of a pavonine initial series of chambers and a single marginal row of pores.

O. duplex, on the other hand, is distinguished by a double row of marginal pores and "a very slight approach to that orbiculine spire which is typical alike of *O. tenuissima* and of *O. marginalis*, approaching much more closely to the true cyclical plan of *O. complanata*. The nucleus (*sic*) consists, as in *O. marginalis*, of a small primordial chamber which is surrounded by a circumambient chamber ; and round this nucleus is seen a row of chamberlets which often at once forms a nearly entire annulus, the ring being soon completed in succeeding circlets, and all subsequent additions being made on the cyclical plan" (C. 1883, RGO. p. 26). Carpenter's word "nucleus" refers, of course, only to the primordial chamber of the calcareous test, and not to the true or protoplasmic nucleus.

It appears, therefore, that Carpenter differentiates the two species as follows :—

O. marginalis.	*O. duplex.*
Initial portion, orbiculine ; marginal pores, single.	Initial portion, milioline (cornuspirine) ; marginal pores, double.

* The generic name *Orbitolites* was instituted for *O. complanata* and *O. concava* in Lamarck's earlier 'Système des Animaux sans Vertèbres' (Paris, 1802), p. 376.

But the examination of a large series of specimens from a locality such as the Kerimba Archipelago, where both species are equally abundant, tends to show that these features, though perhaps generally, are not universally consistent, for we have found unquestionable examples of *O. marginalis* presenting both single and double pores in different parts of the periphery of the same specimen, and also presenting the usual orbiculine initial portion in such minimum stage of development as to be practically inseparable from the postulated commencement of *O. duplex*. The specific distinctiveness of the two forms appears to us, therefore, to remain open to some doubt, and the question arises whether they may not be stages in the life-history of the same organism, perhaps forms A and B of a dimorphic series.

119. **Orbitolites duplex** Carpenter.

Orbitolites duplex Carpenter, 1856, etc., RF. 1856, p. 220, pl. v. fig. 10, pl. ix. fig. 10.
„ „ Carpenter, 1883, RGO. p. 25, pl. iii. figs. 8–14, pl. iv. figs. 6–10, pl. v. figs. 1–10.
„ „ Brady, 1884, FC. p. 216, pl. xvi. fig. 7.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 320.

15 *Stations.*

Almost universally distributed, and common at some Stns. The best specimens were at Stns. 2 *b* and 9. Under *O. marginalis* we have dealt at length with the specific characters of this species. In its optimum development there is no difficulty in the identification of a specimen of *O. duplex*; it is only in the younger and more feebly developed specimens that any hesitation is experienced.

The Kerimba specimens of *O. duplex* are subject to much more variation than *O. marginalis*; double and irregularly built individuals were observed at Stn. 11. At Stn. 7 the process of repair was also noticed, and at this Stn., at ? B, and several others, the larger specimens exhibited a tendency to an abnormal and sudden increase in the size of the chambers in the outer annuli, which were often inflated and very thin-walled, the appearance of such a test being like a circular pan or dish with a raised and thickened rim. It is possible that this feature may represent the commencement of the brood-stage, but we have been unable to find any specimens containing primordial young such as we have found in *O. complanata.*

Many of the specimens, both of *O. duplex* and *O. complanata,* exhibit growths of secondary shell-matter usually radiating in bands from the centre of the test, as figured by Carpenter (C. 1856, etc., RF. p. 217, pl. vii. figs. 10, 11). These outgrowths, which are usually of a denser and more porcellanous character than the rest of the shell, probably merely mark excessive shell-development under exceptionally favourable conditions. Symbiotic algæ were observed in all three species of *Orbitolites*, in some cases in such numbers as to give a greenish tinge to the whole shell, as described by Moseley in his "Notes by a Naturalist on the 'Challenger'" (London, 1879, pp. 292–3).

A specimen exhibiting two distinct young individuals fused at a comparatively advanced stage of growth, followed by many concentric annuli of chambers, was found.

120. **Orbitolites complanata** Lamarck.

Orbitolites complanata Lamarck, 1802, Syst. Anim. sans Vert. p. 376.
„ „ Carpenter, 1856, etc., RF. 1856, p. 224, pls. iv.–ix.
„ „ Möbius, 1880, FM. p. 81, pl. iv. figs. 4, 5, pl. v. figs. 1–5.
„ „ Carpenter, 1883, RGO. p. 29, pl. v. figs. 11–18, pls. vi.–viii.
„ „ Brady, 1884, FC. p. 218, pl. xvi. figs. 1–6, pl. xvii. figs. 1–6.
„ „ Lister, 1895, LHF. p. 431, pl. ix. figs. 41–51.
„ „ Chapman, 1900, FLF. p. 181.

9 *Stations.*

Very abundant, especially at Stns. 9 and 12, and frequent at many of the other Stns. At Stn. 9 a complete series of specimens from primordial chambers up to nearly half an inch in diameter was obtained, also showing every stage of multiformity and repair. Specimens were found showing the coalescence in the early stage of the shell of from two to five and even seven megalospheric primordial chambers. At Stn. 12 large microspheric specimens were found containing in the outer annulus numerous megalospheric young, primordial chambers often with half to a whole annulus of the succeeding chambers perfectly developed. We are describing and figuring these specimens elsewhere (H.-A. 1915, RPF. pls. xiv., xv. figs. 16–20, 33).

It is noticeable that the Kerimba specimens exhibiting this stage in the life-history were flat and otherwise normal, not distorted or crumpled at the edges as in *O. complanata*, var. *laciniata* Brady [which would appear to be the same as *Marginopora vertebralis*, var. *plicata* Dana (J. D. Dana, 1846, in C. Wilkes' U.S. Exploring Expedition, vol. vii., Zoophytes, p. 706, pl. lx. fig. 9)]. In this variety alone the reproductive process appears to have been hitherto recorded.

At Stn. 9, which was the Stn. at which *Orbitolites* reached its optimum development, many individuals were found exhibiting the superficial deposits of shell-matter arranged in radiating lines from the centre of the test above referred to.

Alveolina d'Orbigny.

121. **Alveolina boscii** (Defrance).

"*Alveolites*" Defrance, 1816, Dict. Sci. Nat. vol. i. p. 557 (*Alveolite grain de festuques*, Bosc.) *.
Oryzaria boscii Defrance, 1820, Dict. Sci. Nat. vol. xvi. p. 104 (sub *Fabularia*).
Alveolina boscii d'Orbigny, 1826, TMC. p. 306, no. 5, Modèle no. 50.
„ „ Möbius, 1880, FM. p. 79, pl. iii. figs. 13–15, pl. iv. fig. 1.
„ „ Brady, 1884, FC. p. 222, pl. xvii. figs. 7–12.

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* The page 137, which is generally given in synonymies, describes *Alveolitis* "*Animal inconnu, contenu dans deux cellules calcaires*," which has no relation to *A. boscii*. *Alveolites* occurs in the "Supplement" to vol. i.

5 *Stations.*

The species, considering the latitude and shallowness of the deposits, is poorly represented, never occurring in any quantity. None of the specimens attains a very large size, but they are otherwise quite typical. Farther to the north, at Perim and in the Red Sea, the species is one of the dominant types of Foraminifera in similar depths.

122. **Alveolina melo** (Fichtel & Moll).

Nautilus melo Fichtel & Moll, 1798, TM. p. 118, pl. xxiv.
Alveolina melo d'Orbigny, 1826, TMC. p. 306. no. 2.
„ „ Möbius, 1880, FM. p. 80, pl. iv. figs. 2–3.
„ „ Brady, 1884, FC. p. 223, pl. xvii. figs. 13–15.
„ „ Egger, 1893, FG. p. 249, pl. iii. fig. 31.

10 *Stations.*

More widely distributed and also more frequent than *A. boscii.* It is most abundant and attains its best development at Stn. 11. At most of the Stns. two distinct forms occur together, one spherical (most frequent), the other obtusely elliptical, suggesting d'Orbigny's species *A. ovoidea* and *A. oblonga*, which, however, merely represent forms intermediate between *A. boscii* and *A. melo* (*cf.* F. 1904, SOF. p. 15, pl. iv. figs. 11–13).

Family ASTRORHIZIDÆ.

Subfamily ASTRORHIZINÆ.

122 *a*. **Astrorhiza limicola** Sandahl.

Astrorhiza limicola Sandahl, 1857, Öfversigt af K. Vetensk. Ak. Förh. Stockholm, vol. xiv. (1858) p. 299, pl. iii. figs. 5, 6.
„ „ Brady, 1884, FC. p. 231, pl. xix. figs. 1–4.
„ „ Agassiz, 1888, "Three Cruises of the 'Blake,'" vol. ii. p. 161, fig. 489.

1 *Station.*

A single specimen attached to the shell of uncertain origin before alluded to.

IRIDIA H.-A. & E.

(*Iridia* nob., non *Iridea* Swainson, quæ Mollusca) *.

123. **Iridia diaphana** H.-A. & E. (See Part I. of this paper, p. 371.)

On a fragment of shell the locus of origin of which was not noted, was found a particularly depressed adherent individual which, we think, represents a continuation of growth in the young, finely granular, domed form. It is very depressed and flat on the surface and largely constructed of small sponge-spicules buried in a brilliantly white cement, forming a very striking and decorative object.

* Swainson, 'A Treatise of Malacology' (London, 1840), pp. 283–285, 379.

Whilst these pages have been passing through the press, we have dealt with the question of the identity of *Vanhoefenella gaussi* Rhumbler with one of the abnormal forms of *Iridia diaphana* [Proc. Zool. Soc. (Lond.) 1915, p. 296]. We now have to consider the question of the relationship of *I. diaphana* with *Squamulina varians* Carter (AMNH. 1870, ser. 4, vol. v. p. 321, pl. v. figs. 1–5). Carter's figures are very diagrammatic, and his description, though voluminous, is by no means clear. At first sight, the early stages of *S. varians* appear to be very similar to those of *I. diaphana*, the test being hemispherical and attached, and with a chitinous foundation; but Carter considers the prominent lateral aperture as specifically essential, whereas in *I. diaphana* an aperture of any kind is rare. The rough surface studded with projecting spicules is never observed in British or tropical *I. diaphana*, nor has it the everted rim attaching it to the host. Specimens in the Millett Collection, named *Placopsilina varians* after Carter's species, are identical with the young *I. diaphana* originally recorded by us from Selsey as *Webbina hemispherica*, and show none of the above-mentioned features of *S. varians*. Carter's figures of the adult form are merely sectional diagrams, and it is impossible to identify them either with his young stage or with *I. diaphana* as figured by us, though their appearance (especially fig. 5) strongly suggests the latter, but there seems no reason for connecting his young and adult forms. Brady transferred *S. varians* to the genus *Placopsilina*, as *Squamulina* is unquestionably allied to the imperforate Miliolidæ, but his identification of it with Siddall's *P. kingsleyi* is more than questionable. Siddall's figure (Proc. Lit. Phil. Soc. Liverpool, vol. xl., App. pl. i. fig. 1) is of the crudest description, and no diagnosis of the form is supplied. It represents almost certainly *P. cenomana* d'Orb., but we have not been able to find the types in the Siddall Collection now in our possession. It would appear, therefore, that our generic name *Iridia* should stand and that Carter's young form (figs. 1, 2) should be known as *Iridia varians*, that Carter's "amœboid" forms (figs. 3–5) are identical with *I. diaphana*, and that Rhumbler's *Vanhoefenella gaussi* is merely an abnormal condition of our type. We shall deal with the matter finally in a forthcoming paper (JRMS. 1916).

Subfamily PILULININÆ.

RHAPHIDOSCENE Vaughan Jennings.

124. **Rhaphidoscene conica** Vaughan Jennings. (Pl. XLVI. figs. 16, 17.)

Rhavhidoscene conica Vaughan Jennings, 1895, "On a new Genus of Foraminifera of the Family Astrorhizidæ," Journ. Linn. Soc. (London), Zoology, vol. xxv. pp. 320–321, pl. x.
" " Rhumbler, 1903, ZRF. p. 225, fig. 50.
" " Chapman, 1902, F. p. 117, pl. v. fig. H.

1 *Station*.

At Stn. 3 a single specimen was found adherent to a fragment of Zostera, which we figure. It differs in several particulars from the original figure and description of Vaughan Jennings, but we have little doubt that it represents the same or a closely allied organism.

The test is constructed of sponge-spicules of varying kinds, acerate and triradiate, loosely and irregularly felted together, the interstices being filled with fine muddy cement substance. There is no "finish" to the external surface of the test, the spicules in some places projecting slightly from the superficial layer. The test is conical, but slightly truncate at the apex, which bears no special aperture; there are several irregular interstices in the walls of the cone and, round the base at the point of attachment, many openings into the interior. How far these may be adventitious we are unable to say.

The interior of the cone appears to be filled with a loosely agglomerated mass of spicules and sand-grains. Diameter of cone ·50 × ·55 mm.; height ·8 mm.

The specimen differs from the type:—(i.) in the irregular disposition of the spicular building material, which, in Vaughan Jennings' specimen, was arranged in regular tent-pole, or wigwam, fashion culminating in a pointed apex; (ii.) in the utilization of sand and cement material between the spicules. The type was composed entirely of sponge-spicules except at the base, where it is stated that there was "a small amount of a white, doubtless calcareous, cement"; (iii.) This basal cement is entirely lacking in the Kerimba specimen, which rises flush from the surface of the host-alga.

The species, so far as we know, has never been recorded since Vaughan Jennings found it in material from the 'Porcupine' dredgings (Faroe Channel, 3rd cruise 1869, 440 fms.) attached to the test of *Botellina labyrinthica*. We have a specimen from Haul 119 'Goldseeker,' also in the Faroe Channel, 60° 34′ N., 4° 32′ W., depth 965 metres, attached to a pebble, which closely resembles Vaughan Jennings' figure in most essential points but is very much larger, being 3 mm. in diameter, the cone much depressed and exhibiting a well-marked apical aperture closed in with fine sand-grains. The walls of the cone in the 'Goldseeker' specimen are entirely composed of acerate sponge-spicules laid regularly side by side as in the type.

Subfamily Saccamminiнæ.

Psammosphæra Schulze.

125. **Psammosphæra fusca** Schulze.

Psammosphæra fusca Schulze, 1874, R. p. 113, pl. ii. fig. 8.
„ „ Brady, 1879, etc., RRC. 1879, p. 27, pl. iv. figs. 1, 2.
„ „ Brady, 1884, FC. p. 249, pl. xviii. figs. 1–8.
„ „ Haeusler, 1890, FST. p. 15, pl. i. figs. 1–3.
„ „ Heron-Allen & Earland, 1912, etc., NSG. 1913, p. 1, pls. i–iii.

4 *Stations.*

A number of specimens built up of calcareous particles and siliceous sand-grains loosely agglutinated with cement occur at Stn. 7 and rare specimens at the other Stns. They are all free-growing individuals at Stn. 7, attached specimens occurring only at Stn. 1.

Subfamily Rhabdamminiнæ.

Jaculella Brady.

126. **Jaculella acuta** Brady.

Jaculella acuta Brady, 1879, etc., RRC. 1879, p. 35, pl. iii. figs. 12, 13.
„ „ Brady, 1884, FC. p. 255, pl. xxii. figs. 14–18.
„ „ Goës, 1882, RRCS. p. 143, pl. xii. fig. 432.
„ „ Flint, 1899, RFA. p. 269, pl. ix. fig. 4.
„ „ Cushman, 1910, etc., FNP. 1910, p. 70, figs. 90–91.

1 *Station*.

One unbroken initial portion and a terminal fragment from Stn. 1, built up of sand-grains and calcareous particles. Most of the records given by Brady are from deep water, but the species probably occurs all over the world in moderate depths, as it certainly does round the British Islands.

Hyperammina Brady.

127. **Hyperammina vagans** Brady.

Hyperammina vagans Brady, 1879, RRC. etc., 1879, p. 33, pl. v. fig. 3.
„ „ Brady, 1884, FC. p. 260, pl. xxiv. figs. 1–9.
„ „ Flint, 1899, RFA. p. 270, pl. xi. fig. 2.
Tolypammina vagans Rhumbler, 1903, ZRF. p. 277, fig. 125, *a*, *b*.
„ „ Cushman, 1910, etc., FNP. 1910, p. 67, figs. 84, 85.
Hyperammina vagans Heron-Allen & Earland, 1913, CI. p. 41, pl. ii. fig. 9.

7 *Stations*.

A few specimens only, excepting at Stns. 12 and ? X. Some attached to shell-fragments, others free, others again which have evidently been attached in their earlier life and have subsequently adopted a free existence. There is the usual range in the method of construction. At Stn. 9, where the specimen was attached to the inner concave surface of a shell, the tube was thin and largely composed of cement. At Stn. 12, where the specimens were attached to the exterior surface of Nullipore algæ, the tube was stoutly built, with large incorporated sand-grains. At Stn. 2 the single specimen was principally built up of sponge-spicules and cement, the spicules projecting in the manner adopted by *Hyperammina ramosa* Brady. At Stns. 3 and 11 the tube was built of fine sand-grains embedded evenly in cement.

Aschemonella Brady.

128. **Aschemonella ramuliformis** Brady. (Pl. XLVI. figs. 18, 19.)

Aschemonella ramuliformis Brady, 1884, FC. p. 273, pl. xxvii. figs. 12–15.
„ „ Cushman, 1910, etc., FNP. 1910, p. 81, fig. 110.

1 *Station*.

At Stn. 11 a few fragments of an organism were obtained, which we think must be attributed to Brady's species. They consist of portions of a branching unseptate tube, built up of sponge-spicules, arranged parallel to the long axis of the tube and covered with an investing layer of sand and cement, the whole forming a somewhat thin-walled organism, in which the central space is large compared to the thickness of the wall of the test. None of the fragments shows an unbroken terminal portion, either oral or aboral. The colour is a very pale brown, but there is no noticeable ferruginous cement.

We think there can be very little doubt as to the Rhizopodal nature of the fragments, their general appearance being very distinctive. Moreover, the branching of the tube may be considered as evidence of their protozoan as opposed to an annelid origin. The interior of the tube is smooth, but there is no trace of any chitinous lining. We have found identical, but much larger, fragments growing in the interstices of the at present somewhat controversial organism named *Ramulina herdmani* by Dakin (D. 1906, FC. p. 226, pl. —, figs. 1–6), and these leave no doubt whatever as to its Rhizopodal nature, though throwing little or no further light on its affinities.

Brady's genus *Aschemonella* appears to be the most likely attribution for these fragments, but, in view of the fact that the records for the genus are all from deep water ranging between 390 and 2900 fms., nothing more definite can be decided in the absence of perfect specimens.

RHIZAMMINA Brady.

129. **Rhizammina algæformis** Brady.

Rhizammina algæformis Brady, 1879, etc., RRC. 1879, p. 39, pl. iv. figs. 16, 17.
„ „ Brady, 1884, FC. p. 274, pl. xxviii. figs. 1–11.
„ „ Flint, 1899, RFA. p. 272, pl. xv. fig. 1.
„ „ Cushman, 1910, etc., FNP. 1910, p. 33, fig. 23.

1 *Station.*

Several specimens growing attached to an oyster-shell from Stn. ?X. The majority of them were simple tubes, the remainder furcating irregularly.

SAGENINA Chapman.

130. **Sagenina frondescens** (Brady).

Sagenella frondescens Brady, 1879, etc., RRC. 1879, p. 41, pl. v. fig. 1.
„ „ Brady, 1884, FC. p. 278, pl. xxviii. figs. 14, 15.
Sagenina frondescens Chapman, 1899, FFA. p. 4, pl. i. figs. 1, 2, pl. ii. figs. 1, 2.
„ „ Chapman, 1900, FLF. p. 182.
„ „ Cushman, 1910, etc., FNP. 1910, p. 71, fig. 93.

5 *Stations.*

Was only observed at five Stns., but probably occurs adherent to coarse material all over the area. A few large shells which we received in spirit, locality unmentioned, were covered with an exceptionally dense growth of this organism.

HALIPHYSEMA Bowerbank.

131. **Haliphysema tumanowiczii** Bowerbank.

Haliphysema tumanowiczii Bowerbank, 1862, Phil. Trans. Roy. Soc. Lond., p. 1105, pl. lxxiii. fig. 3 ; Monogr. Brit. Sponges, vol. i. 1864, p. 179, pl. xxx. fig. 359, vol. ii. 1866, p. 76.
Squamulina scopula Carter, 1870, "On two new Species of the Foraminiferous Genus *Squamulina* etc.," AMNH. ser. 4, vol. v. pp. 309–326, pl. iv.

Haliphysema tumanowiczii W. Savile Kent, 1878, "The Foraminiferal Nature of *Haliphysema tumanowiczii* (Bow.) demonstrated," AMNH. ser. 5, vol. ii. p. 68, pls. iv., v.
" " Möbius, 1880, FM. p. 72, pls. i. & ii. fig. 1.
" " Brady, 1884, FC. p. 281, pl. xxvii. A. figs. 4, 5 (References).
" " Duerden, 1894, MIR. p. 231.

1 *Station.*

One or two specimens were found growing in pits on the surface of the oyster-shell referred to under the description of the material from Stn. ? X. The shell, which had been preserved in spirit, was encrusted with bryozoa and calcareous Algæ. Further specimens from a shell, the precise locus of origin of which was unnôted. The specimens exhibit the large and squamuline base upon which Carter originally referred the specimens to Schultze's genus, *Squamulina*, very perfectly. From the base arises a cylindrical column of finely cemented material, of a brilliant white tint, crowned with the usual tuft of spicules.

The species is one of those recorded by Möbius from the adjacent locality of Mauritius, and his figures are of the type of our Kerimba specimens. The species is probably of world-wide distribution, though the records are scanty, owing to its parasitic habit of growth and extreme friability.

Family LITUOLIDÆ.

Subfamily LITUOLINÆ.

REOPHAX Montfort.

132. **Reophax difflugiformis** Brady.

Reophax difflugiformis Brady, 1879, etc., RRC. 1879, p. 51, pl. iv. fig. 3.
" " Brady, 1884, FC. p. 289, pl. xxx. figs. 1–5.
" " Haeusler, 1885, LAI. p. 9, pl. i. fig. 1.
" " Haeusler, 1890, FST. p. 26, pl. iii. figs. 1–3, pl. v. figs. 25–27.
" " Chapman, 1895, FWS. p. 313, pl. xi. fig. 1.
Proteonina difflugiformis Rhumbler, 1903, ZRF. p. 245, figs. 80 *a*, *b*.

1 *Station.*

One large subglobular specimen from Stn. 11, furnished with a produced neck composed chiefly of calcareous particles.

HAPLOPHRAGMIUM Reuss.

133. **Haplophragmium agglutinans** (d'Orbigny).

Spirolina agglutinans d'Orbigny, 1846, FFV. p. 137, pl. vii. figs. 10–12.
Haplophragmium agglutinans Brady, 1884, FC. p. 301, pl. xxxii. figs. 19–26.
" " Egger, 1893, FG. p. 260, pl. iv. figs. 16, 36.
" " Chapman, 1895, FWS. p. 313, pl. xi. fig. 2.
" " Millett, 1898, etc., FM. 1899, p. 357, pl. v. fig. 1.
" " Heron-Allen & Earland, 1910, NBF. p. 422, fig. 1.

2 *Stations.*

One specimen, large and typical, built up of molluscan fragments and sand-grains with one or two grains of magnetite, at Stn. 1, and another broken specimen lacking the initial spiral portion at Stn. 8, in which the proportion of magnetite grains used in the construction of the shell is large and striking. None of the other Foraminifera at Kerimba building adventitious tests employs magnetite, and, as this mineral is not abundant in the Kerimba sands, its occurrence in these specimens of *H. agglutinans* confirms our statement as to the selective power exhibited by this species. The only Kerimba sand containing any marked proportion of magnetite grains is that from Stn. 13 (Pemba Bay), which is geographically at the other extremity of our series of samples. We have discussed this tendency exhibited by *H. agglutinans* to incorporate magnetite in its shell in several of our papers (*cf.* H.-A. & E. 1909 TNS. p. 411 *et passim*).

134. **Haplophragmium compressum** Goës. (Pl. XLVI. figs. 20, 21.)

Lituolina irregularis, var. *compressa* Goës, 1882, RRCS. p. 141, pl. xii. figs. 421–423.
Rhaphidohelix elegans Möbius, 1880, FM. p. 76, pl. ii. fig. 2.
Haplophragmium emaciatum Brady, 1884, FC. p. 305, pl. xxxiii. figs. 26–28.
„ „ Egger, 1893, FG. p. 262, pl. v. figs. 53, 54.
„ *compressum* Goës, 1896, DOA. p. 31.
„ „ Millett, 1898, etc., FM. 1899, p. 359, pl. v. fig. 8.

1 *Station.*

A number of specimens at Stn. 13, characterized by very light grey, almost white tests, built of sand-grains firmly cemented together. Spicules entirely absent. The septation is very obscure. The test is umbilicate on both sides, and the final chamber in large specimens often presents a tendency to expose the preceding whorl in an irregular manner.

The Kerimba specimens cannot be described as strongly marked or typical, but we have little hesitation in assigning them to Goës' species. They differ, however, from the types of Goës in the entire absence of spicular material. Goës appears to lay considerable stress on the spicular habit of his type, as he refers to the preponderance of spicules in the test. He also compares his type with *Rhaphidohelix eleyans* Möbius and *Haplophragmium foliaceum* Brady. There can be no doubt as to the close resemblance of Goës' type to that of Möbius both in shape and in the preponderance of spicular material, but Brady's species bears no very close resemblance to the type of Goës, and, moreover, *H. foliaceum* never in our experience utilises spicules for the construction of its test. It seems possible therefore that Goës intended to refer to *Haplophragmium emaciatum* Brady, which is of similar shape to Goës' type, and, moreover, utilises spicules largely in the construction of its test. We have accordingly referred *H. emaciatum* Brady to the earlier type of Goës, while leaving *H. foliaceum* apart. Too much importance must not, however, be placed on the utilisation of spicular material

where no other selective tendency is displayed, as their occurrence may depend largely on local conditions. Hence the absence of spicules in the Kerimba specimens of *Haplophragmium compressum*, spicules being extremely rare at Stn. 13, the only locality in which the species was found. The young tests are strongly suggestive of *Haplophragmium neocomianum* Chapman, but are markedly umbilicate, and thicker than Chapman's type.

135. **Haplophragmium canariense** (d'Orbigny).

Nonionina canariensis d'Orbigny, 1839, FIC. p. 128, pl. ii. figs. 33, 34.
Haplophragmium canariensis Siddall, 1879, CBRF. p. 4.
„ *canariense* Brady, 1884, FC. p. 310, pl. xxxv. figs. 1–5.
„ „ Egger, 1893, FG. p. 261, pl. v. figs. 27–29.
„ „ Millett, 1898, etc., FM. 1899, p. 359.
„ „ Chapman, 1895, FWS. p. 314, pl. xi. fig. 5.
„ „ Heron-Allen & Earland, 1910, NBF. p. 425, fig. 2.
„ „ Heron-Allen & Earland, 1913, CI. p. 45, pl. iii. fig. 5.

12 *Stations.*

Occurs at most Stns., but is usually represented by only one or two individuals, and these, as a rule, very small and starved. At Stn. 11, however, we found a good many specimens of quite normal proportions, such as occur in any British dredgings, which appear quite gigantic beside the other Kerimba specimens.

136. **Haplophragmium crassimargo** Norman.

Haplophragmium canariense (pars) Brady, 1884, FC. p. 310, pl. xxv. fig. 4.
„ *crassimargo* Norman, 1892, Museum Normanianum, pt. viii. p. 17 (Note).
„ „ Heron-Allen & Earland, 1910, NBF. p. 424, figs. 3, 4.

1 *Station.*

Canon Norman instituted this well-marked variety for those specimens of *H. canariense* in which the normal compressed and smoothly cemented test is replaced by a stout and roughly agglutinated test of comparatively large sand-grains. In the North Sea the variety attains a comparatively gigantic size as compared with the usual proportions of *H. canariense*. The Kerimba specimens are quite small (diameter of largest individual ·3 mm.), but they agree otherwise with typical *H. crassimargo* in the rough construction of the test, which is composed of sand-grains and coral-débris. Their size, although small, is in much the same proportion to the Kerimba specimens of *H. canariense* as in the larger North Sea examples of the two species.

137. **Haplophragmium globigeriniforme** Parker & Jones.

Lituola nautiloidea, var. *globigeriniformis* Parker & Jones, 1865, NAAF. p. 407, pl. xv. figs. 46, 47; pl. xvii. figs. 96–98.
„ *globigeriniformis* Wright, 1877, RFDA. p. 103, pl. iv. fig. 6.
Haplophragmium globigeriniformis Siddall, 1879, CBRF. p. 4.

Haplophragmium globigeriniforme Brady, 1884, FC. p. 312, pl. xxxv. figs. 10, 11.
„ „ Egger, 1893, FG. p. 260, pl. v. figs. 30, 31.
„ „ Millett, 1898, etc., FM. 1899, p. 361.
„ „ Sidebottom, 1904, etc., RFD. 1905, p. 4, pl. i. fig. 6.

2 *Stations.*

A single specimen at each Stn.—small, but typical.

137 *a*. **Haplophragmium anceps** Brady.

Haplophragmium anceps Brady, 1884, FC. p. 313, pl. xxxv. figs. 12–15.
„ „ Chaster, 1892, FS. p. 57, pl. i. fig. 2.
„ „ Millett, 1898, etc., FM. 1899, p. 361, pl. v. fig. 10.
„ „ Heron-Allen & Earland, 1913, CI. p. 47, pl. iii. fig. 4.

1 *Station.*

One exceptionally fine and large specimen at Stn. 11. The occurrence of this arctic and deep-water species in tropical shallow water is very noticeable.

NOURIA H.-A. & E.

465. **Nouria polymorphinoides** H.-A. & E. (See Part I. of this paper, pp. 375–6.)

Reophax ampullacea Brady, Millett, 1898, etc., FM. 1899, p. 253, pl. iv. fig. 9.

When originally dealing with this species we had the figure of *Technitella legumen* Norman, in Millett's Malay Monograph, before us (M. 1898, etc., FM. 1899, p. 251, pl. iv. fig. 4). The oblique arrangement of the spicules in the drawing was so different from the normal characteristics of *T. legumen* that the identity of the specimens appeared doubtful. Since that Part of the paper was published, the Millett Collection has come into our possession, and our conjectures are fully confirmed. The specimens, which are exceedingly numerous, are all polythalamous and clearly referable to *N. harrisii*. They vary greatly in construction, but the commonest type is isomorphous with *Polymorphina rotundata*. The Malay types of *Reophax ampullacea* Brady are clearly *N. polymorphinoides* of a minute form as compared with the Kerimba specimens, and are isomorphous with *P. compressa*.

PLACOPSILINA d'Orbigny.

138. **Placopsilina cenomana** d'Orbigny.

Placopsilina cenomana d'Orbigny, 1850, etc., PP. vol. ii. 1850, p. 185. no. 758.
„ „ Reuss, 1854, KO. p. 71, pl. xxviii. figs. 4, 5.
Lituola (*Placopsilina*) *cenomana* Carpenter, Parker, & Jones, 1862, IF. p. 143, pl. xi. fig. 14.
Placopsilina cenomana Haeusler, 1883, ALB. (QJGS. vol. xxxix. p. 27, pl. iii. fig. 1).
„ „ Brady, 1884, FC. p. 315, pl. xxxvi. figs. 1–3.
„ „ Chapman, 1900, FLF. p. 183.
„ „ Sidebottom, 1904, etc., RFD. 1905, p. 4, pl. i. fig. 7.

5 *Stations.*

One excellent specimen at Stn. 11 attached to nullipore, and a few smaller and sometimes rather doubtful fragments at the other Stns., the best at Stn. ? X. The scarcity of this species, often so common in shallow tropical waters, is noticeable.

CRITHIONINA Goës.

139. **Crithionina mamilla** Goës.

Crithionina mamilla Goës, 1894, ASF. p. 15, pl. iii. figs. 34–36.
" " Millett, 1898, etc., FM. 1899, p. 250, pl. iv. fig. 2.
" " Rhumbler, 1903, ZRF. p. 230, fig. 56.
" " Heron-Allen & Earland, 1912, etc., NSG. 1913, p. 9, pl. iii.
" " Heron-Allen & Earland, 1913, CI. p. 40.

1 *Station.*

A few typical specimens on the oyster-shell from Stn. ? X.

BDELLOIDINA Carter.

140. **Bdelloidina aggregata** Carter.

H. J. Carter, 1877, "*Bdelloidina aggregata*, a new Genus and Species of Arenaceous Foraminifera etc.," Ann. & Mag. Nat. Hist. ser. 4, vol. xix. pp. 201–209, pl. xiii. figs. 1–8.
Bdelloidina aggregata Brady, 1884, FC. p. 319, pl. xxxvi. figs. 4–6.
" " Chapman, 1899, FFA. p. 7, pl. i. fig. 3 & text-fig.
" " Rhumbler, 1909, etc., FPE. 1913, p. 449, fig. 158.

1 *Station.*

A few quite characteristic fragments of this species were found at Stn. 11. Owing to the parasitic nature of the organism on shell and coral fragments, and the lack of suitable material for examination, we are unable to state whether it occurs at other Stns., but it is probably of not infrequent occurrence in shallow tropical waters, judging from our experience of other gatherings where suitable material was available.

HADDONIA Chapman.

141. **Haddonia torresiensis** Chapman. (Pl. XLVI. fig. 22.)

Haddonia torresiensis F. Chapman, 1897, "On *Haddonia*, a new Genus of the Foraminifera from Torres Straits," Journ. Linnean Soc. Lond. vol. xxvi. (Zoology) (1898) pp. 452–456, pl. xxviii. & text-fig. p. 453.
" " Chapman, 1899, FFA. p. 6.
" " Chapman, 1900, FLF. p. 183.
" " Chapman, 1901, FFA. p. 393, pl. xxxv. fig. 1.

3 *Stations.*

A few individuals attached to shell-fragments. At Stn. 11 they were presumably free or detached. It seems probable that the species may be distributed over the area, but,

owing to its method of growth and the paucity of suitable material for examination, has escaped observation.

The occurrence of this genus—hitherto known only from the Torres Straits and tropical Pacific—at Kerimba is very noteworthy.

Subfamily TROCHAMMININÆ.

THURAMMINA Brady.

142. **Thurammina papillata** Brady.

Thurammina papillata Brady, 1879, etc., RRC. 1879, p. 45, pl. v. figs. 4–8.
„ „ Carpenter, 1881, M. p. 561, fig. 320 *g, h* (ed. 1901, p. 815, fig. 614 *g, h*).
„ „ Haeusler, 1883, ALB. p. 60, pl. iv. figs. 9–13 (see QJGS. vol. xxxix. 1883, p. 27, pl. iii. figs. 2–6).
„ „ Haeusler, 1883, JVT. p. 262, pl. viii.
„ „ Brady, 1884, FC. p. 321, pl. xxxvi. figs. 7–18.
„ „ Egger, 1893, FG. p. 263, pl. v. fig. 9.

2 *Stations.*

One minute spherical specimen at Stn. 3, characterized by a virtual absence of papillæ, and another at Stn. 13. The test is constructed of extremely fine calcareous particles, neatly agglutinated. We have met with similar specimens from Cuba. In colour and general appearance the specimens are perhaps more closely referable to *T. albicans* Brady, but as the distinguishing feature of that species, according to Brady, is the thick shell-wall contrasting with the thin wall of *T. papillata*, it seems desirable to refer the Kerimba specimens to *T. papillata.*

HIPPOCREPINA Parker.

143. **Hippocrepina oviformis,** sp. n. (Pl. XLVI. figs. 23, 24.)

1 *Station.*

Test free, minute, oval, slightly produced at the oral extremity. Walls thick, formed of finely agglutinated, very minute sand-grains, light grey in colour. Surface smooth. Aperture a simple circular opening on a slightly produced terminal neck. The walls of this species are so thick and densely constructed that practically no structure is visible when the specimens are mounted in balsam.

Very rare at Stn. ? B, the only locality at which it was observed.

Breadth ·2 mm. Length ·27 mm.

HORMOSINA Brady.

144. **Hormosina globulifera** Brady. (Pl. XLVI. fig. 25.)

Hormosina globulifera Brady, 1879, etc., RRC. 1879, p. 60, pl. iv. figs. 4, 5.
„ „ Carpenter, 1881, etc., M. (6th Edn.) p. 561, fig. *c*; 1901 (8th Edn.), p. 813, fig. 614 *c*.

Hormosina globulifera Brady, 1884, FC. p. 326, pl. xxxix. figs. 1–6.
„ „ Goës, 1894, ASF. p. 29, pl. vi. figs. 218, 219.
„ „ Cushman, 1910, etc., FNP. 1910, p. 93, figs. 136, 137.

1 *Station.*

A single specimen, consisting of two chambers only, from Stn. 11. The presence of this specimen, the identity of which appears to be beyond question, in a shallow-water dredging presents one of those anomalies of distribution which are always puzzling to the Rhizopodist. The test is composed of sand-grains and coralline fragments including some red material which is almost certainly débris of *Polytrema*, thus placing the local origin of the specimen beyond question. *H. globulifera* in all previous records is essentially a deep-water type, and, although Brady records it from all the great oceans, his minimum depth is 400 fms. We have, however, found specimens off the British coast at somewhat lesser depths.

AMMODISCUS Reuss.

145. **Ammodiscus tenuis** Brady.

Ammodiscus tenuis Brady, 1879, etc., RRC. 1881, p. 51.
„ „ Brady, 1884, FC. p. 332, pl. xxxviii. figs. 4–6.
„ *incertus* (pars) Cushman, 1910, etc., FNP. 1910, p. 75, fig. 96.

1 *Station.*

One small specimen only at Station 1.

146. **Ammodiscus gordialis** (Jones & Parker). (Pl. XLVI. fig. 26.)

Trochammina squamata gordialis Jones & Parker, 1860, RFM. p. 304.
„ *gordialis* Carpenter, Parker, & Jones, 1862, IF. p. 141, pl. xi. fig. 4.
„ *squamata*, var. *gordialis* Parker & Jones, 1865, NAAF. p. 408, pl. xv. fig. 32.
Ammodiscus gordialis Brady, 1884, FC. p. 333, pl. xxxviii. figs. 7–9.
„ „ Brady, Parker, & Jones, 1888, AB. p. 218, pl. xlii. fig. 22.
„ „ Egger, 1893, FG. p. 264, pl. v. figs. 39, 40.

9 *Stations.*

Fairly frequent at some Stns., but never abundant. The specimens illustrate all the usual wild-growing forms; in many cases they have evidently been attached during life. At Stn. 3 most of the specimens show a marked tendency to depart from the normal irregular spiral and to form produced tubes. At Stn. 5 all the specimens are very minute; at Stn. 6 they are all of a grey colour, contrasting with the normal ferruginous tint exhibited at all the other Stns.

147. **Ammodiscus charoides** (Jones & Parker).

Trochammina squamata charoides Jones & Parker, 1860, RFM. p. 304.
„ *charoides* Carpenter, Parker, & Jones, 1862, IF. p. 141, pl. xi. fig. 3.
Ammodiscus charoides Berthelin, 1878, FBP. p. 223 (p. 23 [No. 18] in the Reprint, 1884).
„ „ Brady, 1884, FC. p. 334, pl. xxxviii. figs. 10–16.
„ „ Flint, 1899, RFA. p. 279, pl. xxiv. fig. 2.

1 *Station.*

One minute specimen which exhibits the commencement of the second stage in the formation of the shell, in which the spiral tube takes a turn at right angles to the axis of the earlier coils, and proceeds to enwrap them.

TROCHAMMINA Parker & Jones.

148. **Trochammina squamata** Jones & Parker.

Trochammina squamata Jones & Parker, 1860, RFM. p. 304, and Table.
„ „ Carpenter, Parker, & Jones, 1862, IF. p. 141. pl. xi. fig. 1.
„ „ Parker & Jones, 1865, NAAF. p. 407, pl. xv. fig. 30.
„ „ Brady, 1884, FC. p. 337, pl. xli. fig. 3.
„ „ Egger, 1893, FG. p. 264, pl. v. figs. 4–6.
„ „ Heron-Allen & Earland, 1913, CI. p. 50, pl. iii. figs. 7–10.

12 *Stations.*

Generally distributed and often fairly common. At most of the Stns. where it occurs the specimens are of quite average size, but at Stns. 3 and 12 they were exceptionally large and well grown. They are all of the normal ferruginous tint except at Stn. ? X, where it is common, small, and nearly white in colour.

149. **Trochammina ochracea** (Williamson). (Pl. XLVI. figs. 27, 28.)

Rotalina ochracea Williamson, 1858, RFGB. p. 55, pl. iv. fig. 112, pl. v. fig. 113.
Trochammina squamata Parker & Jones, 1865, NAAF. pl. xv. fig. 31 *a–c*.
„ *ochracea* Balkwill & Millett, 1884, FG. p. 25, pl. i. fig. 7.
„ „ Brady, 1884, FC. p. 337–8.
„ „ Millett, 1898, etc., FM. 1899, p. 363, pl. v. fig. 12.
„ „ Heron-Allen & Earland, 1913, CI. p. 51.

6 *Stations.*

Sparingly distributed and rare, except at Stn. 11, where it is relatively abundant. At this Stn. the species presents an extraordinary variety of form, normal specimens both free and attached being found, also a distinctive variety which has unquestionably lived in the attached state, although the numerous specimens observed were all free. The variety is characterized by the possession of a broad and irregular chitinous carina of a grey colour, contrasting strongly with the chambers of the test, which are of the normal ochreous tint. We figure one of these. The same form occurs very rarely at Stn. ? X.

150. **Trochammina plicata** (Terquem).

Patellina plicata Terquem, 1875, etc., APD. 1876, p. 72, pl. viii. fig. 9.
Trochammina plicata Balkwill & Millett, 1884, FG. p. 26, pl. ii. fig. 8.
„ „ Halkyard, 1889, RFJ. p. 64, pl. i. fig. 11.
„ „ Millett, 1898, etc., FM. 1899, p. 363, pl. v. fig. 13.
„ „ Heron-Allen & Earland, 1913, CI. p. 51.

1 *Station.*

Two fine specimens. They are exceedingly thin and scale-like, and the plications are more delicate and regular than is usually the case.

151. **Trochammina inflata** (Montagu).

Nautilus inflatus Montagu, 1808, TB. Suppl. p. 81, pl. xviii. fig. 3.
Rotalina inflata Williamson, 1858, RFGB. p. 50, pl. iv. figs. 93, 94.
Trochammina inflata Brady, 1884, FC. p. 338, pl. xli. fig. 4.
" " Egger, 1893, FG. pl. v. figs. 10–12, 16–18.
" " Goës, 1894, ASF. p. 29, pl. vi. figs. 222–224.

4 *Stations.*

Occurs at only a few Stns. At Stn. 5 it is very rare, but quite typical, the specimens being indistinguishable from such as would be found in a British gathering. At Stn. ?X it is rare and very small, also thin-walled and showing a tendency to collapse. At Stn. 11 it is more common and well developed.

151 *a*. **Trochammina nitida** Brady.

Trochammina nitida Brady, 1879, etc., RRC. 1881, p. 52.
" " Brady, 1884, FC. p. 339, pl. xli. figs. 5, 6.
" " Goës, 1894, ASF. p. 30, pl. vi. figs. 225–230.
" " Millett, 1898, etc., FM. 1899, p. 363.

1 *Station.*

At Stn. 11 a good many large and typical specimens, often largely composed of sponge-spicules and with strong ferruginous coloration. The species appears to be nothing more than a depressed form of *T. inflata*, in company with which it occurs.

152. **Trochammina rotaliformis** Wright.

Trochammina inflata (Montagu) var., Balkwill & Wright, 1885, DIS. p. 331, pl. xiii. figs. 11, 12.
" " var., Halkyard, 1889, RFJ. p. 63, pl. i. fig. 10.
" *rotaliformis* Heron-Allen & Earland, 1908, etc., SB. 1911, p. 309.
" " Heron-Allen & Earland, 1913, CI. p. 52, pl. iii. figs. 11–13.

10 *Stations.*

Generally distributed and fairly typical throughout the material, the best specimens at Stn. 12. At Stn. ?X the specimens were small and of a white tint, as were those of *T. squamata* Jones & Parker at this Stn. The same colour-tint prevails at Stn. ?B.

Carterina Brady.

153. **Carterina spiculotesta** (Carter).

Rotalia spiculotesta H. J. Carter, 1877, "Description of a new Species of Foraminifera (*Rotalia spiculotesta*)," Ann. & Mag. Nat. Hist. ser. 4, vol. xx. p. 470, pl. xvi.; 1879, ser. 5, vol. iii. p. 414; 1880 (SGM), ser. 5, vol. v. p. 452.

Carterina spiculotesta Brady, 1884, FC. p. 346, pl. xli. figs. 7–10.
„ „ Millett, 1898, etc., FM. 1899, p. 365.
„ „ Chapman, 1900, FLF. p. 184.
„ „ Sidebottom, 1904, etc., RFD. 1905, p. 6, pl. i. fig. 10.

6 *Stations.*

This very rare and interesting species occurs fairly often in these dredgings, but the number of specimens is always small. It occurs in its best development at Stn. 3, and after that the best specimens are from Stn. 11. The individuals found divide naturally into two groups—small and large; the absence of all intermediate-sized specimens, except in one or two instances, seems to point to the individuals representing not so much growth-stages as racial distinctions. In the small specimens the earlier portions are always much more depressed than in the larger, all the latter with one exception being of a steeply conical type as compared with the flat outspreading test originally figured by Carter. The colour, as described by Carter, Brady, and Sidebottom, is deep brown in the early chambers and white in the subsequent. Some of our small specimens are of a uniform deep colour all over.

At Stn. ?B we found one small individual characterized by a sudden transition at the commencement of the last whorl of chambers, from the strongly marked ferruginous colour to the purely white.

At Stn. 12 the initial chambers are but very slightly coloured, the colouring-matter only extending over one convolution. At Stn. 11 one individual was found in which the whole test is very depressed, almost flat on the superior surface, the initial coloured chambers few, and the later ones, after one or two rotaline convolutions, become irregularly annular, the general outline of the test being nearly circular, not "amœbiform" as in Carter's figure. In this particular specimen the spicular bodies also appear to be abnormally small, whereas in others from the same Stn. they are, if anything, above the average size, especially in the earliest chambers of the test. The umbilical hollow in the Kerimba specimens is very often filled in (i.) with agglutinated sand-grains; this may merely point to the specimen having been sessile on a sandy bottom; (ii.) with secondary growth which resembles fine arenaceous cement, but may possibly be the same as the granular matter which separates the spicular bodies of the normal shell-wall; (iii.) with a definite outgrowth of finely arenaceous substance somewhat similar to the young stage of *Crithionina mamilla* Goës. In one individual there is a similar outgrowth on the superior wall of the test; it cannot be stated definitely whether these processes are connected with the *Carterina* or are merely adherent organisms.

Carter's original description of *Rotalia spiculotesta* was based on a single specimen found on a coral in the Pacific (East Oceania) and appears to have been a large ($\frac{1}{15}$ in. diam.) and quite abnormal individual in which the regular rotaline arrangement of the early chambers was followed by an irregular series of chambers becoming more and

more eccentric in shape as they were added, the two chambers forming the final annulus being lobose and amœbiform in shape; the specimen appears to have been of the most depressed type—Carter says that its thickness was almost inappreciable. He refers to the absence of any visible aperture, which he inferred was inferior, but we have been unable to verify the existence of a definite aperture in any portion of the test. He also states that there is no particular arrangement of the spicules, "which as often cross each other, as they are seen to be only one layer deep, and with reference to their relative position lie in all possible directions, seldom appearing above the level of the surface, although evincing by the occasional projection of one end or their entire separation about some part which has been broken, the form above described." In the Kerimba specimens, however, there is a definite arrangement of the spicules as regards the inferior and superior sides of the test respectively. On the superior side the spicules are more or less generally arranged in definite lines following the spiral curve of the shell, while on the inferior side they are nearly always arranged radially from the central depression to the edge of each chamber. This arrangement of the spicules is fairly well illustrated in Hollick's figure in the 'Challenger' Report, especially as regards the inferior view. There is often great variation in the size of the spicules, not only in different specimens, but in different chambers of the same individual, and the variation is not always as might be expected in the direction of a larger spicule with an increase in the size of the chambers. In one specimen at Stn. 11 the initial chambers of the shell are composed of a few spicules very much larger than the average, and nearly twice the size of those forming the later chambers of the test. In another specimen from the same Stn. the spicules in all the earlier chambers are remarkably small, and the terminal chamber is built, so far as its inner margin is concerned, of similar minute spicules, while the peripheral portion is constructed of larger spicules, five or six times as large as the former. When *Carterina* assumes the scale-like depressed form, at any rate, the final chambers are strengthened by the formation of internal labyrinthic walls, and this is well shown when a specimen is mounted in balsam. A similar tendency to form strengthening walls between the two faces of the test is exhibited in *Haplophragmium foliaceum* Brady.

The spicular bodies in Carter's original figure answer to his written description, "round, smooth, fusiform, transparent, and solid calcareous spicules whose ends are sharp-pointed or round." Brady described them as "solid fusiform bodies with pointed ends."—There is, however, much more range of form than Carter apparently had opportunities of observing; the spicules in the Kerimba specimens vary from short cylinders with almost squarely terminating ends, to the most acutely pointed fusiform bodies; the blunt cylindrical spicules give an appearance of regular "brick-work" to the walls when they occur. Interspersed among the fusiform spicules, and varying greatly in numbers, are a number of small spherical bodies. These are presumably what Carter referred to when he described the spicules as interwoven and cemented together by "a

minutely areolated calcareous crystalline but white-looking structure," and to which Brady referred when stating that "the thicker portions of the wall contained a certain amount of siliceous or calcareous sand," and, again, "calcareous spicules embedded in calcareous cement." But these spherical bodies appear to be be quite distinctive and peculiar to *Carterina*, and it seems probable that they may represent the initial stage of growth of the fusiform spicules, and that increase in the area of the wall of the test is obtained by the increase in the growth of these bodies in the course of their development into the true spicules.

Family TEXTULARIIDÆ.

Subfamily TEXTULARIINÆ.

TEXTULARIA Defrance.

154. **Textularia folium** Parker & Jones.

Textularia folium Parker & Jones, 1865, NAAF. pp. 370 & 450, pl. xviii. fig. 19.
„ „ Möbius, 1880, FM. p. 92, pl. viii. figs. 16, 17.
„ „ Brady, 1884, FC. p. 357, pl. xlii. figs. 1–5.
„ „ Egger, 1893, FG. p. 272, pl. vi. figs. 27, 28.
„ „ Chapman, 1900, FLF. p. 184.
„ „ Rhumbler, 1906, FLC. p. 59, pl. v. figs. 51, 52.
„ „ Chapman, 1907, RFV. p. 127, pl. ix. fig. 4.

1 *Station.*

A single specimen only, noticeable on account of the extreme rarity of this typical shallow-water species in what might have been expected to be favourable material. It is recorded by Möbius from Mauritius as rare (from the intestine of *Maretia planulata*).

155. **Textularia fusiformis** Chaster.

Textularia fusiformis Chaster, 1892, S. p. 58, pl. i. fig. 3.

1 *Station.*

One typical example. The species, first recorded by the late Dr. Chaster from Southport, occurs rarely in dredgings all round the British Islands and we have also found it in shallow water from the Maltese coast and from Tahiti. It therefore appears to be widely distributed, though always rare.

156. **Textularia inconspicua** Brady. (Pl. XLVII. figs. 1–4.)

Textularia inconspicua Brady, 1884, FC. p. 357, pl. xlii. fig. 6.
„ „ Millett, 1898, etc., FM. 1899, p. 557, pl. vii. fig. 1.

12 *Stations.*

Almost universally distributed and very plentiful at some Stns., attaining more than

normal size and development. At many of the Stns., especially Stns. 1, 3, 4, 7, 9, 12, ? X, and ? B, some of the specimens were faintly hispid all over, the best examples being at ? B.

157. **Textularia inconspicua,** var. **jugosa** Brady.

Textularia jugosa Brady, 1884, FC. p. 358, pl. xlii. fig. 7.
„ *inconspicua,* var. *jugosa* Millett, 1898, etc., FM. 1899, p. 558, pl. vii. fig. 2.
„ „ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 310, pl. ix. fig. 12.

6 *Stations.*

This limbate form occurs in company with the type at six Stns. The bulk of the specimens are not strongly limbate, but at Stns. 12 *a* and 12 some large and abnormally strongly marked tests were obtained.

158. **Textularia rhomboidalis** Millett.

Textularia rhomboidalis Millett, 1898, etc., FM. 1899, p. 559, pl. vii. fig. 4.
„ „ Sidebottom, 1904, etc., RFD. 1905, p. 8, pl. ii. figs. 2, ? 3.

15 *Stations.*

Universally distributed and quite one of the typical Kerimba species, attaining very fine proportions at Stns. 7, 9, and 11. The species exhibits a considerable amount of variation within certain limits, due principally to the degree of inflation of the chambers and the consequent suppression of the acute marginal edges. This in advanced specimens gives a strongly crispate appearance to the edge view, almost as marked as in *T. crispata* Brady, of which this species may be regarded as a hyaline isomorph.

159. **Textularia crispata** Brady. (Pl. XLVII. figs. 5, 6.)

Textularia crispata Brady, 1884, FC. p. 359, pl. cxiii. fig. 2.

2 *Stations.*

Large and typical specimens at Stn. 11, and one broken but typical example at Stn. 3. This very distinctive species appears to be of extremely local distribution, the records of its occurrence being apparently hitherto confined to Raine Island, Torres Straits.

160. **Textularia concava** (Karrer).

Plecanium concavum Karrer, 1868, MFKB. p. 129, pl. i. fig. 3.
Textularia concava Brady, 1884, FC. p. 360, pl. xlii. figs. 13, 14, pl. xliii. fig. 11.
„ „ ? Reuss (*sic*), Egger, 1893, FG. p. 271, pl. vi. figs. 3, 4.
„ „ Fornasini, 1896, TC. pp. 2 *et seq.*, plate.
„ „ Millett, 1898, etc., FM. 1899, p. 559, pl. vii. fig. 5.
„ „ Fornasini, 1903, TA. p. 306, pl. O. fig. 11.
„ „ Sidebottom, 1904, etc., RFD. 1905, p. 7, pl. i. fig. 11.

5 *Stations.*

Very poorly represented in the material, the best at Stn. 11; other specimens at

Stns. 7 and 10 all devoid of a produced phialine aperture, but presenting the well-marked concavity down the median line and the quadrangular section with rounded periphery distinguishing the species. The Kerimba specimens are much nearer Fornasini's figure (F. 1903, TA.) than Karrer's original drawing. At Stn. ? X one specimen was found of the variety figured by Brady (FC. pl. xliii. fig. 11) which he regarded as a passage-form linking the species with *T. gramen*.

161. **Textularia sagittula** Defrance.

Textularia sagittula Defrance, 1824, Dict. Sci. Nat. vol. xxxii. p. 177; vol. liii. p. 344; Atlas Conch. pl. xiii. fig. 5.
„ „ Blainville, 1825, MMC. p. 370, pl. v. fig. 5 (not 6).
Textularia cuneiformis (typica ?) Williamson, 1858, RFGB. p. 75, pl. vi. figs. 158, 159.
Textularia sagittula Brady, 1884, FC. p. 361, pl. xlii. figs. 17, 18 (References).
„ „ Balkwill & Wright, 1885, DIS. p. 332, pl. xiii. figs. 15–17 (*pars*).
„ „ Egger, 1893, FG. p. 271, pl. vi. figs. 8–10.
„ „ Millett, 1898, etc., FM. 1899, p. 560 (References).

6 *Stations.*

Very sparingly distributed. The best at Stn. ? X, where the specimens are quite typical and identical with de Blainville's figure. At Stn. 9 it occurs in two well-marked varieties, characterized respectively by broad and narrow shells, but the characteristic parallel sutural lines are distinctly marked in both varieties.

162. **Textularia sagittula,** var. **jugosa** Brady.

Textularia sagittula, var. *jugosa* Jones, Parker, & Brady, 1866, etc., MFC. 1895, p. 145, pl. v. fig. 19 (References).
„ „ ("forma abbreviata") Fornasini, 1887, TA. p. 399, pl. xi. fig. 2.
„ *jugosa* Egger, 1893, FG. p. 273, pl. vi. figs. 19–21.
Textularia sagittula, var. *jugosa* Millett, 1898, etc., FM. 1899, p. 561, pl. vii. fig. 8.

5 *Stations.*

Occurs at very few Stns., but when present is usually abundant and characterized by an extraordinary range in size and variety in the relative proportions of the length and breadth of the test. Stn. 11 furnishes a numerous and typical series ranging from the very short and broad, strongly limbate form figured by Millett (*ut supra*) to the long variety figured in the Crag Monograph. The short thick type with less conspicuous limbation separated by Fornasini as the "abbreviated form" also occurs at this Stn.

163. **Textularia rugosa** (Reuss). (Pl. XLVII. figs. 7–9.)

Plecanium rugosum Reuss, 1869, FOG. p. 453, pl. i. fig. 3.
Textularia rugosa Brady, 1884, FC. p. 363, pl. xlii. figs. 23, 24.
„ „ Egger, 1893, FG. p. 270, pl. vi. figs. 29–31.
Textularia rugosa Chapman, 1900, FLF. p. 185.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 310.

4 *Stations.*

D'Orbigny utilized this specific name in 1826 (TMC. p. 262. no. 10) for a form which he did not in any way describe, but which according to the "Planche inédite" as figured by Fornasini (Riv. Ital. Paleont. 1901, p. 105, pl. iii. fig. 3) represents a Textularia of *sagittula* type, but with rounded edges. D'Orbigny's name being a *nomen nudum* must lapse, and there is the less reason to regret this as Reuss' figure represents a well-marked and distinct type.

T. rugosa is very sparingly represented at Kerimba. This is noteworthy, as the species is generally fairly abundant in the neighbourhood of coral-reefs. The best series of specimens was obtained at Stn. 11, where it attained a large size. Other good individuals at Stn. 12. At both these Stns. the characteristic flexed sutural edges of the chambers were strongly developed. At Stn. 9 the species is represented by a weaker form, in which the characteristic flexure is less marked and the specimens show signs of affinity to *T. hauerii* d'Orbigny.

At Stn. 11 a few abnormal individuals were found, which we figure. They commence with a triserial or gaudryine arrangement of the chambers, which at half-growth become converted into typical *T. rugosa.*

164. **Textularia agglutinans** d'Orbigny.

Textularia agglutinans d'Orbigny, 1839, FC. p. 144, pl. i. figs. 17, 18, 32–34.
„ „ Parker & Jones, 1865, NAAF. p. 369, pl. xv. fig. 21.
„ „ Möbius, 1880, FM. p. 93, pl. ix. figs. 1–8.
„ „ Brady, 1884, FC. p. 363, pl. xliii. figs. 1–3; vars., figs. 4, 12.
„ „ Egger, 1893, FG. p. 267, pl. vi. figs. 1, 2.
„ „ Goës, 1894, ASF. p. 35, pl. vii. figs. 281–4 & 294–303.
„ „ Fornasini, 1895, BR., p. 657 *et seq.*, plate, figs. 3–6.

15 *Stations.*

Universally distributed and often abundant and typical. The best specimens occur at Stns. 1, 6, and 9. There is as usual a wide variation, based principally on the relative length and breadth of the shell, the species passing imperceptibly into the variety *T. porrecta* Brady, on the one hand, and into the broader and smoother *T. gramen* d'Orbigny, on the other. At Stn. 3 the tendency is towards *T. gramen.* At the majority of the Stns. the species is marked by a coarse and roughly agglutinate test, strongly in contrast with *T. gramen*, which at nearly all the Stns. is smoothly and neatly built. At Stn. 7, however, specimens of *T. agglutinans*, which are rather smaller than the Kerimba average, are of a smooth neat type. At Stn. 11, where the species attained very large proportions, some of the individuals had the appearance of having spiroplectine initial chambers, but they are so small that the feature is difficult to confirm. At Stns. 1 and 12 monstrous individuals, in which additional chambers have been added as outgrowths from various portions of the shell, have been found.

165. **Textularia candeiana** d'Orbigny. (Pl. XLVII. figs. 10–16.)

Textularia candeiana d'Orbigny, 1839, FC. p. 143, pl. i. figs. 25–27.
„ (*fungiformis*) Fornasini, 1887, ITI. p. 387, pl. x. fig. 1.
„ (*fungiformis*) Fornasini, 1896, TC. pp. 2 *et seq.* pl. O. figs. 1–5.
„ *sagittula*, var. *candeina* (sic) Millett, 1898, etc., FM. 1899, p. 562, pl. vii. fig. 12.
„ *candeiana* Sidebottom, 1904, etc., RFD. 1905, p. 7, pl. ii. fig. 1.

10 *Stations.*

This form of *T. agglutinans*, marked by excessive and rapid increase in the inflation of the chambers, culminating in a final pair which are semi-globular, is generally distributed among the dredgings, but is never very abundant. Excellent specimens were obtained at Stns. 1, 3, 9, and 12, particularly fine and frequent at the latter. The texture of the shell is almost uniformly coarse, but finely agglutinate, somewhat between the structure of the typical *T. agglutinans* (of Kerimba) and *T. gramen*.

166. **Textularia porrecta** Brady.

Textularia agglutinans, var. *porrecta* Brady, 1884, FC. p. 364, pl. xliii. fig. 4.
„ *porrecta* Egger, 1893, FG. p. 269, pl. vi. figs. 17, 18.

8 *Stations.*

Generally distributed, but never so abundant as the typical *T. agglutinans*. The best specimens were at Stns. 3, 9, and 12, particularly fine at Stn. 3. At Stn. 9 the individuals were remarkable, as the first half of the test was very roughly constructed, the latter portion being smooth and matt. At the other Stns. the form is usually of a roughly agglutinate type throughout. At Stn. 9 it is possible that some of the specimens had spiroplectine initial chambers, but, owing to the texture and opacity of the shell, this feature is extremely difficult to diagnose with certainty.

167. **Textularia luculenta** Brady.

Textularia luculenta Brady, 1884, FC. p. 364, pl. xliii. figs. 5–8.

1 *Station.*

One characteristic specimen at Stn. 3. All the localities given by Brady for this species are in the Atlantic Ocean at depths ranging from 350 to 675 fms.

168. **Textularia gramen** d'Orbigny.

Textularia gramen d'Orbigny, 1846, FFV. p. 248, pl. xv. figs. 4–6.
„ „ Brady, 1884, FC. p. 365, pl. xliii. figs. 9–10.
„ „ Balkwill & Wright, 1885, DIS. p. 332, pl. xiii. figs. 13, 14.
„ „ Haeusler, 1890, FST. p. 71, pl. xi. figs. 26, 27, 37.
„ „ Egger, 1893, FG. p. 272, pl. vi. figs. 24–26.
„ „ Millett, 1898, etc., FM. 1899, p. 563.

14 *Stations.*

Almost universally distributed and often very abundant. At nearly all the Stns. the specimens are quite typical; there are, of course, many passage-forms intermediate between this species and *T. agglutinans* and *T. conica*. At Stn. 7 a curious variety marked by a depressed median line occurs. The best and most typical examples were at Stns. 2, 3, 4, and 10.

169. **Textularia hauerii** d'Orbigny. (Pl. XLVII. figs. 21–23.)

Textularia hauerii d'Orbigny, 1846, FFV. p. 250, pl. xv. figs. 13–15.
„ *gramen* (pars) Brady, 1884, FC. p. 365.

12 *Stations.*

A transition-form, which we figure, is generally distributed, and at the Stns. where it occurs is often one of the most abundant and typical. It seems to come nearer to d'Orbigny's *T. hauerii* than to any other Textularian. Brady regarded *T. hauerii* as merely a modification of *T. gramen* (*ut supra*) characterized by less angular edges, but the Kerimba specimens are sufficiently marked and divergent from *T. gramen*, as represented in these dredgings, to render the separation of the specimens desirable. In the somewhat rough texture of the shell their affinities appear to lie rather in the direction of *T. candeiana* than of *T. gramen*.

The Kerimba specimens of *T. hauerii* have, as a rule, about eight pairs of chambers regularly increasing in breadth and thickness, and with the sutural lines somewhat depressed owing to the inflation of the chambers. Marginal edge lobulate and varying from rounded in the latter portion of the shell to acute or subcarinate in the initial portion. Surface-texture somewhat coarse, but neatly agglutinate. The species is most abundant at Stns. 1 and 12, reaching its best proportions at the latter. *T. hauerii* was recorded by d'Orbigny from the Tertiaries of Vienna. It is probably widely distributed, but has not been separated from the records of *T. gramen*.

170. **Textularia foliacea,** sp. n. (Pl. XLVII. figs. 17–20.)

9 *Stations.*

Test free, highly compressed, consisting of seven to nine pairs of chambers regularly increasing in width so as to give a leaf-shaped outline to the shell. Sutural lines depressed, often strongly marked, but at times very obscure, and obliquely set, so that the tapering off of the ultimate pair of chambers gives the characteristic diamond or foliaceous outline. Median line of the shell depressed below the marginal edges, aperture small and regularly textularian. Test composed of sand-grains and other adventitious substances firmly and neatly cemented together, but with a rough external surface.

This is one of the most characteristic of the Kerimba Textulariidæ, though not

universally distributed. It occurs in the greatest abundance and in its best development at Stn. 1, and very fine examples were also obtained at Stn. 9. At Stns. 3 and 10 the specimens were less characteristic and showed a tendency to pass, by inflation of the chambers, into *T. hauerii*.

The affinities of our species are between *T. luculenta* Brady and *T. hauerii* or *gramen* d'Orbigny. It may be compared as regards its highly compressed and parallel-faced test with the *Textularia immensa* of Cushman (Proc. U.S. Nat. Mus. vol. xliv. 1913, p. 633, pl. lxxix. fig. 2), from which it differs only in the character of its aperture.

We have specimens from Timor Sea (Java, 50 fms.), where it is frequent, and from Vavau (S. Pacific, 16 fms.). We have also observed specimens in some of Brady's unsorted material from Fiji at Cambridge, and a single specimen among his specimens of *T. agglutinans* from "Coral Reef, Australia, 17 fms." It is probably therefore widely distributed in coral-reef areas.

Length 1·0 to 1·5 mm., breadth ·6, thickness ·3 mm.

171. **Textularia conica** d'Orbigny.

Textularia conica d'Orbigny, 1839, FC. p. 143, pl. i. figs. 19, 20.
„ „ Brady, 1884, FC. p. 365, pl. xliii. figs. 13, 14; pl. cxiii. fig. 1.
„ „ Haeusler, 1890, FST. p. 72, pl. xi. figs. 40–42, 45, 46.
„ „ Egger, 1893, FG. p. 273, pl. vi. figs. 34–36.
„ „ Millett, 1898, etc., FM. 1899, p. 563.
„ „ Chapman, 1900, FLF. p. 185.

16 *Stations.*

Universally distributed and generally abundant. An excellent series of specimens was obtained at many Stns., notably at Stns. 2 and 6. At Stn. 8 specimens intermediate with *T. gramen* and at Stn. 11 specimens passing into *T. trochus* d'Orbigny were observed. At Stn. 12 a monstrous individual, in which the normal shell was followed by a cylindrical bigenerine series of three chambers set at an angle of 45° to the principal axis of the shell, was found.

171 *a*. **Textularia conica,** var. **corrugata,** nov. (Pl. XLVII. figs. 24–27.)

1 *Station.*

At Stn. 11 a considerable number of specimens referable to this species, but presenting extraordinary limbate or jugose characteristics extending all round the shell, were found. We figure some of them. Like all the Textulariidæ at this Stn. the shells are largely constructed of minute rounded calcareous particles giving a very striking appearance to the test, their glassy appearance contrasting very strongly with the ochreous agglutinating cement.

172. **Textularia trochus** d'Orbigny. (Pl. XLVII. fig. 28.)

Textularia trochus d'Orbigny, 1840, CBP. p. 45, pl. iv. figs. 25, 26.
„ „ Jones, Parker, & Brady, 1866, etc., MFC. p. 150, pl. iii. figs. 17, 18.
„ „ Brady, 1884, FC. p. 366, pl. xliii. figs. 15–19 ; pl. xliv. figs. 1–3.
„ „ Haeusler, 1890, FST. p. 72, pl. xi. figs. 43, 44.
„ „ Egger, 1893, FG. p. 273, pl. vi. figs. 37, 38.
„ „ Egger, 1899, KOA. p. 28, pl. xiv. figs. 27–28.

12 *Stations.*

Generally distributed, but never very abundant, though good and typical specimens occur at many Stns., the best at Stns. 3 and 12. At Stn. 12, at which many double and monstrous shells occurred, an abnormal specimen, which we figure, was found in which in mid-growth the axis of alternation of the chambers has twisted itself round to a right angle, forming a cruciform test.

173. **Textularia turris** d'Orbigny.

Textularia turris d'Orbigny, 1840, CBP. p. 46, pl. iv. figs. 27, 28.
„ „ Reuss, 1845–6, VBK. pt. i. p. 39, pl. xiii. fig. 76.
„ „ Brady, 1884, FC. p. 366, pl. xliv. figs. 4, 5.
„ „ Egger, 1899, KOA, p. 29, pl. xiv. fig. 29.

3 *Stations.*

Occurs at very few Stns., but large and typical at Stns. 11 and 12. At Stn. 11 a variety occurs in which the entire surface of the shell is covered with minute rolled sand-grains, giving the appearance of an investment of clear beads to the test and entirely masking the sutural lines.

174. **Textularia barrettii** Jones & Parker.

Textularia barrettii Jones & Parker, 1863, FJ. pp. 80 & 105.
„ „ Jones & Parker, 1876, FJ. p. 99, text-fig.
„ „ Brady, 1884, FC. p. 367, pl. xliv. figs. 6–8.
„ „ Egger, 1893, FG. p. 272, pl. vi. figs. 5–7.

3 *Stations.*

Very rare, but good and large examples at Stn. 11.

Verneuilina d'Orbigny.

175. **Verneuilina spinulosa** Reuss.

Verneuilina spinulosa Reuss, 1849–50, FOT. p. 374, pl. ii. (xlvii.) fig. 12.
„ „ Reuss, 1861, Model no. 6.
„ „ Egger, 1857, MSO. p. 292, pl. v. (ix.) figs. 17, 18.
„ „ Brady, 1870, FTR. p. 301, pl. xii. fig. 6.
„ „ Brady, 1884, FC. p. 384, pl. xlvii. figs. 1–3.

Verneuilina spinulosa Brady, Parker, & Jones, 1888, AB. p. 219, pl. xlii. figs. 14, 15.
„ „ Egger, 1893, FG. p. 281, pl. vii. figs. 11, 14–16.
„ „ Chapman, 1900, FLF. p. 185.
„ „ Rhumbler, 1906, FLC. p. 61, pl. v. fig. 53.

17 *Stations.*

Universally distributed and generally very abundant, attaining exceptionally fine proportions at Stns. 1, 3, 9, and ? B. The specimens with spinous margins predominate. At Stn. 7 some of the specimens are spinous all over the surface.

176. **Verneuilina pygmæa** (Egger).

Bulimina pygmæa Egger, 1857, MSO. p. 284, pl. viii. (xii.) figs. 10, 11.
Textularia triseriata Terquem, 1882, FEP. p. 145, pl. xv. (xxiii.) fig. 10.
Verneuilina pygmæa Brady, 1884, FC. p. 385, pl. xlvii. figs. 4–7.
„ „ Egger, 1893, FG. p. 279, pl. vii. figs. 8–10.
„ „ Goës, 1894, ASF. p. 33, pl. vii. figs. 262, 263.
„ „ Millett, 1898, etc., FM. 1900, p. 11, pl. i. fig. 13.
„ „ Heron-Allen & Earland, 1913, CI. p. 55, pl. iv. fig. 10.

1 *Station.*

A single specimen of the minute hyaline type figured by Millett and by ourselves (*ut supra*). The Kerimba specimen has an aperture similar to the Clare Island specimen and is therefore unlike the Malay example; but the absence of this aperture is not universal in the Malay seas, as we have specimens from Segaar in New Guinea and the Sahul Bank in the Timor Sea, exactly resembling Millett's figure, but with a small characteristic aperture.

177. **Verneuilina polystropha** (Reuss).

Bulimina polystropha Reuss, 1845–6, VBK. pl. ii. p. 109, pl. xxiv. fig. 53.
Polymorphina silicea Schultze, 1854, OP. p. 61, pl. vi. figs. 10, 11.
Verneuilina polystropha Brady, 1878, RRNP. p. 436, pl. xx. fig. 9.
„ „ Brady, 1884, FC. p. 386, pl. xlvii. figs. 15–17.
„ „ Goës, 1894, ASF. p. 32, pl. vii. figs. 247–255.
„ „ Heron-Allen & Earland, 1913, CI. p. 55, pl. iv. figs. 1–5.

10 *Stations.*

Generally distributed, but never abundant, and none of the specimens attains a large size. They are, as a rule, characterized by the comparative absence of ferruginous cement.

Tritaxia Reuss.

178. **Tritaxia lepida** Brady.

Tritaxia lepida Brady, 1879, etc., RRC. 1881, p. 55.
„ *ovata* Terquem, 1882, FEP. p. 105, pl. xi. (xix.) fig. 11.
„ *lepida* Brady, 1884, FC. p. 389, pl. xlix. fig. 12.
„ „ Millett, 1898, etc., FM. 1900, p. 12, pl. i. fig. 15.

1 *Station.*

One quite typical specimen. This appears to be a very rare form, but at the same time widely distributed, the 'Challenger' locality being the North Atlantic, whilst Millett records it from the Malay Archipelago and from the Torres Straits.

CHRYSALIDINA d'Orbigny.

179. **Chrysalidina dimorpha** Brady. (Pl. XLVII. figs. 29–31.)

Chrysalidina dimorpha Brady, 1879, etc., RRC. 1881, p. 54.
" " Brady, 1884, FC. p. 388, pl. xlvi. figs. 20, 21.
" " Egger, 1893, FG. p. 274, pl. vi. figs. 47, 51, 52.
" " Millett, 1898, etc., FM. 1900, p. 12, pl. i. fig. 14.
" " Cushman, 1910, etc., FNP. 1911, p. 60, figs. 96, 97.

4 *Stations.*

This beautiful but rare species is represented by an occasional specimen at a few Stns. It was most frequent at Stn. 3, but the finest specimen was from Stn. 9: this was of quite abnormal size, there being 14 or 15 chambers in the uniserial portion of the test. Our records though few, are scattered practically all round the world in tropical shallow water, including the east coast of Madagascar.

BIGENERINA d'Orbigny.

180. **Bigenerina nodosaria** d'Orbigny.

Bigenerina nodosaria d'Orbigny, 1826, TMC. p. 261, no. 1, pl. xi. figs. 9–12, Modèle no. 57.
" " Terrigi, 1880, SGP. p. 192, pl. ii. fig. 28.
" " Brady, 1884, FC. p. 369, pl. xliv. figs. 14–18.
" " Goës, 1894, ASF. p. 37, pl. vii. figs. 313–323.
" " Millett, 1898, etc., FM. 1899, p. 564, pl. vii. fig. 13.

2 *Stations.*

A single abnormal specimen at Stn. 12, in which the nodosarian chambers start at an angle from the penultimate chamber of the textularian initial portion, leaving the final textularian chamber with its aperture projecting at the side of the test. The textularian portion of the shell is of the *Textularia conica* type. A fine normal specimen at Stn. ?X.

PAVONINA d'Orbigny.

181. **Pavonina flabelliformis** d'Orbigny. (Pl. XLVIII. figs. 1–6.)

Pavonina flabelliformis d'Orbigny, 1826, TMC. p. 260. no. 1, pl. x. figs. 10, 11, Modèle no. 56.
" " Brady, 1879, etc., RRC. 1879, p. 282, pl. viii. figs. 29, 30.
" " Möbius, 1880, FM. p. 91, pl. viii. figs. 13–15.
" " Brady, 1884, FC. p. 374, pl. xlv. figs. 17–21.
" " Millett, 1898, etc., FM. 1900, p. 7.
" " Chapman, 1902, CKA. p. 231.

6 *Stations.*

This rare and beautiful form may be considered to be one of the most typical

Kerimba species, though it does not occur at many of the Stns. At those Stns. at which it is found, however, it attains a size and development greatly in excess of any specimens hitherto recorded, and constitutes one of the most beautiful objects imaginable. It reaches its optimum development at Stns. 3 and 9, where every stage of growth is represented, from the young regularly-textularian form to large fan-shaped tests, presenting as many as five or six complete semi-annular chambers, without septal divisions. At Stns. 1, 10, and 11 the species also occurs, but not in such abundance or attaining such fine dimensions; at Stn. 12 the species is represented by a single young textularian form.

Brady's figures do not do full justice to the method of growth: his fig. 17, representing the largest pavonine specimen, has not a single unseptate annular chamber; while fig. 18, which shows the unseptate type of chamber, does not assume the pavonine form at all. In some of our specimens the arched non-septate chambers commence immediately after the textularian series, and proceed at once to surround the earlier portion, which is almost entirely enclosed by the later growth. The figure by Möbius gives perhaps a better idea of the pavonine development of the shell; d'Orbigny's original figure which shows the pavonine character very well does not demonstrate the textularian growth at all. In the Kerimba specimens the earlier portion of the shell is often very thick and dense compared with the later chambers, and this appears to be due to layers of shell-substance deposited during the later stages of growth; there is a distinctly laminar structure in the apical portion when the test is examined by transmitted light.

The recurrence of this species in such a high state of perfection in these waters is interesting. As Brady (*loc. cit. supra*) points out, d'Orbigny's original specimens came from Madagascar, and then the species was lost sight of for more than fifty years, when Brady found it again in material from Madagascar *, since when it has been recorded from many localities in the Indian Ocean and tropical Pacific. It is clear that in these waters the type is persistent, and, like many other of our recorded species first found by d'Orbigny in material from Madagascar, is within a few years of its centenary †.

The species occurs very rarely in the fossil condition in the Australian Tertiary beds of Muddy Creek, Victoria (Upper Eocene ?).

* This is Brady's account in FC. 1884, but in the preliminary papers, *ut supra* (RRC. 1879, etc.), he stated that he had refound it in sand from the Seychelles dredged by E. P. Wright, and referred to AMNH. ser. 4, vol. xix. p. 41 (not p. 105, as cited by Brady). It is probable that he found it at both localities (see H.-A. & E. Proc. Zool. Soc. [Lond.] 1915, p. 296).

† Some confusion has been introduced by Costa, who, in PRN. 1853, etc., 1856, states on p. 178 that d'Orbigny found it at Madagascar, but on p. 180 that he found it at Cuba (obviously a slip of the pen), and records a species *Pavonina italica* from the clays of Reggio (Calabria), of which he gives a figure (pl. xvi. figs. 26–28) which represents clearly *Orbitolites tenuissima* Carpenter; this name should therefore lapse and become *Orbitolites italica* Costa. D'Orbigny in the Cuba Monograph (1839, FC. p. 25) merely refers to his Madagascan specimens in his sketch of the classification of the Foraminifera.

SPIROPLECTA Ehrenberg.

182. **Spiroplecta wrightii** Silvestri.

Spiroplecta sagittula (Defrance), Wright, 1891, SWI. p. 471.
„ „ „ Wright, 1902, FRI. p. 211, pl. iii.
„ *wrightii* Silvestri, 1903, S. pp. 1–5, woodcuts.
„ „ Heron-Allen & Earland, 1913, CI. p. 56.
„ *sagittula* Sidebottom, 1904, etc., RFD. 1905, p. 9, pl. ii. fig. 4; and text-fig.

5 *Stations.*

This spiroplectine isomorph of *Textularia sagittula* Defrance is extremely rare in the Kerimba dredgings, but the specimens are well marked, although the spiroplectine portion is much less pronounced than is often the case in British dredgings. It follows practically the same distribution as *T. sagittula,* which would appear to afford sound evidence that the two forms are extremely closely allied. We have gone into this matter at considerable length in our Clare Island monograph (*ut supra*).

183. **Spiroplecta biformis** (Parker & Jones).

Textularia agglutinans, var. *biformis* Parker & Jones, 1865, NAAF. p. 370, pl. xv. figs. 23, 24.
„ *biformis* Brady, 1878, RRNP. p. 436, pl. xx. fig. 8.
Spiroplecta biformis Brady, 1884, FC. p. 376, pl. xlv. figs. 25–27.
„ „ Balkwill & Wright, 1885, DIS. p. 333, pl. xiii. fig. 21; text-fig. 2.
„ „ Egger, 1893, FG. p. 275, pl. vi. figs. 48–50.
„ „ Millett, 1898, etc., FM. 1900, p. 8, pl. i. fig. 8.
„ „ Heron-Allen & Earland, 1913, CI. p. 56.

2 *Stations.*

Two typical specimens only, one at each Stn.

GAUDRYINA d'Orbigny.

184. **Gaudryina pupoides** d'Orbigny.

Gaudryina pupoides d'Orbigny, 1840, CBP. p. 44, pl. iv. figs. 22–24.
„ „ d'Orbigny, 1846, FFV. p. 197, pl. xxi. figs. 34–36.
„ „ Brady, 1884, FC. p. 378, pl. xlvi. figs. 1–4.
„ „ Egger, 1893, FG. p. 278, pl. vii. figs. 1–3, 49–51.
„ „ Millett, 1898, etc., FM. 1900, p. 8 (References).

1 *Station.*

A single typical specimen at Stn. 2 *a.*

185. **Gaudryina filiformis** Berthelin.

Gaudryina filiformis Berthelin, 1880, EAM. p. 25, pl. xxiv. fig. 8.
„ „ Wright, 1880–81, SD. p. 180, pl. viii. figs. 3 A, B.
„ „ Brady, 1884, FC. p. 380, pl. xlvi. fig. 12.
„ „ Brady, Parker, & Jones, 1888, AB. p. 219, pl. xlii. fig. 6.
„ „ Millett, 1898, etc., FM. 1900, p. 9.
„ „ Sidebottom, 1910, RFBP. p. 11, pl. i. fig. 9.
„ „ Heron-Allen & Earland, 1913, CI. p. 57, pl. iv. figs. 7–9.

2 *Stations.*

A single specimen at each Stn., small and poorly developed.

186. **Gaudryina scabra** Brady. (Pl. XLVIII. figs. 7–14.)

Gaudryina pupoides Brady, 1870, FTR. p. 300, pl. xii. fig. 5.
„ *scabra* Brady, 1884, FC. p. 381, pl. xlvi. fig. 7.

14 *Stations.*

This is one of the most characteristic forms in the Kerimba dredgings, occurring at practically every Stn. and often in considerable numbers. The specimens exhibit an enormous range of variation, two types being predominant: (i.) a short broad type in which the gaudryine chambers are numerous, the textularian chambers being limited to one or two pairs; and (ii.) a long narrow type in which the gaudryine chambers are few in number and are followed by from three to six pairs of chambers on the textularian plan. These long specimens are, as a rule, much more neatly constructed than the short broad individuals, but the texture throughout is of a coarse rough type, similar to the specimens originally figured by Brady (*ut supra*) under the name *G. pupoides*. None of the neatly constructed tests subsequently figured under the name "*scabra*" (B. 1884, FC.) were found; probably this type of shell is confined to deep water.

There is very little doubt but that this species is closely allied to *Verneuilina polystropha* Reuss; indeed, it is often difficult to distinguish the short broad specimens from that species, except by the characteristic textularian aperture. It is, perhaps, merely a dimorphous variation of that species.

187. **Gaudryina rugosa** d'Orbigny.

Gaudryina rugosa d'Orbigny, 1840, CBP. p. 44, pl. iv. figs. 20, 21.
„ „ Hantken, 1875, CSS. p. 13, pl. i. fig. 4.
„ „ Brady, 1884, FC. p. 381, pl. xlvi. figs. 14–16.
„ „ Chapman, 1891, etc., GF. 1892, p. 752, pl. xi. fig. 9.
„ „ Millett, 1898, etc., FM. 1900, p. 10.

2 *Stations.*

Not uncommon at Stn. 11, and rare at Stn. 13, but not otherwise recorded. The specimens are all remarkable, owing to the fact that the terminal textularian chambers are practically square in section, the outer edges being parallel instead of curved.

VALVULINA d'Orbigny.

188. **Valvulina conica** Parker & Jones.

Valvulina triangularis Parker & Jones, 1857, FCN. p. 295, pl. xi. figs. 15, 16.
„ „ var. *conica* Parker & Jones, 1865, NAAF. p. 406, pl. xv. fig. 27.
„ *conica* Brady, 1884, FC. p. 392, pl. xlix. figs. 15, 16.
„ „ Brady, Parker, & Jones, 1888, AB. p. 220, pl. xli. fig. 21; pl. xlii. figs. 16, 17.
„ „ Goës, 1894, ASF. p. 39, pl. viii. figs. 342–352.
„ „ Cushman, 1910, etc., FNP. 1911, p. 58, fig. 93.

2 *Stations.*

A few small specimens at Stn. 11 characterized by coarsely agglutinate tests, and a few at Stn. 13 in which the test is larger and constructed of very fine material.

CLAVULINA d'Orbigny.

189. **Clavulina communis** d'Orbigny. (Pl. XLVIII. figs. 15–17.)

Clavulina communis d'Orbigny, 1826, TMC. p. 268. no. 4.
„ „ d'Orbigny, 1846, FFV. p. 196, pl. xii. figs. 1, 2.
„ „ Brady, 1884, FC. p. 394, pl. xlviii. figs. 1–13.
„ „ Egger, 1893, FG. p. 275, pl. vi. figs. 42, 43.
„ „ Millett, 1898, etc., FM. 1900, p. 12.

1 *Station.*

A single abnormal specimen from Stn. ?X, which we figure. It is characterized by the fact that the early portion of the test consists of five or six pairs of regularly textularian chambers, followed by seven chambers of the normal uniserial type. The aperture is regularly clavuline. The shell is built up of extremely fine clear sand-grains, glistening white in colour. The sutural lines of the later textularian chambers and most of the uniserial chambers are marked by a somewhat thickened deposit of granular texture. The test is curved at the point of transition from the textularian to the uniserial mode of growth.

190. **Clavulina obscura** Chaster.

Verneuilina polystropha (Reuss), "dimorphous form," Wright, 1885–6, BLP. p. 320, pl. xxvi. fig. 2.
Clavulina obscura Chaster, 1892, CS. p. 58, pl. i. fig. 4.
„ „ Heron-Allen & Earland, 1913, CI. p. 59, pl. iv. fig. 6.

10 *Stations.*

Ranges from extremely rare to common, but not universally distributed. The best specimens were at Stns. 2*a* and 7. There is great range in the shape and nature of the test; in some instances it is coarsely built of sand and shell-fragments of disproportionally large size, the segmentation being quite obscure; in others the sandy grains are small and the proportion of cement large, resulting in a neatly constructed test with well-marked sutural lines.

191. **Clavulina cylindrica** Hantken. (Pl. XLVIII. figs. 18, 19.)

Clavulina cylindrica Hantken, 1875, CSS. p. 18, pl. i. fig. 8.
„ „ Brady, 1884, FC. p. 396, pl. xlviii. figs. 32–38.
„ *bradyi* (nom. nov.) Cushman, 1910, etc., FNP. 1911, pl. 73. figs. 118, 119.

1 *Station.*

A single specimen in which the final chamber is separated from its predecessors by a somewhat deep suture and occupies one-half of the entire shell.

The *C. cylindrica* of d'Orbigny (1826, TMC. p. 268. no. 1) figured by Fornasini from the "Planches inédites" (Riv. Ital. Paleont. 1897, p. 13) was a form intermediate between *Sagrina* and *Uvigerina*, and being a *nomen nudum* lapses in favour of Hantken's species.

192. **Clavulina angularis** d'Orbigny.

Clavulina angularis d'Orbigny, 1826, TMC. p. 268. no. 2, pl. xii. fig. 7.
" *tricarinata* d'Orbigny, 1839, FC. p. 111, pl. ii. figs. 16–18.
" *triangularis* Goës, 1882, RRCS. p. 86, pl. xi. figs. 387–389.
" *angularis* Brady, 1884, FC. p. 396, pl. xlviii. figs. 22–24.
" " Millett, 1898, etc., FM. 1900, p. 13.
" " Heron-Allen & Earland, 1908, etc., SB. 1910, p. 407, pl. vi. fig. 7.
" " Sidebottom, 1910, RFBP. p. 11, pl. i. fig. 10.

3 *Stations.*

A few specimens only at the three Stns., presenting no special features.

193. **Clavulina angularis,** var. **difformis** Brady. (Pl. XLVIII. figs. 20–22.)

Clavulina angularis, var. *difformis* Brady, 1884, FC. p. 396, pl. xlviii. figs. 25–31.

1 *Station.*

At Stn. 11, in conjunction with the type, but more abundantly and in far better development, occurs this curious variety. The specimens from Kerimba are regularly square or pentagonal in section and more uniform in structure than Brady's figure would suggest.

Brady's only record for this striking variety was from Nares Harbour, Admiralty Islands, New Guinea, 17 fms. Specimens are not uncommon in some S. Australian shore-sands.

Subfamily BULIMININÆ.

BULIMINA d'Orbigny.

194. **Bulimina pupoides** d'Orbigny.

Bulimina pupoides d'Orbigny, 1846, FFV. p. 185, pl. xi. figs. 11, 12.
" " Terrigi, 1880, SGP. p. 193, pl. ii. figs. 30–34.
" " Goës, 1882, RRCS. p. 63, pl. iv. figs. 82–94.
" " Brady, 1884, FC. p. 400, pl. l. fig. 15.
" " Egger, 1893, FG. p. 285, pl. viii. fig. 63.
" " Millett, 1898, etc., FM. 1900, p. 273 (References).

5 *Stations.*

This species, usually so abundant in shallow-water gatherings, is very sparingly found in the Kerimba dredgings. It is common at Stn. 7, frequent at Stn. 5, and very rare at Stn. 1.

195. **Bulimina affinis** d'Orbigny.

Bulimina affinis d'Orbigny, 1839, FC. p. 105, pl. ii. figs. 25, 26.
„ „ Brady, 1884, FC. p. 400, pl. L. fig. 14.
„ „ Burrows, Sherborn, & Bailey, 1890, RC. p. 554, pl. viii. fig. 23.
„ „ Egger, 1893, FG. p. 285, pl. viii. fig. 71.
„ „ Millett, 1898, etc., FM. 1900, p. 274 (References).

2 *Stations.*

One small and very weak specimen at each Stn.

196. **Bulimina elegans** d'Orbigny.

Bulimina elegans d'Orbigny, 1826, TMC. p. 270. no. 10, Modèle no. 9.
„ „ Parker, Jones, & Brady, 1859, etc., NF. 1865, p. 20, pl. ii. fig. 64.
„ „ Brady, 1884, FC. p. 398, pl. L. figs. 1–4.
„ „ Egger, 1893, FG. p. 284, pl. viii. figs. 66, 67.
„ „ Millett, 1898, etc., FM. 1900, p. 274, pl. ii. fig. 1.
„ „ Chapman, 1907, RFV. p. 127.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1910, p. 409, pl. vi. fig. 11.

2 *Stations.*

Frequent at Stn. 7, all the specimens being small. A single similar specimen at Stn. 8.

197. **Bulimina fusiformis** Williamson.

Bulimina pupoides, var. *fusiformis* Williamson, 1858, RFGB. p. 63, pl. v. figs. 129, 130.
Bulimina fusiformis Terquem, 1875, etc., APD. p. 37, pl. v. fig. 10.
„ „ Millett, 1898, etc., FM. 1900, p. 275, pl. ii. fig. 2.
„ „ Wright, 1900, FLMB. p. 100, pl. v. fig. 5.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 312.
„ „ Heron-Allen & Earland, 1913, CI. p. 61.

6 *Stations.*

This little species, so abundant in many British and northern dredgings, is extremely rare in the Kerimba Archipelago. Single individuals were observed at a few Stns. At Stn. 6 it was more plentiful, but still very rare, showing a tendency to pass into *B. squammigera*. It is noteworthy that during forty years after its first diagnosis this really common species does not appear to have been recorded excepting by Terquem (*ut supra*).

198. **Bulimina ovata** d'Orbigny.

Bulimina ovata d'Orbigny, 1846, FFV. p. 185, pl. xi. figs. 13, 14.
„ *pedunculata* Costa, 1853, etc., PRN. 1856, p. 334, pl. xviii. fig. 13.
„ *ovata* Brady 1884, FC. p. 400, pl. L. fig. 13.
„ „ Burrows & Holland, 1897, PB. p. 32, pl. ii. fig. 11.
„ „ Egger, 1899, KOA. p. 49, pl. xv. fig. 45.
„ „ Millett, 1898, etc., FM. 1900, p. 275.

2 *Stations.*

One very poor and minute individual from Stn. 5 and a few at Stn. 13.

199. **Bulimina elegantissima** d'Orbigny.

Bulimina elegantissima d'Orbigny, 1839, FAM. p. 51, pl. vii. figs. 13, 14.
" " Goës, 1882, RRCS. p. 66, pl. iv. figs. 95–98.
" " Brady, 1884, FC. p. 402, pl. L. figs. 20–22.
" " Egger, 1893, FG. p. 289, pl. viii. figs. 101, 102.
" " Millett, 1898, etc., FM. 1900, p. 276, pl. ii. fig. 4.
" " Sidebottom, 1904, etc., RFD. 1905, p. 11, pl. ii. figs. 7–12; pl. iii. figs. 1, 2.
" " Heron-Allen & Earland, 1908, etc., SB. 1910, p. 409, pl. vi. fig. 12.

7 *Stations.*

Rare, except at Stn. 7. Most of the specimens are small. There are two types, one short and broad, the other long and narrow; the long and narrow form at Stn. 10 shows signs of passing into Terquem's *B. elegantissima*, var. *seminuda*, the chambers being short and the spire considerably drawn out. At Stn. ?X an abnormally long specimen was found.

200. **Bulimina elegantissima,** var. **compressa** Millett. (Pl. XLVIII. figs. 23–30.)

Bulimina elegantissima, var. *compressa* Millett, 1898, etc., FM. 1900, p. 277, pl. ii. fig. 5.

13 *Stations.*

Generally distributed, but not many individuals, except at Stns. 2 *a* and 11. There are two distinct types, one of which closely resembles Millett's figure, the other being much broader towards the oral extremity and more distinctly bolivine in outline. The marginal edge of the broad form is often strongly lobulate, the best specimens of this form were obtained at Stn. 2 *a*. At Stn. 3 a specimen was observed in which the terminal chamber consisted of a large expanded "balloon" similar to Sidebottom's figure of *B. elegantissima*, var. *seminuda* (S. 1904 etc., RFD. 1905, pl. iii. fig. 2). At Stn. 11 a specimen of the narrow type was found in association with a minute individual consisting of three chambers only (?budding), and at Stn. 7 several individuals with the terminal chamber broken and the internal septa dissolved which had evidently been in association with others. At Stn. ?B some specimens exhibit curvature of the longitudinal axis as in *Bolivina tortuosa* Brady. At Stn. 11 specimens with the young "budding" individual attached were found.

201. **Bulimina elegantissima,** var. **seminuda** Terquem.

Bulimina seminuda Terquem, 1882, FEP. p. 117, pl. xii. (xx.) fig. 21.
" *elegantissima*, var. *seminuda* Brady, 1884, p. 403, pl. L. figs. 23, 24.
" " " Heron-Allen & Earland, 1908, etc., SB. 1911, p. 311.

15 *Stations.*

Universally distributed, very common at Stns. 1 and 2. Three well-marked types are noticeable, a short stout acutely pointed form, a long narrow acutely pointed form, and

a rather long obtusely pointed form. The short thick form is by far the commonest, and the obtusely pointed ranks next in point of frequency. "Plastogamic" or "budding" individuals (or specimens which have passed through this stage, as shown by the destruction of the apertural end and septa) were observed at Stns. 2, 6, 9, 11, and 12. At none of these Stns. was the species present in such numbers as at Stn. 1, where no associated pairs were observed. Representatives of all three forms were observed among the associated individuals. With one or two exceptions there was great disparity in size between the associated shells (see H.-A. 1915, RPF. p. 248, pl. 15. fig. 28, *a–f*.)

202. **Bulimina pulchella** d'Orbigny.

Bulimina pulchella d'Orbigny, 1839, FAM. p. 50, pl. i. figs. 6, 7.

1 *Station.*

A few individuals at Stn. 7. They form, in their elongated form, a connecting-link between *B. marginata* and the *B. marginata*, var. *biserialis* of Millett, observed at the same Stn. The chambers in *B. pulchella* are very much more elongate in the long axis of the shell than in typical *B. marginata*. D'Orbigny's original record was from the west coast of S. America, and the species does not appear to have been recorded elsewhere.

203. **Bulimina marginata** d'Orbigny.

Bulimina marginata d'Orbigny, 1826, TMC. p. 269. no. 4, pl. xii. figs. 10–12.
" *pupoides*, var. *marginata* Williamson, 1858, RFGB. p. 62, figs. 126, 127.
" *marginata* Brady, 1884, FC. p. 405, pl. li. figs. 3–5.
" " Egger, 1893, FG. p. 287, pl. viii. figs. 69, 70.
" " Goës, 1894, ASF. p. 46, pl. ix. figs. 439–444.

3 *Stations.*

This species is extremely rare, being found at three Stns. only and but a few specimens at each. At Stn. 7 the specimens were small and delicate, with rather a long spine, whereas at Stn. 8 they were thick-shelled and obtuse, similar to the type so abundant in British waters.

204. **Bulimina marginata,** var. **biserialis** Millett.

Bulimina marginata, var. *biserialis* Millett, 1898, etc., FM. 1900, p. 278, pl. ii. fig. 7.

1 *Station.*

A few individuals only. They differ from Millett's figure in the relatively small number of pairs of chambers, having four to five pairs as against eight in his figure.

205. **Bulimina echinata** d'Orbigny.

Bulimina echinata d'Orbigny, 1826, TMC. p. 269. no. 5.
" " Fornasini, 1901, BCI. p. 176, fig. 2.
" " Fornasini, 1901, CBA. p. 379, pl. O. fig. 38.

1 *Station.*

One typical individual from Stn. 10. The species is very clearly distinguishable from *B. aculeata* d'Orb. by the thickly-set investment of small and very fine spines covering the surface of the chambers on the aboral half of the shell.

206. **Bulimina inflata** Seguenza.

Bulimina inflata Seguenza, 1862, RFC. p. 109 (p. 25 in the reprint), pl. i. fig. 10.
„ „ Schwager, 1866, FKN. p. 246, pl. vii. fig. 91.
„ „ Brady, 1884, FC. p. 406, pl. li. figs. 10–13.
„ „ Brady, Parker, & Jones, 1888, AB. p. 220, pl. xliii. fig. 9.
„ „ Egger, 1893, FG. p. 288, pl. viii. fig. 85.
„ „ Flint, 1899, RFA. p. 291, pl. xxxvii. fig. 5.

2 *Stations.*

At Stn. ? X a single specimen was found, characterized by a somewhat compressed mode of growth (as in *Bulimina elegantissima*, var. *compressa*) and by the presence of coarse perforations between the costæ, which are also noticeable as being continuous over the entire surface of the chambers composing the cell. Another not very typical specimen was observed at Stn. 2 *b*.

B. inflata is normally a deep-water species, so that the presence of these individuals in shallow water at Kerimba is striking.

207. **Bulimina williamsoniana** Brady.

Bulimina williamsoniana Brady, 1879, etc., RRC. 1881, p. 56.
„ „ Brady, 1884, FC. p. 408, pl. li. figs. 16, 17.
„ „ Millett, 1898, etc., FM. 1900, p. 279, pl. ii. fig. 8.
„ „ (*Buliminoides*) Cushman, 1910, etc., FNP. 1911, p. 90, fig. 144.

4 *Stations.*

This very beautiful little form is much rarer in the Kerimba area than is usually the case in shallow-water tropical gatherings. The only Stn. where more than an occasional specimen was found was Stn. 11, and even there it is of rare occurrence, though quite typical and well developed. At Stn. ? X one of the two individuals observed had the whole of the face of the terminal chamber eroded away, suggesting that this species may be addicted to the "association" habit or to the method of reproduction of which we believe this feature to be significant.

208. **Bulimina convoluta** Williamson.

Bulimina pupoides, var. *convoluta* Williamson, 1858, RFGB. p. 63, pl. v. figs. 132, 133.
„ *convoluta* Brady, 1884, FC. p. 409, pl. cxiii. fig. 6.
„ „ Egger, 1893, FG. p. 288, pl. viii. figs. 83, 84.
„ „ Millett, 1898, etc., FM. 1900, p. 279, pl. ii. fig. 9.
„ „ Heron-Allen & Earland, 1913, CI. p. 63.

4 *Stations.*

The typical *B. convoluta* occurs at only 4 Stns., good specimens at Stns. 1 and 4, and a single test at Stns. 10 and 11. The specimens are quite normal and typical.

209. **Bulimina convoluta,** var. **nitida** Millett.

Bulimina convoluta, var. *nitida* Millett, 1898, etc., FM. 1900, p. 280, pl. ii. fig. 10.
" " " Sidebottom, 1904, etc., RFD. 1905, p. 12, pl. iii. fig. 3.

15 *Stations.*

This occurs at every Stn., except 7 and 8; the best at Stns. 1 and 12, very rare at Stns. 2, 3, 5, and 11. They all agree with Millett's description and figure, except in the appearance of the shell-wall. He describes the shell-substance as "opaque and lustrous, almost iridescent"; the Kerimba specimens, however, are characterized by a peculiar opalescent shell-wall, dappled with patches of absolutely hyaline shell, which appear black by contrast with their surroundings. The variety is widely distributed, but appears to be confined to tropical waters, whereas the type-species is of practically world-wide distribution, though always rare.

210. **Bulimina squammigera** d'Orbigny. (Pl. XLVIII. figs. 31–35.)

Bulimina squammigera d'Orbigny, 1839, FIC. p. 137, pl. i. figs. 22–24.
Polymorphina appula Costa, 1853, etc., PRN. 1856, p. 286 (error for 282), pl. xviii. fig. 17.
Bulimina squamigera (sic) Siddall, 1878, FRD. p. 49.
" " Earland, 1905, FBS. p. 207.
" " Heron-Allen & Earland, 1913, CI. p. 61.

9 *Stations.*

Sparingly distributed at many Stns., the best individuals at Stns. 7 and 12.

Virgulina d'Orbigny.

211. **Virgulina schreibersiana** Czjzek. (Pl. XLIX. figs. 1–12.)

Virgulina schreibersiana Czjzek, 1848, FWB. p. 147, pl. xiii. figs. 18–21.
Polymorphina longissima Costa, 1853, etc., PRN. 1856, pl. xiii. figs. 22, 23.
Bulimina presli, var. (*Virgulina*) *schreibersii* Parker & Jones, 1865, NAAF. p. 375, pl. xv. fig. 18; pl. xvii. figs. 72, 73.
Virgulina schreibersiana Brady, 1884, FC. p. 414, pl. lii. figs. 1–3.
" " Egger, 1893, FG. p. 290, pl. viii. figs. 93, 95.
" " Goës, 1894, ASF. p. 48, pl. ix. figs. 459, 461–472.
" " Heron-Allen & Earland, 1908, etc., SB. 1910, p. 409, pl. vi. fig. 13.

13 *Stations.*

Almost universally distributed. Although never abundant, this species exhibits an extraordinary diversity in development and construction. The original type of Czjzek, marked by slightly swollen chambers and a somewhat small and inconspicuous aperture, is very rare, and occurs only at Stn. 7. The form generally assumed throughout the gatherings is a broad-mouthed, somewhat compressed, but regular-chambered type,

varying greatly in proportionate length and breadth. The shorter forms are often considerably inflated and not always readily distinguishable from Buliminæ of the type of *B. fusiformis* Will. and *B. affinis* d'Orb. Increasing in length and with greater compression of the shell we reach the type figured by Millett from the Malay Archipelago (M. 1898, etc., FM. 1900, p. 280, pl. ii. fig. 13); the aperture in the Kerimba specimens is seldom, if ever, a terminal slit as figured by him, but is lateral and more or less concealed by the incurving edge of the final chamber. We figure a long series of specimens illustrating the extraordinary diversity of form in the Kerimba types.

212. **Virgulina schreibersiana,** var. **carinata,** nov. (Pl. XLIX. figs. 13–17.)

1 *Station.*

At Stn. 7 an extraordinary variety occurs, characterized by extreme compression of the shell, the edges of which are furnished with a stout border or carina. The earlier segments in this variety are also noticeable for their regularly biserial development and progression. The aperture is large and characteristic, situated on the inner face of the terminal chamber.

The robust growth of the species, the regular Bolivine arrangement of the early chambers, and the characteristic margin appear to us to be sufficient for the separation of this form from the other varieties of *V. schreibersiana* occurring in the dredgings.

BIFARINA Parker & Jones.

213. **Bifarina porrecta** (Brady).

Bolivina porrecta Brady, 1879, etc., RRC. 1881, p. 57.
„ „ Brady, 1884, FC. p. 418, pl. lii. fig. 22.
„ „ Egger, 1893, FG. p. 300, pl. viii. figs. 7–9, 46, 47.
Bifarina porrecta Millett, 1898, etc., FM. 1900, p. 540, pl. iv. fig. 3.
Bolivina (*Bifarina*) *porrecta* Cushman, 1910, etc., FNP. 1911, p. 48, fig. 79.

2 *Stations.*

At Stn. 1 the specimens are of fairly frequent occurrence and present great variety of form, ranging from small and regularly bolivine individuals to an advanced type (represented by one specimen) which is very near the *B. elongata* of Millett, the punctæ being inserted in regular parallel rows. At Stn. 9 one specimen was observed the surface of which was minutely hispid.

214. **Bifarina mackinnonii** Millett. (Pl. XLVIII. figs. 36, 37.)

Bifarina mackinnonii Millett, 1898, etc., FM. 1900, p. 281, pl. ii. fig. 15.

2 *Stations.*

At Stn. 1 a single specimen, which we believe represents the initial portion of this test, and a small typical example at Stn. XI. This form, originally described by Millett from the Malay Seas as "very rare," has a wide distribution in shallow

tropical waters. The best examples we have seen are from the late Capt. Seabrook's dredgings in the Macassar Straits (45 fms.), but we have also met with occasional specimens in Vavau (Pacific) and other Pacific gatherings, and in shallow water at Ngoney, Madagascar.

Bolivina d'Orbigny.

215. **Bolivina punctata** d'Orbigny.

Bolivina punctata d'Orbigny, 1839, FAM. p. 63, pl. viii. figs. 10–12.
„ „ Möbius, 1880, FM. p. 94, pl. ix. figs. 9, 10.
„ „ Brady, 1884, FC. p. 417, pl. lii. figs. 18, 19.
„ „ Goës, 1894, ASF. p. 49, pl. ix. figs. 475–478, 480.
„ „ Chapman, 1900, FLF. p. 186.
„ „ Chapman, 1907, RFV. p. 128.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 336; and 1910, p. 409, pl. vii. fig. 3.

17 *Stations.*

Universally distributed, but less abundant than *B. nobilis*, into which it passes imperceptibly. The same long and short forms occur as in that species, and, judging by casual examination, the short form represents the megalospheric type. A bifarine form occurs at Stns. 1, 3, and 11. At Stn. 1 a strongly limbate variety also occurs. The bifarine specimens are quite hyaline, and not tinged with orange colouring-matter in the initial chambers as is so frequently the case. At Stns. 2, 6, 7, 10, and 11 a very coarsely perforate broad type occurs, at Stn. 7 these specimens have the perforations arranged in longitudinal lines, at Stn. 6 a specimen occurred which was weakly hispid all over.

216. **Bolivina nobilis** Hantken.

Bolivina nobilis Hantken, 1875, CSS. p. 65, pl. xv. fig. 4.
„ „ Brady, 1884, FC. p. 424, pl. liii. figs. 14, 15.
„ „ Egger, 1893, FG. p. 299, pl. viii. figs. 35–37.
„ „ Millett, 1898, etc., FM. 1900, p. 541, pl. iv. fig. 4.
„ „ Chapman, 1907, TFV. p. 32, pl. iv. fig. 81.

17 *Stations.*

Occurs at every Stn., fairly abundant at all except Stn. 8, where it was very rare. As usual, the specimens exhibit considerable variation both in shape and strength of marking. Two distinct types are found in company at most Stns.: a long type regularly increasing in breadth to the final chamber, and a short broad type which is of approximately equal width throughout three-quarters of its length. The two types, except at Stn. 9, where they are equally abundant, vary in proportion, the short type being by far the commoner. The strength and extent of the costæ range between specimens in which only a few faint markings occur on the earlier chambers, and others

in which it extends over the greater portion of the shell. As a rule, the short type is more strongly marked than the long.

Dimorphous individuals similar to the one figured by Millett occur at Stns. 7 and 12 and, as in his figure, this particular variety is characterized by the punctation being arranged in longitudinal rows. The normal specimens, on the other hand, are, as a rule, irregularly punctate, although a few of them show a tendency to a longitudinal arrangement of the punctæ in the later chambers.

217. **Bolivina textilarioides** Reuss.

Bolivina textilarioides Reuss, 1862, NHG, p. 81, pl. x. fig. 1.
„ „ Brady, 1884, FC. p. 419, pl. lii. figs. 23–25.
„ „ Brady, Parker, & Jones, 1888, AB. p. 221, pl. xliii. fig. 1.
„ „ Egger, 1893, FG. p. 297, pl. viii. figs. 13–16, 110–112.
„ „ Millett, 1898, etc., FM. 1900, p. 542, pl. iv. fig. 5.
„ „ Chapman, 1907, RFV. p. 128.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 316, pl. x. figs. 10–12.

5 *Stations.*

A few specimens, presenting no notable features. This is usually more at home in deep water than in shallow deposits.

218. **Bolivina dilatata** Reuss.

Bolivina dilatata Reuss, 1849–50, FOT. p. 381, pl. iii. (xlviii.) fig. 15.
„ „ Brady, 1884, FC. p. 418, pl. lii. figs. 20, 21.
„ „ Brady, Parker, & Jones, 1888, AB. p. 221, pl. xliii. figs. 3, 6.
„ „ Egger, 1893, FG. p. 294, pl. viii. figs. 17–20.
„ „ Millett, 1898, etc., FM. 1900, p. 542 (References).

9 *Stations.*

A few fairly typical specimens at Stns. 3, 4, and 6, and at many other Stns. specimens which link up Reuss's form with the stout and characteristic species *B. robusta* Brady.

219. **Bolivina difformis** (Williamson).

Textularia variabilis, var. *difformis* Williamson, 1858, RFGB. p. 77, pl. vi. figs. 166, 167.
Bolivina difformis Brady, 1887, SBRF. p. 899.
„ „ Heron-Allen & Earland, 1913, CI. p. 65.

2 *Stations.*

One typical specimen at each Stn.

220. **Bolivina tortuosa** Brady.

Bolivina tortuosa Brady, 1879, etc., RRC. 1881, p. 57.
„ „ Brady, 1884, FC. p. 420, pl. lii. figs. 31–34.
„ „ Egger, 1893, FG. p. 298, pl. viii. figs. 43, 44.
„ „ Chapman, 1900, FLF. p. 187.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 317, pl. x. figs. 3, 4.
„ „ Heron-Allen & Earland, 1913, CI. p. 66, pl. v. fig. 1.

14 *Stations.*

Occurs at all Stns. except 5, 9, and 12, never abundantly, but generally very fine. The best specimens are from Stns. 1, 2 *b*, and 11: at Stn. 11, in addition to the normal type, specimens occur in which the early chambers are costate, and one individual in which the whole surface of the test is covered with raised and contorted lines of shell-substance.

221. **Bolivina robusta** Brady.

Bolivina robusta Brady, 1879, etc., RRC. 1881, p. 57.
„ „ Brady, 1884, FC. p. 421, pl. liii. figs. 7–9.
„ „ Egger, 1893, FG. p. 294, pl. viii. figs. 31–32.
„ „ Millett, 1898, etc., FM. 1900, p. 543.

15 *Stations.*

Universally distributed, often in considerable numbers, and very variable in size and the solidarity of the test. Two forms are noticeable: one a broadly diamond-shaped form, very thick in the median line; the other a smaller and much narrower form, though equally thick in proportion. The two forms occur together, noticeably at Stns. 10 and 12, where they are both equally common, in varying proportions at the other Stns. except at Stn. 11 where only the large form occurs, and in its maximum development. No spinous specimens have been observed, and there is little variation in the appearance of the shell, otherwise than in the extent of limbation of the sutures, but at Stn. 2 *a* a few coarsely punctate individuals were observed. One specimen was observed in which the initial chambers projected sideways in a spiroplectine curve.

222. **Bolivina limbata** Brady. (Pl. L. figs. 1–4.)

Bolivina limbata Brady, 1879, etc., RRC. 1881, p. 57.
„ „ Brady, 1884, FC. p. 419, pl. lii. figs. 26–28.
„ „ Egger, 1893, FG. p. 300, pl. viii. figs. 10–12 (11–13 in text).
„ „ Chapman, 1900, FLF. p. 187; and 1901, FFA. p. 409 (*Bifarina limbata*), pl. xxxvi. fig. 12.
„ „ Heron-Allen & Earland, 1913, CI. p. 67, pl. v. figs. 2, 3.

12 *Stations.*

Very generally distributed, often abundant. The species reaches its maximum development in size and beauty at Stn. 11, the specimens being characterized by a tendency to a bifarine arrangement of the later chambers even more pronounced than in Brady's types and Chapman's 1901 figures. At Stn. 11 and also at Stn. 1 some of the individuals exhibit prominent punctation which tends to an arrangement in parallel lines, giving a pseudo-sulcate appearance to the surface of the test. At Stn. 3 truly costate specimens occur. At Stn. ?X a single individual was observed of abnormally compressed form.

223. **Bolivina lobata** Brady.

Bolivina lobata Brady, 1879, etc., RRC. 1881, p. 58.
„ „ Brady, 1884, FC. p. 425, pl. liii. figs. 22, 23.
„ „ Egger, 1893, FG. p. 300, pl. viii. figs. 55, 56.
„ „ Millett, 1898, etc., FM. 1900, p. 543, pl. i. fig. 4 (*Bigenerina fimbriata*).
„ „ Cushman, 1910, etc., FNP. 1911, p. 46, figs. 74, 75.

15 *Stations.*

Occurs practically everywhere, very often common. While constant to type, the specimens present a certain amount of variation in minor features. As a rule, the entire surface of the chambers is rough, owing to the presence of innumerable projecting points. But many specimens, notably at Stn. 4, have a smooth and hyaline surface at the basal portion of each chamber, the roughness being confined to the superior half. At other Stns. (notably Stns. 2 *b*, 10, and 11) the aculeate growths fuse and form reticulating costæ over the surface of the chambers. The species reaches its best development as regards size and ornament at Stns. 1 and 11.

224. **Bolivina convallaria** Millett.

Bolivina convallaria Millett, 1898, etc., FM. 1900, p. 544, pl. iv. fig. 6.

1 *Station.*

One specimen from Stn. 12, which is of a type in which the sides of the test are regularly parallel for at least three-quarters of the length of the shell. Millett's type, as figured, represents the later pairs of chambers as separated by varying spaces, but in the Kerimba specimens the spacing is uniform over the greater portion of the shell. Millett refers to the variability of the species as regards the form and arrangement of the chambers, and perhaps his figure represents an extreme type. The species occurs at several Stns. in Millett's Malay gatherings " by no means common." We have met with it at Singapore, in the Macassar Straits, and in many Pacific shallow-water gatherings—notably at Tahiti, where it is common. All of the specimens which we have seen are of a very regular type, similar to the Kerimba shell, and presenting very little variation except in the development of the marginal spines.

225. **Bolivina variabilis** (Williamson).

Textularia variabilis (*typica*) Williamson, 1858, RFGB. p. 76, pl. vi. figs. 162, 163 (incorrectly numbered 161, 162 on the plate).
Bolivina variabilis Chaster, 1892, CS. pp. 59, 69.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 336.
„ „ Heron-Allen & Earland, 1913, CI. p. 68.

11 *Stations.*

Occurs at many Stns., never in any numbers. The specimens exhibit a considerable

amount of variation, especially as regards their punctation, some being very coarsely perforate. Many specimens passing, on the one hand, into *B. plicata* and, on the other, into *B. punctata* were observed.

226. **Bolivina plicata** d'Orbigny.

Bolivina plicata d'Orbigny, 1839, FAM. p. 62, pl. viii. figs. 4–7.
„ „ Möbius, 1880, FM. p. 95, pl. ix. figs. 12, 13.
„ „ Halkyard, 1889, RFJ. p. 65, pl. i. fig. 13.
„ „ Goës, 1894, ASF. p. 51, pl. ix. figs. 487, 488.
„ „ Heron-Allen & Earland, 1913, CI. p. 68.

1 *Station.*

One specimen only, but quite typical.

227. **Bolivina inflata** Heron-Allen & Earland.

Bolivina inflata Heron-Allen & Earland, 1913, CI. p. 68, pl. iv. figs. 16–19.

8 *Stations.*

Occurs in small numbers at the Stns., but only at a few is it quite typical. At Stn. ?X the specimens are somewhat angular at the periphery, and show signs of approaching *Textularia rhomboidalis* Millett.

228. **Bolivina simpsoni,** sp. n. (Pl. XLIX. figs. 18–35.)

14 *Stations.*

This handsome and very distinctive form is quite one of the features of the Kerimba dredgings at every Stn., except No. 7.

The test commences with a primordial chamber often bearing a terminal spine of considerable length, followed by four to seven or eight pairs of chambers. The earlier pairs are frequently ornamented with stout marginal spines, which are themselves extensions of the limbate sutural walls. The marginal spines are practically parallel and may extend to a length approaching the whole diameter of the test at the point of their emergence. The shell-wall is thick and covered all over with rough aculeate growths, which, in the later chambers, may become fused and develop into raised lines of shell-substance ("verriculations") either straight or curved. The sutural lines are strongly limbate, especially in the early chambers where they stand up as thick walls of clear shell-substance, the surface of the chambers being deeply sunk between them and very inconspicuous. In the later chambers the limbation of the sutures, although present, is much less marked, owing to the fact that the chambers as they become broader become slightly inflated. Down the median line of the shell there is a more or less clear space due to the interruption of the limbate sutures. The aperture is a deep broad bolivine slit, the marginal edges are sometimes thickened and glassy, but the verriculate markings often extend over the curve of the edge, into the aperture.

The shell is coarsely punctate in the spaces between the verriculations of the surface.

Bolivina simpsoni exhibits great diversity of size, development, and external decoration: two well-marked forms occur usually in company, one showing the prominent terminal and marginal spines, the other being spineless. This does not appear to be due to excessive shell-growth in the spinous form, as the sutural lines of the spineless form are often even more strongly limbate than in the spinous type. A short and a long type also occur, apparently definite forms, and not stages of growth; the short type is more commonly spineless, but sometimes the spines on this type are quite abnormally developed. In the long type of both forms there is usually a sudden change in the surface-appearance of the shell at about its mid-growth, the chambers suddenly increasing in breadth and turgidity, with a consequent diminution of the effect produced by the limbate sutures, thus giving an appearance of neatness and finish to the later half of the test.

At Stn. 6 a specimen was observed in which, at this change of growth, the test took on a bigenerine habit, two or three chambers having been formed in a continuous series.

Young individuals bear some resemblance to *Textularia jugosa* Brady (= *Textularia inconspicua*, var. *jugosa* Millett), but are readily distinguishable by their aperture and their much greater size.

We have found our species in the Brady Collection at Cambridge, where it figures as *Textularia jugosa* Brady, from Tamatave (Madagascar) shore-sand. There are two slides of *T. jugosa* in the Collection, the other one containing typical *T. jugosa* from Raine Island. The Madagascar specimens are representative of the Kerimba form, but in a somewhat pauperate condition, similar indeed to the specimens which we have ourselves found from Ngoney (Madagascar). None of them attains the robust dimensions of the best Kerimba types, and, although the limbation and verriculate surface-markings are well shown in some of the stronger individuals, none of them presents marginal spines. The aperture in all cases is typically bolivine.

The species reaches its best development as regards size and numbers at Stns. 4, 9, 10, and 12. At Stn. 4 both the spinous and the spineless forms occur equally large. At Stn. 9 there are only a few spineless, mostly of the short type, but the spinous form is very common and very large. At Stn. 10 only the spinous form was observed and was very common. At Stn. 12 the short spineless and very large spinous specimens were found. At Stn. 11 the spineless form only is recorded, characterized by inordinately thick limbation, and coarse verriculate markings on the later chambers.

We take pleasure in associating this very handsome species with the name of Dr. J. J. Simpson, by whom this material was dredged in the Kerimba Archipelago.

Length extremely variable—a series measured ranged from ·2 to 1·0 mm. in length. Breadth less variable, between ·2 and ·4 mm.

MIMOSINA Millett.

229. **Mimosina rimosa,** sp. n. (Pl. L. figs. 5–11.)

10 *Stations.*

Test free, hyaline, consisting of three to five pairs of chambers arranged in a regular biserial order. The initial portion of the test is sometimes triserial. The chambers somewhat inflated, giving slightly depressed sutural lines. Shell-wall coarsely perforate, in the usual mimosine manner; surface of the test smooth and glassy, usually very transparent. Aperture mimosine or double, but abnormal, consisting of a long fissure extending all round the lower half of each chamber midway between the two faces of the test and forming a compressed funnel which opens into the internal cavity of the chamber. In the fissure, and near the point of junction of the last two chambers, is a small secondary opening into the chamber which is not connected with the funnel.

This well-marked form is one of the most distinctive of the Kerimba types, occurring at nearly every Stn., often moderately plentiful. It may be regarded as closely allied to *M. hystrix* Millett, from which, however, it differs in many points, notably in the invariable absence of all spinous processes and in its very distinctive aperture.

Breadth ·18 mm., length ·3 mm., thickness ·1 mm.

230. **Mimosina affinis** Millett.

Mimosina affinis Millett, 1898, etc., FM. 1900, p. 548, pl. iv. fig. 11.

15 *Stations.*

Universally distributed, often very common. This is one of the typical species of the Kerimba dredgings, and is extremely true to type; hardly any variation has been observed except at Stn. 8, where a few of the specimens had the apical edge of the chambers ornamented with short spines like *Bulimina marginata*, and at Stn. 12 where a few specimens had a single short stout apical spine.

There do not appear to be any published records of this species except Millett's original one from the Malay Archipelago, "occurring in great profusion at nearly all the Stations," and its discovery in equal abundance at Kerimba on the other side of the Indian Ocean, in common with so many other distinctly Malayan types, is certainly of the greatest zoological interest.

We have met with a few minute but typical specimens in a dredging from Vavau in the Friendly Islands (S. Pacific, 16 fms.), and it would therefore appear to be widely distributed across the Indo-Pacific area.

231. **Mimosina spinulosa** Millett.

Mimosina spinulosa Millett, 1898, etc., FM. 1900, p. 548, pl. iv. figs. 12, 13.

16 *Stations.*

Universally distributed, sometimes very common, but, on the whole, less typical of

the locality than *M. affinis*. The specimens do not present any particular features of interest, both the spinous and the straight-edged types figured by Millett occurring at most of the Stns. If anything, the spinous variety (Millett, fig. 13) is the most abundant; the surface of the test is, in its best development, much more strongly marked than is indicated in the original figures, the shell-wall being ridged with fine rounded costæ in the grooves, between which the typical vesicles are placed. The whole of the surface of the test, especially in its initial portion, is often covered with a dense outgrowth of spiny processes masking the sutural lines. The shell-wall is described by Millett as "cellular or spongy," but, viewed as a transparent object under a high power, this characteristic shell-wall of the Mimosinæ appears to be due to small vesicles in the thickness of the shell-substance communicating with the interior and exterior surfaces by the pseudopodial perforations.

M. spinulosa appears to be more widely distributed than the other species, as we have records of its occurrence at many localities in the Indo-Pacific area.

232. **Mimosina echinata,** sp. n. (Pl. L. figs. 12–18.)

Mimosina hystrix Millett, var., Sidebottom, 1904, etc., RFD. 1905, p. 16, pl. iii. fig. 9.
„ „ „ „ Sidebottom, 1910, RFBP. p. 13.

2 *Stations.*

At Stn. ?X a few specimens were found, and a single individual at Stn. 10, which are, we think, beyond question the same as those figured and described by Sidebottom as a variety of *M. hystrix* Millett, but, as he points out, they present points of difference from that species and it appears desirable to separate them. The Kerimba specimens, like those from Delos, are triserial in the early stages. This triserial portion varies considerably in its development, in some cases extending up to the terminal pair of chambers, which are always biserially arranged; in other specimens the triserial portion is very small and the shell is biserial throughout the great part of its development. These two variations cause a considerable difference in the external appearance of the specimens, the biserial form being much narrower and more compressed than the triserial, which is turgid and practically diamond-shaped in section. The whole surface of the test, except the terminal pair of chambers, is covered with a dense growth of fine spines. The double aperture characteristic of *Mimosina* is well shown in our specimens.

Maximum breadth ·10–·14 mm., length ·14–·16 mm.

233. **Mimosina hystrix** Millett. (Pl. L. fig. 19.)

Mimosina hystrix Millett, 1898, etc., FM. 1900, p. 549, pl. iv. fig. 14.

2 *Stations.*

This species is represented by a single specimen at Stn. ?B, and a few less typical at Stn. ?X. At Stn. ?B it is small and fairly typical, but the marginal spines are,

if anything, more strongly developed, especially in the earlier chambers, than in Millett's figure. The surface of the test is also more strongly grooved than in the Malay figure; the perforations are situated in the sulci between the ridges. At Stn. 7 another specimen was observed which, commencing in the normal triserial growth more prominently developed than usual, terminates with two pairs of chambers of the biserial type; the whole of the surface of the early portion is covered with stout spines, and the specimen may be regarded as either abnormal *M. spinulosa* or as *M. hystrix*, but cannot be definitely assigned to either.

Subfamily CASSIDULININÆ.

CASSIDULINA d'Orbigny.

234. **Cassidulina lævigata** d'Orbigny.

Cassidulina lævigata d'Orbigny, 1826, TMC. p. 282. no. 1, pl. xv. figs. 4, 5.
" " Williamson, 1858, RFGB. p. 68, pl. vi. figs. 141, 142.
" " Brady, 1884, FC. p. 428, pl. liv. figs. 1–3.
" " Egger, 1893, FG. p. 302, pl. vii. figs. 47, 48, 54–56.
" " Goës, 1894, ASF. p. 43, pl. viii. figs. 418–420.

6 *Stations.*

Extremely rare—as a rule, only one or two specimens, all poor and small, except at Stn. 8, where the only specimen seen was quite large and normal.

235. **Cassidulina crassa** d'Orbigny.

Cassidulina crassa d'Orbigny, 1839, FAM. p. 56, pl. vii. figs. 18–20.
" " d'Orbigny, 1846, FFV. p. 213, pl. xxi. figs. 42, 43.
" " Brady, 1884, FC. p. 429, pl. liv. figs. 4, 5.
" " Egger, 1893, FG. p. 303, pl. vii. figs. 35, 36.
" " Wright, 1900, FLMB. p. 100, pl. v. fig. 11.

16 *Stations.*

Universally distributed, and as a rule moderately frequent, but extremely rare at Stns. 3 and 9. All the specimens are of normal type, rather small.

236. **Cassidulina subglobosa** Brady.

Cassidulina subglobosa Brady, 1879, etc., RRC. 1881, p. 60.
" " Brady, 1884, FC. p. 430, pl. liv. fig. 17.
" " Egger, 1893, FG. p. 304, pl. vii. figs. 41, 42, 52, 53.
" " Chapman, 1907, TFV. p. 33, pl. iv. fig. 84.
" " Chapman, 1907, RFV. p. 128.
" " Heron-Allen & Earland, 1913, CI. p. 70.

8 *Stations.*

Very sparingly distributed over the whole area—as a rule, only one or two specimens at each Stn., Stns. 1 and 2 being the only localities at which more than a few individuals were found. All the specimens are small and poorly developed.

237. **Cassidulina bradyi** Norman.

Cassidulina bradyi (Norman MS.) Wright, 1880, NEI. p. 152.
„ „ Brady, 1884, FC. p. 431, pl. liv. figs. 6–10.
„ „ Egger, 1893, FG. p. 304, pl. vii. figs. 38–40.
„ „ Goës, 1894, ASF. p. 44, pl. viii. figs. 423–426.
„ „ Sidebottom, 1904, etc., RFD. 1905, p. 17, pl. iii. fig. 10.

1 *Station.*

A single small individual at Stn. 1. The range of this species, although wide, is limited, so far as records are available, to the N. Atlantic (where it is frequent off the west and south of Ireland) and to the Pacific. Its occurrence at Kerimba in an entirely new area is noteworthy.

238. **Cassidulina bradyi** Norman, var. **elongata** Sidebottom. (Pl. L. fig. 20.)

Cassidulina bradyi, var. *elongata* Sidebottom, 1904, etc., RFD. 1905, p. 17, pl. iii. fig. 11.

3 *Stations.*

Single specimens from Stns. 3, 9, and 11. The nature of this little form appears to us to be extremely obscure, and we are inclined to doubt whether it is not more closely related to the genus *Bulimina*, of the group *B. convoluta* Williamson, than to *Cassidulina*, but any settlement of this point could only be made by some observer having access to a sufficient supply of material. If a *Cassidulina*, it is not unlikely that the variety may be a depauperate form of the *Cassidulina* described by Goës as "*Forma affinis* of *C. bradyi*," and to which he gave the varietal name *stenostegica* (G. 1894, ASF. p. 44, pl. viii. fig. 427). Our specimen from Stn. 3 was found among the fragments of a large specimen of *Cymbalopora bulloides*, which had been mounted in balsam and was accidentally crushed by pressure on the cover-glass, and it may perhaps have been ingested by the larger animal.

We have specimens from Haul 138 of the Scottish Fisheries Cruiser 'Goldseeker,' off Noss Head, Moray Firth, 70 metres, and as Sidebottom's specimens were from Delos, the little organism, whatever its affinities, is widely distributed.

239. **Cassidulina nitidula** (Chaster).

Pulvinulina nitidula Chaster, 1892, CS. p. 66, pl. i. fig. 17.
„ „ Sidebottom, 1904, etc., RFD. 1909, p. 9, pl. iv. fig. 2.
Cassidulina nitidula Heron-Allen & Earland, 1913, CI. p. 70, pl. v. figs. 6–9.

5 *Stations.*

A few specimens at Stn. 7 and an occasional one at the others. They are all minute, even for this normally small species, but otherwise distinctive. The occurrence of *C. nitidula* here in the tropics supports our suggestion (*ut supra*) as to the wide distribution of the species, the records now ranging from the Arctic Circle to the Equator.

240. **Cassidulina (Orthoplecta) clavata** Brady. (Pl. L. figs. 21, 22.)

Cassidulina (*Orthoplecta*) *clavata* Brady, 1884, FC. p. 432, pl. cxiii. fig. 9.
„ „ „ Chapman, 1901, FFA. (1902) p. 402 (list). no. 114.

2 *Stations.*

A single specimen at Stn. 2 and four at Stn. 5, all rather short, but quite typical. The published records of this extremely rare species depend entirely upon Brady's discovery at Nares Harbour (Admiralty Islands, 17 fms.) and Chapman's list from Funafuti "outside the reef Tutanga, 50–60 fms." and "200 fms.," but we have found it also at the 'Challenger' Stn. 185 (Raine Island, 155 fms.), in the Java Sea (45 fms.), and Macassar Straits (50 fms.), never more than a few specimens in any particular dredging. Owing to its small size and obscure characteristics it is very likely to be overlooked, and the species being so widely distributed would probably be found in most suitable tropical dredgings if carefully sought for.

Family LAGENIDÆ.

Subfamily LAGENINÆ.

LAGENA Walker & Boys.

241. **Lagena globosa** (Montagu).

Serpula (*Lagena*) *lævis globosa* Walker & Boys, 1784, TMR. p. 3, pl. i. fig. 8.
Vermiculum globosum Montagu, 1803, TB. p. 523.
Lagena globosa Brown, 1844, RCGB. p. 126, pl. lvi. figs. 37 & 40.
„ „ Brady, 1884, FC. p. 452, pl. lvi. figs. 1–3.
„ „ Terrigi, 1889, CP. p. 111, pl. v. fig. 10, pl. vi. figs. 4–6.
„ „ Egger, 1893, FG. p. 323, pl. x. fig. 66.
„ „ Millett, 1898, etc., FM. 1901, p. 3 (References).

16 *Stations.*

Universally distributed, often very common, and presenting every variation as regards size and character of aperture. The best and largest specimens were at Stns. 3 and 4. At Stn. 6 a double specimen presenting two apertures was observed.

242. **Lagena apiculata** (Reuss).

Oolina apiculata Reuss, 1851, FKL. p. 22, pl. i. fig. 1.
Lagena apiculata Parker, Jones, & Brady, 1866, etc., MFC. 1866, p. 44, pl. i. fig. 27.
„ „ Brady, 1884, FC. p. 453, pl. lvi. figs. 4, 15–18.
„ „ Egger, 1893, FG. p. 324, pl. x. fig. 8.
„ „ Millett, 1898, etc., FM. 1901, p. 5 (References).
„ „ Sidebottom, 1912, etc., LSP. 1912, p. 381, pl. xiv. figs. 16–20; 1913, p. 165, pl. xv. fig. 4.

1 *Station.*

One specimen only at Stn. 1.

243. **Lagena ampulla-distoma** Rymer Jones.

Lagena vulgaris, var. *ampulla-distoma* Ry. Jones, 1872, LJS. p. 63, pl. xix. fig. 52.
Lagena ampulla-distoma Brady, 1884, FC. p. 458, pl. lvii. fig. 5.
„ „ „ Millett, 1898, etc., FM. 1901, p. 5, pl. i. fig. 5.
„ „ „ Sidebottom, 1904, etc., RFD. 1906, p. 2, pl. i. figs. 2, 3.
„ „ „ Sidebottom, 1912, etc., LSP. 1912, p. 384 ; 1913, p. 168.

5 *Stations.*

A few specimens only, all of the original type of Rymer Jones as regards superficial markings, *i. e.* with the entire shell-wall covered with "exogenous shell deposit." None of the specimens presents that differentiation in markings indicated by Brady and Sidebottom, in which the upper half of the shell is relatively smooth as compared with the basal half. At Stns. 1 and 3 two varieties were found in company—one normal, the other in which the apiculate base was lacking. At Stn. 6 all the specimens lacked the distomous base. Such specimens with only a terminal aperture would be easily confused with *L. aspera*, but for the fact that the aperture is of the flush or depressed nature characteristic of the normal *L. ampulla-distoma*, instead of being produced as in *L. aspera*. They seem, however, to confirm the relationship of the type with *L. aspera* rather than with *L. globosa*, to which it is usually affiliated.

244. **Lagena aspera** Reuss.

Lagena aspera Reuss, 1861, FKM. p. 305, pl. i. fig. 5.
„ „ Reuss, 1862, FFL. p. 335, pl. vi. fig. 81.
Entosolenia aspera Möbius, 1880, FM. p. 91, pl. viii. figs. 11, 12.
Lagena aspera Brady, 1884, FC. p. 457, pl. lvii. figs. 7–10.
„ „ Egger, 1893, FG. p. 325, pl. x. fig. 11.
„ „ Millett, 1898, etc., FM. 1901, p. 6.
„ „ Sidebottom, 1912, etc., LSP. 1913, p. 167, pl. xv. figs. 11–13.

3 *Stations.*

Only a few specimens, varying considerably in their markings. Fairly typical at Stn. 4 ; small, but otherwise typical at Stn. ? X. At Stn. 3 the surface of the shell, instead of being spinous, was, under a higher power, seen to be covered with zigzag processes, giving a characteristic appearance to the shell.

245. **Lagena rudis** Reuss.

Lagena rudis Reuss, 1862, FFL. p. 336, pl. vi. fig. 82.
„ „ Reuss, 1863, FCA. p. 145, pl. i. fig. 17.
Entosolenia rudis Möbius, 1880, FM. p. 90, pl. viii. fig. 10.
Lagena rudis Millett, 1898, etc., FM. 1901, p. 6, pl. i. fig. 6.

1 *Station.*

A single specimen of this extremely rare species. Nearly globular, the surface being covered with rounded warty protuberances, irregularly disposed, and not presenting any signs of the "reticulate system" observed in the intermediate spaces by Millett in his Malay specimens.

246. **Lagena lineata** (Williamson).

Entosolenia lineata Williamson, 1848, BSGL. p. 18, pl. ii. fig. 18.
Lagena lineata Reuss, 1863, FFL. p. 328, pl. iv. fig. 48.
„ „ Brady, 1884, FC. p. 461, pl. lvii. fig. 13.
„ „ Balkwill & Wright, 1885, DIS. p. 336, pl. xiv. figs. 13–16.
„ „ Egger, 1893, FG. p. 326, pl. x. figs. 29, 30.
„ „ Heron-Allen & Earland, 1913, CI. p. 75.

3 *Stations.*

Only a few specimens at each Stn. and those very poorly developed, the striæ being hardly distinguishable, except in one specimen at Stn. 11, which has the markings more strongly developed in the form of somewhat wavy broken costæ.

247. **Lagena costata** (Williamson).

Entosolenia costata Williamson, 1858, RFGB. p. 9, pl. i. fig. 18.
Lagena costata Reuss, 1862, FFL. p. 329, pl. iv. fig. 54.
„ „ Wright, 1877, RFDA. p. 103, pl. iv. figs. 11–13.
„ „ Terquem, 1882, FEP. p. 27, pl. i. (ix.) fig. 11.
„ „ Balkwill & Wright, 1885, DIS. p. 338, pl. xiv. figs. 3–5.
„ „ Egger, 1893, FG. p. 328, pl. x. fig. 33 (*gracilis*, pars).
„ „ Millett, 1898, etc., FM. 1901, p. 7, pl. i. fig. 8.

1 *Station.*

A single specimen at Stn. 2*a*, with typically coarse costæ, but the neck more produced than usual.

248. **Lagena hexagona** (Williamson).

Entosolenia squamosa, var. *hexagona* Williamson, 1848, BSGL. p. 20, pl. ii. fig. 23.
Entosolenia squamosa Williamson, 1858, RFGB. p. 12, pl. i. figs. 29–31.
Lagena squamosa Carpenter, Parker, & Jones, 1862, IF. App. p. 309.
Lagena sulcata, var. (*Entosolenia*) *squamosa* Parker & Jones, 1865, NAAF. p. 354, pl. xiii. figs. 40, 41, pl. xvi. fig. 11.
Lagena hexagona Siddall, 1879, CBRF. p. 6.
„ „ Brady, 1884, FC. p. 472, pl. lviii. figs. 32, 33.
„ „ Wright, 1900, FLMB. p. 100, pl. v. fig. 15.

7 *Stations.*

Occurs very sparingly, and never more than a few specimens at each Stn., for the most part poorly developed; the range of markings is, however, considerable, varying between the large and coarsely marked var. *scalariformis* of Williamson and a little type occurring at Stn. 9, in which a neatly oval shell is covered with a very fine raised network closely resembling the var. *catenulata* of Williamson, or the *Ovulina ornata* of Seguenza (S. 1862, FMMM. p. 42, pl. i. fig. 12).

249. **Lagena reticulata** (Macgillivray).

Lagenula reticulata Macgillivray, 1843, HMAA. p. 38.
Lagena reticulata Reuss, 1862, FFL. p. 333, pl. v. figs. 67, 68.
„ „ Terquem, 1882, FEP. p. 28, pl. i. (ix.) fig. 15.

Lagena reticulata Jones, Parker, & Brady, 1866, etc., MFC. 1895, p. 195, pl. iv. fig. 7.
„ *hexagona* Egger, 1893, FG. p. 326, pl. x. fig. 60.
„ *reticulata* Sidebottom, 1910, RFBP. p. 17, pl. ii. fig. 4.
„ „ Heron-Allen & Earland, 1913, CI. p. 76.

3 *Stations.*

Moderately typical specimens. Very rare.

250. **Lagena spumosa** Millett.

Lagena spumosa Millett, 1898, etc., FM. 1901, p. 9, pl. i. fig. 9.

2 *Stations.*

Two weakly specimens, one at each Stn. They present the double shell-wall characteristic of the species, but the outer layer is thinner and very much more delicate than is usually the case. *L. spumosa* is probably of world-wide distribution; we have found it in considerable numbers in 'Goldseeker' dredgings from the Hilte Fjord (Norway) in 260 metres, and at several Stns. in the Faroe Channel, ranging down to 1280 metres.

251. **Lagena lævis** (Montagu).

Vermiculum læve Montagu, 1803, TB. p. 524.
Lagena lævis Williamson, 1848, BSGL. p. 12, pl. i. figs. 1, 2.
„ *vulgaris* Williamson, 1858, RFGB. p. 4, pl. i. figs. 5, 5 *a*.
Phialina (vars.) Seguenza, 1862, FMMM. pp. 43, 44, pl. i. figs. 13–17.
Lagena lævis Brady, 1884, FC. p. 455, pl. lvi. figs. 7–14, 30.
„ „ Millett, 1898, etc., FM. 1901, p. 9 (References).
„ „ Heron-Allen & Earland, 1913, CI. p. 77, pl. vi. fig. 5.

7 *Stations.*

Sparingly distributed, the specimens few in number and poorly developed. At Stn. 1 all the individuals were of a very inflated type; at the others, of the fusiform type in which the neck passes imperceptibly into the body of the test. Specimens showing faint signs of striation on the base, connecting this species with *L. semistriata*, were noted at one or two Stns.

252. **Lagena lævis,** var. **distoma** Silvestri.

Lagena distoma (*lævis* Montagu) Silvestri, 1900, FPNT. p. 245, pl. iv. fig. 43; pl. vi. figs. 74, 75.
Lagena lævis, var. *distoma* Millett, 1898, etc., FM. 1901, p. 10, pl. i. fig. 10.
„ „ „ Silvestri, 1902, MT. p. 158, fig. 58.
„ „ „ Sidebottom, 1910, RFBP. p. 15, pl. i. fig. 12.
„ „ „ Heron-Allen & Earland, 1913, CI. p. 77, pl. vi. fig. 6.

1 *Station.*

A single specimen at Stn. 12.

253. **Lagena lævis,** var. **setigera** Millett.

Lagena clavata, var. *setigera* Millett, 1898, etc., FM. 1901, p. 491, pl. viii. fig. 9.

1 *Station.*

A number of specimens at Stn. 7 which we have no hesitation in associating with Millett's variety, although the basal processes are extremely short as compared with his figure. In Millett's specimens the base is described as a "cup-shaped indentation surrounded by a circle of setæ" (*bristles*); in the Kerimba specimens the indentation, when present, is very small, the base being usually merely truncate; there is no sign of any perforation in the base, and we therefore think that our specimens are more nearly allied to *L. lævis* than to *L. clavata.*

254. **Lagena crenata** Parker & Jones.

Lagena crenata Parker & Jones, 1865, NAAF. p. 420, pl. xviii. fig. 4.
„ „ Brady, 1884, FC. p. 467, pl. lvii. figs. 15, 21.
„ „ Balkwill & Wright, 1885, DIS. p. 339, pl. xiv. figs. 17, 18.
„ „ Millett, 1898, etc., FM. 1901, p. 485, pl. viii. fig. 1.

6 *Stations.*

Sparsely distributed, but never abundant. Very variable in contour and presenting many passage-forms linking it with *L. semistriata.* Two types are usually present, one in which the body slopes gradually into the long neck forming an acute triangle in section, and another in which the body is turgid and the neck produced from it. At Stn. 3 both these forms occur together, and abnormal specimens also, in which the body is very lengthened and narrow. At Stn. 7 the individuals were all large but weakly crenelated. The spiral neck-ornament, which is usually present in typical specimens, is absent or weakly developed in nearly all cases. The absence of this feature may, as Millett suggests, mark the close affinity of the Kerimba specimens to *L. semistriata*, although we have specimens of *L. semistriata* from the Philippine Islands in which the neck is ornamented with a prominent spiral carina more strongly developed than we have ever observed in *L. crenata.* These Philippine specimens, however, are unquestionably abnormal.

255. **Lagena semistriata** Williamson.

Lagena striata, var. *semistriata* Williamson, 1848, BSGL. p. 14, pl. i. figs. 9, 10.
Lagena sulcata, var. *semistriata* Parker & Jones, 1865, NAAF. p. 350, pl. xiii. fig. 23.
Lagena semistriata Jones, Parker, & Brady, 1866, etc., MFC. 1865, p. 34, pl. iv. fig. 6.
„ „ Brady, 1884, FC. p. 465, pl. lvii. figs. 14, 16, 17 (? 18, 20).
„ „ Egger, 1893, FG. p. 327, pl. x. figs. 34, 39.
„ „ Millett, 1898, etc., FM. 1901, p. 486, pl. viii. figs. (?) 2, 3.

4 *Stations.*

Very rare and always weakly developed, the best specimens being from Stn. 9, but only one or two of them were at all typically marked.

256. **Lagena perlucida** Williamson.

Lagena vulgaris, var. *perlucida* Williamson, 1858, RFGB. p. 5, pl. i. figs. 7, 8.
Lagena perlucida Heron-Allen & Earland, 1908, etc., SB. 1911, p. 320, pl. x. fig. 13.
„ „ Heron-Allen & Earland, 1913, CI. p. 78.

2 *Stations.*

A few poor and weak specimens of this rather unsatisfactory form at Stns. 4 and 12.

257. **Lagena sulcata** (Walker & Jacob).

Serpula (*Lagena*) *striata sulcata rotundata* Walker & Boys, 1784, TMR. p. 2, pl. i. fig. 6.
Serpula (*Lagena*) *sulcata* Walker & Jacob, 1798, AEM. p. 634, pl. xiv. fig. 5.
Lagena sulcata Parker & Jones, 1865, NAAF, p. 351, pl. xiii. figs. 28, 29; pl. xvi. figs. 6, 7.
„ „ Brady, 1884, FC. p. 462, pl. lvii. figs. 23, 26, 33, 34; Apiculate forms, pl. lviii. figs. 4, 17, 18, etc. (References).
„ „ Millett, 1898, etc., FM. 1901, p. 488 (References).

6 *Stations.*

Very rare, and only poorly developed specimens with short necks, except at Stns. 7 and 12, where the species was large and frequent, and characterized by numerous short and stout spines radiating from the base.

258. **Lagena lyellii** (Seguenza).

Amphorina lyellii Seguenza, 1862, FMMM. p. 52, pl. i. fig. 40.
Lagena lyellii Brady, 1870, FTR. p. 292, pl. xi. fig. 7.
„ „ Balkwill & Millett, 1884, FG. p. 27, pl. ii. fig. 2.
„ „ Sidebottom, 1910, RFBP. p. 15, pl. i. figs. 13–15, 17, 18.
„ „ Heron-Allen & Earland, 1913, CI. p. 79, pl. vi. fig. 8.

6 *Stations.*

A good many specimens at Stn. 1, less frequent at the others. All the specimens are of a rather marked type, characterized by relatively few stout costæ. In the nature of their markings they resemble terminal chambers of *Nodosaria bicamerata* Rymer Jones, and had that species occurred in the Kerimba gatherings the question of the identity of our specimens would have been open to considerable doubt.

259. **Lagena williamsoni** (Alcock).

Entosolenia williamsoni Alcock, 1865, NHC. p. 195.
Lagena williamsoni Wright, 1877, RFDA., App. p. 104, pl. iv. fig. 14.
„ „ Balkwill & Wright, 1885, DIS. p. 339, pl. xiv. figs. 6–8.
„ „ Heron-Allen & Earland, 1913, CI. p. 80.

1 *Station.*

One typical specimen only of this form, usually very abundant in higher latitudes.

260. **Lagena striato-punctata** Parker & Jones.

Lagena sulcata, var. *striato-punctata* Parker & Jones, 1865, NAAF. p. 350, pl. xiii. figs. 25–27.
„ *striato-punctata* Brady, 1878, RRNP. p. 434, pl. xx. fig. 3.
„ „ Brady, 1884, FC. p. 468, pl. lviii. figs. 37 & 40.
„ „ Millett, 1898, etc., FM. 1901, p. 489, pl. viii. fig. 6.
„ „ Sidebottom, 1912, etc., LSP. 1912, p. 392, pl. xvi. figs. 7–10.
„ „ Cushman, 1910, etc., FNP. 1913, p. 30, pl. xiv. fig. 10.

5 *Stations.*

Sparingly distributed, the only Stn. where more than a single specimen was observed being Stn. 4, where it was moderately frequent. All the specimens are of the original type characterized by a comparatively small number of costæ, the multicostate form figured by Brady not having been observed.

261. **Lagena spiralis** Brady.

Lagena spiralis Brady, 1884, FC. p. 468, pl. cxiv. fig. 9.
„ „ Chaster, 1892, S. p. 60, pl. i. fig. 8.
„ *striatopunctata*, var. *spiralis* Millett, 1898, etc., FM. 1901, p. 489, pl. viii. fig. 7.
„ „ „ Sidebottom, 1912, etc., LSP. 1912, p. 394, pl. xvi. fig. 14.

6 *Stations.*

Widely distributed, but as usual only an occasional specimen except at Stn. 11, where the species was larger and more abundant than elsewhere.

262. **Lagena clavata** (d'Orbigny). (Pl. L. fig. 23.)

Oolina clavata d'Orbigny, 1846, FFV. p. 24, pl. i. figs. 2, 3.
Lagena clavata Brady, 1884, FC. p. 456.
„ „ Egger, 1893, FG. p. 324, pl. x. fig. 68.
„ „ Goës, 1894, ASF. p. 75, pl. xiii. figs. 725–727.
„ „ Millett, 1898, etc., FM. 1901, p. 490 (References).
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 423.
„ „ Cushman, 1910, etc., FNP. 1913, p. 9, pl. ii. fig. 3.

3 *Stations.*

Very rare, and seldom typical. At Stns. 6 and 7 most of the specimens showed a tendency to pass into *L. gracillima*, a few with obscure basal markings approaching *L. crenata*. At Stn. 7 an abnormal specimen constricted in the basal portion was observed, which we figure.

263. **Lagena gracillima** (Seguenza).

Amphorina gracilis Costa, 1853, etc., PRN. 1856, p. 121, pl. xi. fig. 11.
„ *gracillima* Seguenza, 1862, FMMM. p. 51, pl. i. fig. 37.
Lagena gracillima Brady, 1870, FTR. p. 292, pl. xi. fig. 6.
„ „ Brady, 1884, FC. p. 456, pl. lvi. figs. 19–28.
„ „ Egger, 1893, FG. p. 330, pl. x. fig. 12.
„ „ Flint, 1899, RFA. p. 306, pl. liii. fig. 3.
„ „ Cushman, 1910, etc., FNP. 1913, p. 11, pl. i. fig. 4.

12 *Stations.*

Occurs at most Stns., frequent. Common at Stns. 1 and 7, where the best range of individuals were obtained. The most typical specimens were at Stn. 12, where it was less abundant. As usual there is a great deal of variation in the diameter of the central portion of the test. At Stn. 9 some inequilateral specimens were observed in which the shell is curved on one side of the long axis only, the other side being straight from one aperture to the other.

264. **Lagena lævigata** (Reuss).

Fissurina lævigata Reuss, 1849–50, FOT. p. 366, pl. i. (xlvi.) fig. 1.
Fissurina (vars.) Seguenza, 1862, FMMM. pp. 56, 57, pl. i. figs. 44–51.
Lagena lævigata Robertson, 1883, PTG. p. 24.
„ „ Brady, 1884, FC. p. 473, pl. cxiv. fig. 8.
„ „ Balkwill & Millett, 1884, FG. p. 81, pl. ii. fig. 6 ; pl. iii. fig. 6.
„ „ Egger, 1893, FG. p. 330, pl. x. figs. 64, 65.

15 *Stations.*

Universally distributed, sometimes common; there is, as usual, a great range of form and size. Perhaps the most noticeable variation is the occurrence at five or six Stns. of a large form with coarse punctations covering the whole surface of the test, except the central portion, running from the aperture downwards. This central portion is quite clear and imperforate; the marginal edge of this form is rather more acute than usual. At Stns. 7 and 9, ?X and ?B a variety occurs with a broad and almost caudate base. At Stn. 7 this variety occurs in a trigonal form.

265. **Lagena acuta** (Reuss).

Fissurina acuta Reuss, 1858, FP. p. 434 ; and Reuss, 1862, FFL. p. 340, pl. vii. figs. 90, 91.
Lagena acuta Brady, 1884, FC. p. 474, pl. lix. fig. 6.
„ „ Egger, 1893, FG. p. 332, pl. x. figs. 74, 75.
„ „ Sidebottom, 1912, etc., LSP. 1912, p. 401, pl. xvii. figs. 9–11.
„ „ Cushman, 1910, etc , FNP. 1913, p. 6, pl. xxxviii. fig. 6.

3 *Stations.*

A few specimens only, presenting no abnormal feature, except at Stn. 7, where the specimens had two well-marked spines at the base.

266. **Lagena lucida** (Williamson).

Entosolenia marginata, var. *lucida* Williamson, 1858, RFGB. p. 10, pl. i. figs. 22–23.
Entosolenia lucida Möbius, 1880, FM. p. 89, pl. viii. fig. 4.
Lagena lucida Balkwill & Millett, 1884, FG. p. 80, pl. ii. fig. 7 ; pl. iii. figs. 4, 5.
„ „ Millett, 1898, etc., FM. 1901, p. 494.
„ „ Sidebottom, 1904, etc., RFD. 1906, p. 6, pl. i. figs. 9–12.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 425 ; and 1911, p. 318, pl. x. fig. 16.

15 *Stations.*

Occurs nearly everywhere, often very common, but less so at Stns. 9 and ? B. Trigonal specimens at Stn. 1, where it was most abundant, and presented considerable variation in shape and character of marking.

267. **Lagena fasciata** (Egger).

Oolina fasciata Egger, 1857, MSO. p. 270, pl. i. (v.) figs. 12–15.
Lagena fasciata Reuss, 1862, FFL. p. 323, pl. ii. fig. 24.
" *Fissurina* " Schlicht, 1870, FSP. p. 12, pl. iv. figs. 25–30.
Lagena quadricostulata Reuss, 1870, FSP. p. 15.
Lagena quadricostulata Brady, 1884, FC. p. 486, pl. lix. fig. 15.
„ *fasciata* Millett, 1898, etc., FM. 1901, p. 495, pl. viii. fig. 19.
„ „ Heron-Allen & Earland, 1913, CI. p. 83.

2 *Stations.*

Occurs very rarely at Stns. 3 and 5, the marginal costæ being poorly developed and the specimens being very close to the allied *L. annectens*, which is common in the gatherings.

268. **Lagena annectens** Burrows & Holland.

Lagena annectens Burrows & Holland, in Jones, Parker, & Brady, 1866, etc., MFC. 1895, p. 203, pl. vii. fig. 11.
(See Millett, 1898, etc., FM. 1901, p. 495.)

12 *Stations.*

Generally distributed all over the area and often abundant, especially at Stns. 1 and 8. The relationships of this form with *L. faba* Balkwill & Millett, *L. fasciata* Egger, and others, is discussed by Millett sub *L. fasciata* (*ut supra*).

269. **Lagena quadrata** (Williamson).

Entosolenia marginata, var. *quadrata* Williamson, 1858, RFGB. p. 11, pl. i. fig. 27.
" *Fissurina* " (vars.) Seguenza, 1862, FMMM. pp. 58, 68, pl. i. figs. 52, 53; pl. ii. fig. 35.
Entosolenia quadrata Möbius, 1880, FM. p. 90, pl. viii. fig. 9.
Lagena quadrata Brady, 1884, FC. p. 475, pl. lix. figs. 3, 16; pl. lx. fig. 5.
„ „ Balkwill & Millett, 1884, FG. p. 81, pl. ii. fig. 8.
„ „ Egger, 1893, FG. p. 331, pl. x. figs. 78, 79.
„ „ Millett, 1898, etc., FM. 1901, p. 496, pl. viii. fig. 18.

4 *Stations.*

One typical specimen at Stn. 11 and a few weaker ones at Stns. 4, 5, and 8.

270. **Lagena malcomsonii** J. Wright.

Lagena lævigata, var. *malcomsonii* Wright, 1910–11, BCNI. p. 4, pl. i. figs. 1, 2.
Lagena malcomsonii Heron-Allen & Earland, 1913, CI. p. 84, pl. vi. fig. 9.
„ „ Heron-Allen & Earland, 1913, FNS. p. 135.

3 *Stations.*

A single specimen at each Stn.

271. **Lagena marginata** (Walker & Boys).

Serpula (*Lagena*) *marginata* Walker & Boys, 1784, TMR. p. 2, pl. i. fig. 7.
Entosolenia marginata (pars) Williamson, 1848, BSGL. p. 17, pl. ii. figs. 15, 16.
"*Fissurina*" (vars.) Seguenza, 1862, FMMM. pp. 59–71 (*passim*), pls. i., ii.
Lagena vulgaris (vars.) Rymer Jones, 1872, LJS. pp. 59–61, pl. xix. figs. 38–47.
Entosolenia marginata Möbius, 1880, FM. p. 90, pl. viii. figs. 7, 8.
Lagena marginata Brady, 1884, FC. p. 476, pl. lix. figs. 21–23.
" " Egger, 1893, FG. p. 332, pl. x. figs. 20, 66, 67, 96, 97.
" " Millett, 1898, etc., FM. 1901, p. 496 (References).

6 *Stations.*

Sparingly distributed and only a few specimens at each Stn. All of them are of types in which the marginal keel is but slightly developed, except at Stn. 1, where the only specimen recorded is of a compressed circular type with a marginal carina extending all round the shell, and in width nearly equalling that of the central chamber.

272. **Lagena marginato-perforata** Seguenza. (Pl. L. figs. 24–30.)

Lagena marginato-perforata Seguenza, 1879–80, FTR. p. 332, pl. xvii. fig. 34.
" " " Millett, 1898, etc., FM. 1901, p. 621, pl. xiv. fig. 4.
" " " Sidebottom, 1904, etc., RFD. 1906, p. 10, pl. ii. fig. 5.
" " " Heron-Allen & Earland, 1913, CI. p. 86, pl. vii. figs. 5, 6.

11 *Stations.*

The specimens which we record under this somewhat unsatisfactory specific name are quite the most typical, and the most widely distributed and common Lagenæ of the Kerimba gatherings. Zoologically, perhaps, they would be more strictly separable under two distinct varietal names, as the specimens divide naturally into two distinctive groups, marked by the presence of two and three peripheral carinæ respectively. But all agree in the nature of their superficial markings, and, for taxonomical reasons, it seems more convenient to regard this as the distinctive feature, instead of treating the carina and its variations as points of separation in the manner usually adopted by systematists. We have no positive evidence that variation, as regards the carina, is of greater value than variation in any other superficial characteristics. As we pointed out in our Clare Island paper, the specimens usually described under the specific name *L. marginato-perforata* can be separated by the number of their keels, specimens with one carina being the *L. marginato-perforata* of Seguenza (*i. e.* varieties of *L. marginata*), with two keels *L. punctata* Seguenza (*i. e.* varieties of *L. bicarinata* Terquem), while specimens with three keels can be ascribed to the *L.* (*Entosolenia*) *variolata* of Schlumberger if, as seems probable from his figure, the markings in that species are perforations and not lacunæ (var. of *L. orbignyana*, cf. S. 1881, etc., NF. 1882, pl. i. fig. 3).

The Kerimba specimens are mostly furnished with three keels, usually but slightly developed, and often hardly distinguishable excepting under a high power. They there-

fore belong to the group of *L. variolata* (Schlumberger). In themselves they consist of two well-marked and distinctive groups which never merge, and seldom show any variation from the types which we figure. The first or biconvex group resembles Schlumberger's figure except for the fact that the keels are poorly developed, and the perforations are much more numerous and more irregularly disposed all over the two faces of the test, which are strongly curved, so that in section the test represents a biconvex lens. The second or complanate group resembles Millett's figures of *L. marginato-perforata*, except in the fact that the Malay specimens have a margin consisting of a thick rounded edge, while the majority of the Kerimba shells have a triple carina with the median keel considerably more developed than the outer ones, which are really no more than a thickened border round the test, the two faces of which are nearly parallel or but slightly convex.

The distribution of the two groups presents curious features, for, while both the biconvex and the complanate groups occur together at most of the Stns., the number of specimens is often disproportionate, and at some Stns. one or other of the groups is entirely absent. Thus at Stns. 1, 2 *b*, 3, and 4, both forms occur in abundance and in practically equal numbers. At Stns. 5 and 6 only the complanate type is found; at Stn. 11 the biconvex form is very common, the complanate very rare, although it furnished the only trigonal specimen noticed in the gatherings. At Stn. 12 only the biconvex form appears, while at Stn. ?X the biconvex form is frequent and the complanate very rare. On the whole, it may be said that the biconvex or coarsely perforate normal *L. orbignyana* type is the commoner and more constant variety in these dredgings.

273. **Lagena staphyllearia** (Schwager).

Fissurina staphyllearia Schwager, 1866, FKN. p. 209, pl. v. fig. 24.
Lagena vulgaris, var. *spinicosta-marginata* Rymer Jones, 1872, LJS. p. 57, pl. xix. figs. 34–36.
„ *staphyllearia* Brady, 1884, FC. p. 474, pl. lix. figs. 8–11.
„ „ Egger, 1893, FG. p. 331, pl. x. figs. 50, 51, 99.
„ „ Millett, 1898, etc., FM. 1901, p. 619, pl. xiv. fig. 2.
„ „ Sidebottom, 1904, etc., RFD. 1906, p. 8, pl. i. figs. 18–20.

1 *Station.*

One typical specimen at Stn. 3.

274. **Lagena radiato-marginata** Parker & Jones.

Lagena radiato-marginata Parker & Jones, 1865, NAAF. p. 355, pl. xviii. fig. 3.
Fissurina radiato-marginata Seguenza, 1879–80, FTR. p. 136.
Lagena radiato-marginata Brady, 1884, FC. p. 481, pl. lxi. figs. 8, 9.
„ „ „ Millett, 1898, etc., FM. 1901, p. 622.

2 *Stations.*

A few specimens only at each Stn., presenting no abnormal characteristics.

275. **Lagena wrightiana** Brady.

Lagena wrightiana Brady, 1879, etc., RRC. 1881, p. 62.
„ „ Brady, 1884, FC. p. 482, pl. lxi. figs. 6, 7.
„ „ Egger, 1893, FG. p. 334, pl. x. figs. 42, 43.
„ „ Millett, 1898, etc., FM., 1901, p. 622.

7 *Stations.*

Occurs at a few Stns., often frequent. In its most typical form *L. wrightiana* presents no difficulties in identification, the surface of the test being ploughed with more or less parallel grooves, often disappearing towards the middle of the test, which presents a clear spot. Large specimens, however, often suggest an affinity to *L. radiato-marginata* which is difficult to account for, as the structure of the test is normally quite different in that species, the markings in which are not superficial but tubular processes in the thickness of the shell-wall. Whether the grooves or channels in the surface of *L. wrightiana* ever become enclosed by a lamina of shell-substance we are not in a position to say, but the appearance of many specimens suggests something of the kind. Such a slight modification of structure separates two forms which are at present regarded as specifically distinct. *L. wrightiana* occurs most abundantly at Stn. 1, less frequently at Stns. 3 and 11. The specimens exhibit great variety in size, contour, and strength of markings, which in some cases bifurcate as in the Malay specimens recorded by Millett. The size of the central smooth space varies enormously—in some cases it occupies nearly half the area of the shell, whilst in others it is almost entirely lacking.

276. **Lagena lagenoides** (Williamson).

Entosolenia marginata, var. *lagenoides* Williamson, 1858, RFGB. p. 11, pl. i. figs. 25, 26.
Lagena lagenoides Reuss, 1862, FFL. p. 324, pl. ii. figs. 27, 28.
„ „ Brady, 1884, FC. p. 479, pl. lx. figs. 6, 7, 9, 12–14.
„ „ Balkwill & Millett, 1884, FG. p. 82, pl. ii. fig. 11.
„ „ Brady, Parker, & Jones, 1888, AB. p. 223, pl. xliv. fig. 23.
„ „ Millett, 1898, etc., FM. 1901, p. 623, pl. xiv. figs. 8, 9.

1 *Station.*

One small but typical specimen at Stn. 3.

277. **Lagena bicarinata** (Terquem).

Fissurina bicarinata Terquem, 1882, FEP. p. 31, pl. i. (ix.) fig. 24.
Lagena bicarinata Balkwill & Millett, 1884, FG. p. 82, pl. ii. fig. 4 ; pl. iii. fig. 9.
„ „ Balkwill & Wright, 1885, DIS. p. 342, pl. xii. fig. 30.
„ „ Millett, 1898, etc., FM. 1901, p. 624, pl. xiv. fig. 13.
„ „ Sidebottom, 1904, etc., RFD. 1906, p. 13, pl. ii. figs. 13–15.
„ „ Sidebottom, 1912, etc., LSP. 1912, p. 419, pl. xix. figs. 25–27, pl. xx. fig. 1; 1913, p. 197, pl. xvii. fig. 18.

1 *Station.*

The record of this species depends upon two specimens from Stn. 11 which are far removed from the normal type of Terquem. They may be compared with the specimens figured by Sidebottom (1913), in which the faces of the test are slightly convex and the two keels slope towards their edges. It seems not improbable from the appearance of one of the specimens that in the perfect shell these two converging keels were united by a marginal rim which enclosed a hollow channel round the body of the test.

278. **Lagena rizzæ** (Seguenza).

Fissurina rizzæ Seguenza, 1862, FMMM. p. 72, pl. ii. fig. 50.
Lagena rizzæ Gough, 1906, FLL. p. 4, pl. i. fig. 3.
„ „ Heron-Allen & Earland, 1913, CI. p. 89, pl. vii. fig. 9.
„ *quadrata*, var. *rizzæ* Cushman, 1910, etc., FNP. 1913, p. 35, pl. xix. fig. 4.

2 *Stations.*

A typical example at each Stn.

279. **Lagena orbignyana** (Seguenza).

Fissurina orbignyana Seguenza, 1862, FMMM. p. 66, pl. ii. figs. 25, 26.
Lagena orbignyana Brady, 1884, FC. p. 484, pl. lix. figs. 1, 18, 24–26 ; winged var. fig. 20.
„ „ Brady, Parker, & Jones, 1888, AB. p. 222, pl. xliv. fig. 20.
„ „ Egger, 1893, FG. p. 333, pl. x. figs. 89–91.
„ „ Flint, 1899, RFA. p. 308, pl. liv. fig. 4.
„ „ Cushman, 1910, etc., FNP. 1913, p. 42, pl. xix. fig. 1.

14 *Stations.*

Occurs at nearly every Stn., ranging from rare to common. There is no great variation, excepting in that at many Stns., notably 1, 10, 11, 12, and ?X, many of the individuals show minute spots in the substance of the shell-wall which, under a high power, prove to be tiny lacunæ. These specimens form a connecting-link between *L. orbignyana* and *L. lacunata* Burrows & Holland. At Stn. 1, where the species was very common, a number of trigonal specimens were observed. At Stns. 4 and 8 the variety *variabilis* Wright, in which the basal portion of the test is ornamented with a few costæ, occurred, and at Stn. 12 a single specimen which was very near the variety *walleriana* Wright was observed.

280. **Lagena orbignyana,** var. **walleriana** J. Wright. (Pl. L. figs. 31–36.)

Lagena orbignyana, var. *walleriana* Wright, 1886, SWI. p. 611; and 1891, SWI. p. 481, pl. xx. fig. 8.
„ „ „ „ Millett, 1898, etc., FM. 1901, p. 627, pl. xiv. fig. 19.
„ „ „ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 320.
„ „ „ „ Sidebottom, 1910, RFBP. p. 19, pl. ii. fig. 15.

2 *Stations.*

At Stns. 1 and 3, especially at Stn. 1, a considerable number of specimens were found. of a very distinctive form, which we assign to Wright's variety. The tests are characterized by the practically parallel surfaces of the shell, the central portion being only slightly convex. The test is strongly built but very hyaline in the centres, with thick milky-white borders, contrasting strongly with the clear central portion. The centre of this clear portion, which, in the typical var. *walleriana* is furnished with a solid stud of shell-substance, is, in the Kerimba specimens, thickened and marked by one or more irregularly shaped spots of opalescent shell-matter, which may coalesce so as to form a pair of brackets ( ), a horseshoe, or an incomplete ring, giving a very striking appearance to the organism. These opalescent markings are somewhat depressed or eroded into the clear shell-wall. The whole test is much more solidly constructed than in the normal examples of *L. orbignyana*, and the orifice is situated at the extremity of a short thick phialine neck.

281. **Lagena orbignyana,** var. **kerimbatica,** nov. (Pl. L. figs. 38–40.)

3 *Stations.*

Test very compressed, oval, furnished with three keels, the two outer ones extending to the same width as the median, the space between the outer keels and the median divided into equal spaces by a number of divisional walls which project beyond the edges and give a denticulate appearance to the margin of the test. About fifteen to twenty of these denticulations are visible on each edge of the test, increasing in length towards the aboral end. The marginal wall of the test is separated from the carina by a channel; the aperture is on a short produced neck. Surface of the test somewhat rough.

Our Kerimba specimens may be compared with Sidebottom's *L. bicarinata*, var. *imbricata* (S. 1912, etc., LSP. 1912, p. 419, pl. xx. fig. 2), to which they bear a striking superficial resemblance. They differ, however, in the fact that there are three well-defined carinæ instead of two as in *L. bicarinata*, var. *imbricata*, and in the fact that the processes between the carinæ, which in *L. bicarinata*, var. *imbricata*, alternate and extend only to a point midway between the two keels, in the Kerimba variety of *L. orbignyana* form a definite wall running from one side of the test to the other, joining all three keels and separating the intracarinal space into definite oblong spaces as shown in our figure.

Length 0·30–0·34 mm., breadth 0·17 mm,, thickness (measured between outer edges of marginal carinæ) 0·06 mm.

282. **Lagena castrensis** Schwager.

Lagena castrensis Schwager, 1866, FKN. p. 208, pl. v. fig. 22.
„ „ Egger, 1893, FG. p. 333, pl. x. figs. 71, 72.
„ *orbignyana*, var. *castrensis* Millett, 1898, etc., FM. 1901, p. 626, pl. xiv. fig. 20.

2 *Stations.*

A single specimen at Stn. 1 and one at Stn. 11, characterized by well-marked raised tubercles on the surface as in Schwager's original figure. The question of the separation of such tuberculate modifications of *L. orbignyana* from vesicular varieties of the same species has been dealt with by Burrows and Holland in their description of *L. lacunata* (*ut supra*). Millett (*ut supra*) regards the two varieties as inseparable. While there is no doubt that many specimens of *L. lacunata* are also furnished with superficial beads, the few specimens of typical *L. castrensis* which have come under our notice have been devoid of internal lacunæ. For reasons of taxonomy it seems desirable to separate the two varieties.

The specimens figured by Brady as *L. castrensis* and by Balkwill and Wright are clearly referable to *L. lacunata*, as pointed out by Burrows and Holland, the surface being ornamented with depressions, and not with raised beads (see No. 284).

283. **Lagena clathrata** Brady.

Lagena clathrata Brady, 1884, FC. p. 485, pl. lx. fig. 4.
„ „ Balkwill & Millett, 1884, FG. p. 82, pl. ii. fig. 14, pl. iv. fig. 3.
„ „ Millett, 1898, etc., FM. 1901, p. 628, pl. xiv. fig. 23.
„ Sidebottom, 1904, etc., RFD. 1906, p. 14, pl. ii. fig. 14.
„ „ Heron-Allen & Earland, 1913, CI. p. 90, pl. vii. fig. 10.
„ „ Sidebottom, 1912, etc., LSP. 1913, p. 196, pl. xvii. fig. 14.

7 *Stations.*

Occasional specimens, the best at Stns. 2 and 5. A trigonal specimen at Stn. 1.

284. **Lagena lacunata** Burrows & Holland.

Lagena castrensis Brady (*non* Schwager), Brady, 1884, FC. p. 485, pl. lx. figs. 1, 2, & ? 3.
„ „ Balkwill & Wright, 1885, DIS. p. 341, pl. xii. figs. 20, 21.
„ *lacunata* Burrows & Holland in J. P. & B. 1866, etc., MFC. 1895, p. 205, pl. vii. fig. 12.
„ *orbignyana*, var. *lacunata* Sidebottom, 1910, RFBP, p. 19, pl. ii. fig. 14.
„ „ „ „ Cushman, 1910, etc., FNP. 1913, p. 43, pl. xx. fig. 1.
„ „ „ „ Sidebottom, 1912, etc., LSP. 1912, p. 416, pl. xix. figs. 16–18.

9 *Stations.*

Common at Stn. 1 and widely distributed, but infrequent at the other Stns. All the specimens are normal except at Stn. 2, where a single individual was observed in which the lacunæ were very small and evenly distributed over the face of the test, and at Stn. ? X, where the only specimens found were of a similar type. This minutely marked form may be compared with *Entosolenia variolata* Schlumberger (S. 1881, etc. NF. 1882, pl. i. fig. 3), although the cavities in the Kerimba specimens are even smaller and more numerous. The *Fissurina punctata* of Seguenza (S. 1880, FTR. p. 136, pl. xiii. fig. 1), which is compared by Burrows and Holland with their type, is

a somewhat similar shell if the interpretation put upon it by those authors is correct, but Seguenza's figure is difficult to interpret in the sense of "pittings," and both his name and his description ("*questa specie si distingue per un doppio margine . . . e per le grosse punteggiature della superficie*") seem to point merely to a coarsely perforated test, and not to pits or internal lacunæ.

285. **Lagena auriculata** Brady.

Lagena auriculata Brady, 1879, etc., RRC. 1881, p. 61.
„ „ Brady, 1884, FC. p. 487, pl. lx. figs. 29, 33, & ?31.
„ „ Millett, 1898, etc., FM. 1901, p. 625, pl. xiv. figs. 14–16.
„ „ Sidebottom, 1912, etc., LSP. 1912, p. 420, pl. xx. figs. 4–14.

1 *Station.*

A single specimen from Stn. 6 of the *ornata* or *lagenoides* type of *L. auriculata* resembling the figs. 13 and 14 of Sidebottom's plate xx. The same variety is figured by Millett, but the Kerimba specimen agrees with Sidebottom's figure in the limited extent of the auricular processes, which only extend to about the middle portion of the test, whereas in the Malay specimens they are carried up to the neck. This particular variety of *L. auriculata* appears to be widely distributed; we have similar specimens from shallow water off Tahiti and have observed it in one or two other shallow Pacific gatherings. Sidebottom's specimens are all from deep water ranging down to nearly 2000 fms. Several varieties of this very variable form are described and figured by Cushman (C. 1910, etc., FNP. 1913, p. 32).

Subfamily Nodosariinæ.

Nodosaria Lamarck.

286. **Nodosaria proxima** O. Silvestri.

Nodosaria proxima O. Silvestri, 1872, NFVI. p. 63, pl. vi. figs. 138–147.
„ „ Brady, 1884, FC. p. 511, pl. lxiv. fig. 15.
„ „ Fornasini, 1888, TP. p. 149, pl. iii. figs. 10, 11.
„ „ Millett, 1898, etc., FM. 1902, p. 519, pl. xi. fig. 9.

5 *Stations.*

Sparingly distributed excepting at Stn. 1, where a good many individuals were observed. The specimens are, as usual, commonly bilocular, but a perfect trilocular specimen was found at Stn. 1, and one or two showing traces of a broken third chamber at other Stns. At Stn. 7 some of the specimens had the costæ on the initial chamber spirally arranged, those on the terminal chamber being normally straight. Fornasini compares *N. proxima* with *Lagena vulgaris*, var. *bicamerata* Rymer Jones (J. 1872, LJS. p. 65, pl. xix. figs. 60–62).

287. **Nodosaria communis** d'Orbigny.

Nodosaria (*Dentalina*) *communis* d'Orbigny, 1826, TMC. p. 254. no. 35.
„ *communis* Reuss, 1845–6, VBK. pt. i. p. 28, pl. xii. fig. 21.
„ (*Dentalina*) *communis* Brady, 1884, FC. p. 504, pl. lxii. figs. 19–22 (References).
„ *communis* Burrows, Sherborn, & Bailey, 1890, RC. p. 557, pl. ix. fig. 27.
„ „ Egger, 1893, FG. p. 342, pl. xi. figs. 22–24.
„ „ Millett, 1898, etc., FM. 1902, p. 522 (References).
„ „ Goës, 1882, RRCS. p. 26, pl. i. figs. 11–16.

2 *Stations.*

Small and typical specimens at two Stns.

288. **Nodosaria spinulosa** (Montagu). (Pl. L. fig. 37.)

Nautilus spinulosus Montagu, 1808, TB. Suppl. p. 86, pl. xix. fig. 5.
Nodosaria spinulosa d'Orbigny, 1826, TMC. p. 253. no. 15.
„ „ Brown, 1844, RCGB. p. 2, pl. i. fig. 26.
Dentalina spinulosa Sherborn & Chapman, MLC. 1886, p. 750, pl. xv. fig. 13.

1 *Station.*

A single specimen consisting of three chambers. The processes from which the species was named are very regular in their distribution over the surface of the test, and are less acute than is suggested by either Montagu's or Sherborn and Chapman's figures. The Kerimba specimen is a fragment, the initial portion being absent, but in the first chamber of our fragment the processes or tubercles form a double ring at regular intervals round the chamber; in the next chamber there are three rings, and in the third and last chamber there are four.

It is somewhat questionable whether this specimen is recent or a fossil, as it was found at Stn. 13 where numerous fossil foraminifera occur. The appearance of the shell, however, is not distinctively fossil.

Lingulina d'Orbigny.

289. **Lingulina carinata** d'Orbigny.

Lingulina carinata d'Orbigny, 1826, TMC. p. 257. no. 1, Modèle no. 26.
„ „ Brady, 1884, FC. p. 517, pl. lxv. figs. 16, 17.
„ „ Sidebottom, 1904, etc., RFD. 1907, p. 3, pl. i. figs. 15–17.
„ „ d'Orbigny, 1839, FIC. p. 124, pl. i. figs. 5, 6.
„ „ Heron-Allen & Earland, 1913, CI. p. 93, pl. viii. fig. 9.
„ „ Cushman, 1910, etc., FNP. 1913, p. 61, pl. xxix. fig. 3.

1 *Station.*

A single specimen consisting of three chambers, the sides absolutely parallel. It resembles Sidebottom's figure, but has no constrictions at the septal lines.

FRONDICULARIA Defrance.

290. **Frondicularia spathulata** Brady.

Frondicularia spathulata, Brady, 1879, etc., RRC. 1879, p. 270, pl. viii. fig. 5.
" " Brady, 1884, FC. p. 519, pl. lxv. fig. 18.
" " Egger. 1893, FG. p. 346, pl. xi. fig. 32.
" " Sidebottom, 1904, etc., RFD. 1907, p. 5, pl. i. fig. 26.
" " Heron-Allen & Earland, 1913, CI. pp. 97 & 187, pl. viii. fig. 12.

1 *Station.*

A single specimen at Stn. 11, minute, but exactly similar to the little individuals frequently found in northern gatherings.

VAGINULINA d'Orbigny.

291. **Vaginulina legumen** (Linné).

Nautilus legumen Linné, 1788, SN. (Ed. xiii.), p. 3373. no. 22.
Vaginulina legumen d'Orbigny, 1826, TMC. p. 257. no. 2.
" *lævigata* Jones, Parker, & Brady, 1866, etc., MCF. p. 64, pl. iv. fig. 9.
" *legumen* Brady, 1884, FC. p. 530, pl. lxvi. figs. 13–15.
" " Haeusler, 1890, FST. p. 107, pl. xiv. fig. 49.
" " Burrows, Sherborn, & Bailey, 1890, RC. p. 559, pl. x. fig. 16.
" " Egger, 1899, KOA. p. 98, pl. ix. figs. 29, 30.
" " Millett, 1898, etc., FM. 1902, p. 527, pl. xi. fig. 21.

5 *Stations.*

Sparingly distributed, most abundant at Stn. 1, where the specimens have a well-marked spiral initial portion. All the specimens are large and markedly megalospheric, except at Stn. 12, where the species is represented by a small microspheric individual.

CRISTELLARIA Lamarck.

(NOTE.—The rarity of the genus *Cristellaria* in these dredgings is very noticeable. The records of the genus are confined to a few individuals of small size and feeble characteristics found at a very limited number of stations.)

292. **Cristellaria rotulata** (Lamarck).

Lenticulites rotulata Lamarck, 1804, AM. p. 188, no. 3; L. 1816, TEM. pl. 466. fig. 5.
Cristellaria rotulata d'Orbigny, 1840, CBP. p. 26, pl. ii. figs. 15–18.
" " Parker & Jones, 1865, NAAF. p. 345, pl. xiii. fig. 19.
" " Brady, 1884, FC. p. 547, pl. lxix. fig. 13.
" " Egger, 1893, FG. p. 351, pl. xii. figs. 1, 2, 32, 33.
" " Millett, 1898, etc., FM. 1903, p. 257 (References).

3 *Stations.*

The few individuals observed were all small and feebly developed. They were all megalospheric.

293. **Cristellaria cultrata** (Montfort).

Robulus cultratus Montfort, 1808–10, CS. vol. i. p. 214, 54e genre.
Cristellaria cultrata Parker & Jones, 1865, NAAF. p. 344, pl. xiii. figs. 17, 18; pl. xvi. fig. 5.
„ „ Brady, 1884, FC. p. 550, pl. lxx. figs. 4–6.
„ „ Egger, 1893, FG. p. 352, pl. xii. figs. 7–10, 24, 25.
„ „ Chapman, 1895, FAS. p. 33.
„ „ Cushman, 1910, etc., FNP. 1913, p. 64, pl. xxix. fig. 4.

2 *Stations.*

Only a few individuals, very weakly developed as regards the carina, and small in size. All megalospheric.

Subfamily POLYMORPHININÆ.

POLYMORPHINA d'Orbigny.

294. **Polymorphina lactea** (Walker & Jacob).

Serpula lactea Walker & Jacob, 1798, AEM. p. 634, pl. xiv. fig. 4.
Polymorphina lactea typica (pars) Williamson, 1858, RFGB. p. 70, pl. vi. fig. 147.
„ *lactea* Brady, Parker, & Jones, 1870, GP. p. 213, pl. xxxix. fig. 1 (References).
„ „ Brady, 1884, FC. p. 559, pl. lxxx. typical fig. 11; var. fig. 14.
„ „ Egger, 1893, FG. p. 308, pl. ix. figs. 8, 14, 15.
„ „ Heron-Allen & Earland, 1913, CI. p. 100, pl. viii. fig. 16 (double).

3 *Stations.*

Very scantily represented by a few weak individuals.

295. **Polymorphina oblonga** Williamson.

Polymorphina lactea, var. *oblonga* Williamson, 1858, RFGB. p. 71, pl. vi. fig. 149.
„ *oblonga* Brady, Parker, & Jones, 1870, GP. p. 222, pl. xxxix. fig. 7.
Polymorphina formosa Egger, 1893, FG. p. 440, pl. ix. figs. 17–19.
„ *lactea*, var. *oblonga* Millett, 1898, etc., FM. 1903, p. 262, pl. v. fig. 5.
„ *oblonga* Heron-Allen & Earland, 1908, etc., SB. 1909, p. 430.
„ „ Heron-Allen & Earland, 1913, CI. p. 100, pl. viii. fig. 17.

4 *Stations.*

Extremely rare, and with the exception of one specimen at Stn. 5, all small and weak.

296. **Polymorphina compressa** d'Orbigny.

Polymorphina compressa d'Orbigny, 1846, FFV. p. 233, pl. xii. figs. 32–34.
„ „ Brady, Parker, & Jones, 1870, GP. p. 227, pl. xl. fig. 12.
„ „ Brady, 1884, FC. p. 565, pl. lxxii. figs. 9–11.
„ „ Egger, 1893, FG. p. 309, pl. ix. figs. 11–13.
„ „ Millett, 1898, etc., FM. 1903, p. 262 (References)
„ „ Sidebottom, 1904, etc. RFD. 1907, p. 13, pl. iii. figs. 1–6, 12, 13.

3 *Stations.*

One small but typical specimen at Stn. 7, and less typical individuals at the other Stns.

297. **Polymorphina communis** d'Orbigny.

Polymorphina (*Guttulina*) *communis* and *problema* d'Orbigny, 1826, TMC. p. 266. nos. 14 & 15, pl. xii. figs. 1–4 ; Modèles nos. 61, 62.
„ *communis* Egger, 1857, MSO. p. 288, pl. ix. (xiii.) figs. 16–18.
„ „ Brady, Parker, & Jones, 1870, GP. p. 224, pl. xxxix. fig. 10 A, B.
„ „ Brady, 1884, FC. p. 568, pl. lxxii. fig. 19.
„ „ Millett, 1898, etc., FM. 1903, p. 263 (References).
„ „ Flint, 1899, RFA. p. 319, pl. lxvii. fig. 6.

3 *Stations.*

Many small specimens at Stn. 1, and an occasional poorly developed specimen at the other Stns.

298. **Polymorphina sororia** Reuss.

Polymorphina (*Guttulina*) *sororia* Reuss, 1863, FCA. p. 151, pl. ii. figs. 25–29.
„ *sororia* Brady, 1884, FC. p. 562, pl. lxxi. figs. 15, 16.
„ „ Egger, 1893, FG. p. 308, pl. ix. fig. 20.
„ „ Egger, 1899, KOA. p. 126, pl. xvii. figs. 6, 7.
„ „ Millett, 1898, etc., FM. 1903, p. 265.
„ „ Cushman, 1910, etc., FNP. 1913, p. 88, pl. xxx. fig. 3.

8 *Stations.*

Sparingly distributed, but more abundant than any other *Polymorphina* in the area ; the specimens are all small, the best being at Stns. 3 and 9.

299. **Polymorphina regina** Brady, Parker, & Jones.

Polymorphina regina Brady, Parker, & Jones, 1870, GP. p. 241,pl. xli. fig. 32.
„ *semicostata* Marsson, 1878, SIR. p. 150, pl. ii. fig. 19.
„ *regina* Brady, 1884, FC. p. 571, pl. lxxiii. figs. 11–13.
„ „ Egger, 1893, FG. p. 310, pl. ix. figs. 45, 50, 51.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 435.
„ „ Cushman, 1910, etc., FNP. 1913, p. 91, pl. xli. figs. 6, 7.

2 *Stations.*

Two small and weak but recognizable specimens, one at each Stn.

300. **Polymorphina complexa** Sidebottom. (Pl. LI. figs. 1–3.)

Polymorphina? complexa Sidebottom, 1904, etc., RFD. 1907, p. 16, text-figs. 3–7, pl. iv. figs. 1–9.
„ „ Sidebottom, 1910, FBP. p. 22.

4 *Stations.*

This species is represented by a single specimen at each Stn., but all well developed

and typical, resembling Sidebottom's figures 3 and 5. The affinities of the species are, as the author says, "very puzzling." One feature which is characteristic of the Kerimba specimens, and which is also evident in some specimens from Delos given us by Sidebottom, and which is suggested in his figure 5 *a* (but is not referred to in the text), is the presence of a series of secondary apertures on the edge of each chamber close to the septal lines. They appear to be perforations passing through the shell, and closely resemble the similar openings in *Candeina nitida* d'Orbigny. When the test of *P. complexa* is broken it exhibits a "postage stamp fracture" along this line of perforations. All the Kerimba specimens have a cribrate aperture as in the Delos examples, but this does not appear to be an area irregularly perforated with many apertures as in the type-figures, but merely a curved line carrying the marginal perforations round the looped edge of the terminal chamber, where the penultimate chamber projects into it. The texture of the Kerimba shells is more hyaline than that of the Delos specimens, which are described as being of a "very delicate pale ivory, and .... they are generally semi-transparent." The Kerimba specimens are finely punctate and suggestive of the thin hyaline shell of *Bulimina ovata* d'Orbigny. The question as to whether this species should remain in the genus *Polymorphina* or whether it should be transferred to *Candeina*, or even to a new genus, must stand over until the point can be decided by the study of a larger number of specimens.

Uvigerina d'Orbigny.

301. **Uvigerina auberiana,** var. **glabra** Millett.

Uvigerina auberiana d'Orbigny, 1839, FC. p. 106, pl. ii. figs. 23, 24.
" " Goës, 1882, RRCS. p. 60, pl. iv. figs. 71–75.
" *auberiana*, var. *glabra* Millett, 1898, etc., FM. 1903, p. 286, pl. v. figs. 8, 9.
" " " " Sidebottom, 1904, etc., RFD. 1908, p. 2, pl. i. figs. 5, 6.

11 *Stations.*

This variety is the only characteristic and widely distributed representative of the genus *Uvigerina* occurring in the Kerimba dredgings. It occurs in varying numbers at practically all the Stns., and presents but little variation except in the surface-texture of the shell, which is, as a rule, quite smooth, but is faintly hispid at Stns. 5, 6, and 7. At Stn. 7 the hispid decoration is arranged in regular lines, giving a sub-striate appearance to the test. At Stn. ? X the uvigerine chambers are almost entirely suppressed, the test being biserial throughout. There is considerable divergence in the length of the specimens, most Stns. furnishing examples of two kinds, (i.) short and broad, and (ii.) long and narrow. This divergence appears to be due to the extent of the uvigerine development.

302. **Uvigerina tenuistriata** Reuss.

Uvigerina (no specific name) Schlicht, 1870, FSP. pp. 65, 66, pl. xxii. figs. 34–36.
„ *tenuistriata* Reuss, 1870, FSP. p. 485.
„ „ Brady, 1884, FC. p. 574, pl. lxxiv. figs. 4–7.
„ „ Spandel, 1909, RMB. p. 209, pl. ii. fig. 1.
„ „ Bagg, 1912, PFC. p. 77, pl. xxiii. figs. 9, 10.

1 *Station.*

One specimen, differing from the usual type in the somewhat accentuated costæ and in the absence of a produced neck; the aperture is long, and marked only by the presence of an everted lip.

303. **Uvigerina pygmæa** d'Orbigny.

Uvigerina pygmæa d'Orbigny, 1826, TMC. p. 269, pl. xii. figs. 8, 9; Modèle no. 67.
„ „ d'Orbigny, 1846, FFV. p. 190, pl. xi. figs. 25, 26.
„ „ Williamson, 1858, RFGB. p. 66, pl. v. figs. 138, 139.
„ „ Parker & Jones, 1865, NAAF. p. 363, pl. xiii. figs. 53–57, pl. xvii. fig. 65.
„ „ Brady, 1878, RRNP. p. 435, pl. xx. fig. 7.
„ „ Brady, 1884, FC. p. 575, pl. lxxiv., Type, figs. 11, 12; Elongate, figs. 13, 14.
„ „ Egger, 1893, FG. p. 314, pl. ix. fig. 42.

4 *Stations.*

Very rare. At Stn. 3 the few specimens found were large and typical. At Stn. 12 was a long narrow specimen approaching *U. tenuistriata* Reuss. At Stn. 11 a single specimen intermediate between *U. pygmæa* and *U. aculeata* d'Orbigny (d'O. 1846, FFV. p. 191, pl. xi. figs. 27, 28).

304. **Uvigerina porrecta** Brady.

Uvigerina porrecta Brady, 1879, etc., RRC. 1879, p. 274, pl. viii. figs. 15, 16.
„ „ Brady, 1884, FC. p. 577, pl. lxxiv. figs. 21–23.
„ „ Egger, 1893, FG. p. 315, pl. ix. figs. 57, 63.
„ „ Millett, 1898, etc., FM. 1903, p. 269.

2 *Stations.*

Very rare. All the specimens are of a short broad type, like Brady's fig. 23.

305. **Uvigerina selseyensis** Heron-Allen & Earland.

Uvigerina selseyensis Heron-Allen & Earland, 1908, etc., SB., 1909, p. 437, pl. xviii. figs. 1–3.
„ „ Cushman, 1910, etc., FNP. 1913, p. 93, pl. xlii. fig. 5.

1 *Station.*

One typical example. Cushman's figure (*ut supra*) differs from the type in the markedly costate surface of the chambers.

306. **Uvigerina angulosa** Williamson.

Uvigerina angulosa Williamson, 1858, RFGB. p. 67, pl. v. fig. 140.
„ *pygmæa*, var. *angulosa* Parker & Jones, 1865, NAAF. p. 364, pl. xiii. fig. 58; pl. xvii. fig. 66.
„ *angulosa* Seguenza, 1879, FTR. pp. 226, 307.
„ „ Brady, 1884, FC. p. 576, pl. lxxiv. figs. 15–18.
„ „ Egger, 1893, FG. p. 314, pl. ix. figs. 40, 46, 47.
„ „ Goës, 1894, ASF. p. 51, pl. ix. figs. 502–509.
„ „ Heron-Allen & Earland, 1913, CI. p. 104.

1 *Station.*

A single specimen of the short broad type. The rarity of this widely distributed species in these dredgings is noteworthy, but it is more particularly a cold-water form.

Sagrina Parker & Jones.

307. **Sagrina columellaris** Brady.

Sagrina columellaris Brady, 1879, etc., RRC. 1881, p. 64.
Siphogenerina glabra Schlumberger, 1883, FGG. p. 118, pl. iii. fig. 1.
Sagrina columellaris Brady, 1884, FC. p. 581, pl. lxxv. figs. 15–17.
„ „ Egger, 1893, FG. p. 316, pl. ix. figs. 28, 31, 33.
„ „ Millett, 1898, etc., FM. 1903, p. 270, figs. 10, 11.
„ „ Cushman, 1910, etc., FNP. 1913, p. 104, pl. xlvii. figs. 2, 3.

7 *Stations.*

Sparingly distributed, abundant only at Stn. 1, where all the specimens are small and very irregular in form. The best individuals at Stn. ? X. Many of the specimens show signs of the development of irregular costæ, linking them with the entosolenian form of *S. raphanus*.

308. **Sagrina virgula** Brady. (Pl. LI. figs. 4, 5.)

Sagrina virgula Brady, 1879, etc., RRC. 1879, p. 61, pl. viii. figs. 19–21.
„ „ Brady, 1884, FC. p. 583, pl. lxxvi. figs. 4–10.
„ „ Egger, 1893, FG. p. 318, pl. ix. fig. 27.
„ „ Millett, 1898, etc., FM. 1903, p. 271.

8 *Stations.*

Widely distributed, but very rare, only an occasional specimen being met with at each Stn., most of them being small and poorly developed, similar to Brady's fig. 6. Good specimens at Stn. 12. At Stn. 1 a single individual with well-marked spinous growths, similar to Brady's figs. 4, 5. All the specimens are of the typical shallow-water type, exhibiting well-developed uvigerine initial chambers.

309. **Sagrina striata** (Schwager). (Pl. LI. figs. 6–8.)

Dimorphina striata Schwager, 1866, FKN. p. 251, pl. vii. fig. 99 & text-fig. 2.
Sagraina striata Schwager, 1876, etc., CF. 1877, p. 25, fig. 35.

Sagrina striata Brady, 1884, FC. p. 584, pl. lxxv. figs. 25, 26.
Siphogenerina striata Egger, 1893, FG. p. 316, pl. ix. figs. 32, 34, 35, 64, 65.
Sagrina striata Millett, 1898, etc., FM. 1903, p 272.
Siphogenerina striata Cushman, 1910, etc., FNP. 1913, p. 107, pl. xlvii. figs. 4, 5.

3 *Stations.*

At Stn. 10 the specimens are of a regular type, cylindrical in section, similar to Brady's figures. At Stn. 11 the specimens are large, oval in section, and characterized by a bifarine arrangement of the middle chambers, the septa, which are limbate, running in a zigzag direction. The shells thus appear to present a transition-type between *S. striata* and *S. bifrons* Brady (B. 1884, FC. p. 582, pl. lxxv. figs. 18–20).

310. **Sagrina raphanus** Parker & Jones.

Uvigerina (*Sagrina*) *raphanus* Parker & Jones, 1865, NAAF. p. 364, pl. xviii. figs. 16–17.
Siphogenerina costata Schlumberger, 1883, FGG. p. 118, fig. B.
Sagrina raphanus Brady, 1884, FC. p. 585, pl. lxxv. figs. 21–24.
Siphogenerina (*Sagrina*) *raphanus* Egger, 1893, FG. p. 317, pl. ix. fig. 36.
Sagrina raphanus Millett, 1898, etc., FM. 1903, p. 272.
Nodosaria cylindracea Dakin, 1906, FC. p. 235, pl. fig. 8.

5 *Stations.*

Occurs sparingly, but sometimes in considerable numbers. The best at Stns. 5 and 11, where it was large and well developed. Only small individuals at Stns. 1 and 3. All the specimens are of the entosolenian type, similar to Dakin's figure (*ut supra*). His figure, however, represents a shell with exceptionally fine and numerous costæ.

311. **Sagrina tessellata** Brady. (Pl. LI. fig. 9.)

Sagrina tessellata Brady, 1884, FC. p. 585, pl. lxxvi. figs. 17–19.
„ „ Millett, 1898, etc., FM. 1903, p. 273, pl. v. fig. 16.

2 *Stations.*

Two typical specimens (both broken) at Stn. 1, and a somewhat obscure individual at Stn. 10. This extremely interesting form is of much more frequent occurrence in shallow water of the eastern area of the Indian Ocean; we have records of it from many shallow gatherings in the Malay and Eastern seas. Millett's figures and description of the chambers "subdivided into chamberlets by transverse septa" would, if confirmed, raise some doubts as to the proper status of this form, which would then require removal to a separate subgenus. The scarcity of material, and its small size and obscurity of structure must, however, postpone any discussion upon this point; but it appears to us from an examination of many balsam-mounted specimens under high magnifications that this "tesselated" appearance is not due to the presence of chamberlets but to two series of ridges at right angles to each other, which project from the inner surface of the shell-wall into the cavities of the chambers, but do not subdivide the cavity into chamberlets.

Family GLOBIGERINIDÆ.

GLOBIGERINA d'Orbigny.

312. **Globigerina bulloides** d'Orbigny.

Globigerina bulloides d'Orbigny, 1826, TMC. p. 277, no. 1; Modèles nos. 17 and 76.
" " Möbius, 1880, FM. p. 92.
" " Brady, 1884, FC. p. 593, pls. lxxvii. & lxxix. figs. 3–7 (References).
" " Millett, 1898, etc., FM. 1903, p. 685 (References).
" " Heron-Allen & Earland, 1913, CI. p. 104.

16 *Stations.*

Universally distributed, and at most Stns. in moderate numbers. The specimens represent practically all the known variations, but are all of the small type commonly found in inshore waters, and are generally marked by relatively coarse areolation of the surface-walls. At Stns. 7 and ?B the specimens were particularly small in size.

313. **Globigerina triloba** Reuss.

Globigerina triloba Reuss, 1849–50, FOT. p. 374, pl. ii. (xlvii.) fig. 11.
Pylodexia atlantica Ehrenberg, 1873, LMT. p. 388, pl. iv. fig. 2.
Globigerina bulloides, var. *triloba* Brady, 1884, FC. p. 595, pl. lxxix. figs. 1, 2, pl. lxxxi. figs. 2, 3.
" *triloba* Egger, 1893, FG. p. 370, pl. xiii. figs. 71–76.
" " Chapman, 1900, FLF. p. 188.
" " Chapman, 1907, RFV. p. 133.

4 *Stations.*

Only a few records of this well-marked variety. The best individuals were at Stn. 3.

314. **Globigerina dubia** Egger.

Globigerina dubia Egger, 1857, MSO. p. 281, pl. v. (ix.) figs. 7–9.
" " Brady, 1884, FC. p. 595, pl. lxxix. fig. 17.
" " Egger, 1893, FG. p. 366, pl. xiii. figs. 36–38, 77.
" " Millett, 1898, etc., FM. 1903, p. 686.
" " Flint, 1899, RFA. p. 322, pl. lxix. fig. 4.
" " Cushman, 1910, etc., FNP. 1914, p. 6, pl. iv. figs. 1–3.

7 *Stations.*

Only a few specimens observed, and mostly small except at Stns. 10, 11, 12, where they are of good dimensions and quite typical.

315. **Globigerina cretacea** d'Orbigny. (Pl. LI. figs. 10–13.)

Globigerina cretacea d'Orbigny, 1840, CBP. p. 34, pl. iii. figs. 12–14.
" " Goës, 1882, RRCS. p. 92, pl. vi. figs. 203–207.
" " Brady, 1884, FC. p. 596, pl. lxxxii. figs. 10, 11.
" " Egger, 1893, FG. p. 365, pl. xiii. figs. 26–28.
" " Goës, 1894, ASF. p. 86.
" " Heron-Allen & Earland, 1913, CI. p. 104.

7 *Stations.*

Occurs rather infrequently, in any numbers only at Stns. 1 and 12. All the Kerimba specimens differ considerably both from d'Orbigny's original type and from the species *G. sub-cretacea*, instituted by Chapman (C. 1901, FFA. p. 410, pl. xxxvi. fig. 16) for the reception of recent specimens on what appears to us to be insufficient grounds, having regard to the very variable nature of the Globigerine shell. The principal point of distinction in Chapman's species is the depression of the spire, which in d'Orbigny's figure is a flattened cone, whereas in Chapman's Funafuti specimens the central portion is inverted and below the level of the last whorl of chambers. He describes his species as having "few chambers," but as figured by him they are more numerous than in d'Orbigny's original figure.

In the Kerimba specimens the spire is flattened, but hardly depressed below the level of the circumambient chambers; the number of chambers is limited, the entire shell consisting, as a rule, of two to two and a half whorls, the chambers rapidly increasing in size, the later ones being almost globular in shape, and the external surface is irregularly studded with a few beads which were probably, in life, furnished with comparatively stout spines. All the chambers are visible on the superior side of the shell—on the inferior side, as a rule, only the final whorl is visible, the depressed umbilical portion being usually obscured by secondary shell-matter. The aperture is a restricted arch on the face of the terminal chamber.

The Kerimba specimens thus appear to occupy an intermediate position between d'Orbigny's original fossil type and Chapman's recent species, but we see no necessity for separating our specimens from d'Orbigny's species or any objection to including Chapman's specimens under the same specific name, the differences appearing to be too slight to justify separation.

316. **Globigerina inflata** d'Orbigny.

Globigerina inflata d'Orbigny, 1839, FIC. p. 134, pl. ii. figs. 7–9.
„ „ Parker & Jones, 1865, NAAF. p. 367, pl. xvi. figs. 16, 17.
„ „ Brady, 1884, FC. p. 601, pl. lxxix. figs. 8–10.
„ „ Egger, 1893, FG. p. 369, pl. xiii. figs. 45–47.
„ „ Goës, 1894, ASF. p. 85, pl. xiv. figs. 763–765.
„ „ Millett, 1898, etc., FM. 1903, p. 687 (References).

4 *Stations.*

Only a few individuals, but fairly typical. This species appears to reach its best development in the temperate zone in the Atlantic, where it is one of the dominant forms.

317. **Globigerina rubra** d'Orbigny.

Globigerina rubra d'Orbigny, 1839, FC. p. 82, pl. iv. figs. 12–14.
„ „ Van den Broeck, 1876, FB. p. 77, pl. iii. figs. 7, 9, 10.
„ „ Brady, 1884, FC. p. 602, pl. lxxix. figs. 11–16.

Globigerina rubra Egger, 1893, FG. p. 366, pl. xiii. figs. 42–44.
„ „ Millett, 1898, etc., FM. 1903, p. 687.
„ „ Heron-Allen & Earland, 1913, FNS. p. 131, pl. x. figs. 13–15.

14 *Stations.*

This species is a very variable one—indeed, it is questionable whether it should not be broken up into at least three different specific types. The specific character is, of course, indicated by its name—a typical pink colour. Secondary to this comes an elevated trochoid spire and the presence of arched secondary apertures on the superior surface of the shell. Both or either of these features may be suppressed or absent in any series of specimens, the secondary apertures being the least constant and apparently confined to large tropical specimens. At Kerimba the species occurs nearly everywhere, and is in nearly all cases represented by a type in which the dominant pink colour is well marked and constant, but the secondary apertures are absent, and the trochoid spire is comparatively inconspicuous. The specimens are thus mainly separable from *G. bulloides* by their pink coloration only. The only typical specimens presenting the elevated spire and the secondary apertures were noted at Stn. 11, and, curiously enough, the majority were almost devoid of coloration, but a few typically red individuals were found. At Stn. 2 a few individuals were found of the minute type so abundant in Northern Seas in which a comparatively high spire is present, but no coloration. Such individuals are to be found in muddy littoral deposits all over the world.

318. **Globigerina conglobata** Brady.

Globigerina conglobata Brady, 1879, etc., RRC. 1879, p. 286.
„ „ Brady, 1884, FC. p. 603, pl. lxxx. figs. 1–5; pl. lxxxii. fig. 5.
„ „ Brady, Parker, & Jones, 1888, AB. p. 225, pl. xlv. fig. 13.
„ „ Egger, 1893, FG. p. 368, pl. xiii. figs. 55, 56.
„ „ Millett, 1898, etc., FM. 1903, p. 688 (References).

8 *Stations.*

Fairly generally distributed, but only a few specimens at each Stn., and these poorly developed, except at Stns. 10, 11, and 12, where the specimens are larger and quite typical.

319. **Globigerina æquilateralis** Brady.

Globigerina æquilateralis Brady, 1879, etc., RRC. 1879, p. 285.
„ „ Brady, 1884, FC. p. 605, pl. lxxx. figs. 18–21.
„ „ Egger, 1893, FG. p. 364, pl. xiii. figs. 5–8.
„ „ Fornasini, 1899, GA. p. 580, pl. iv. figs. 3, 4.
„ „ Rhumbler, 1900, NPF. p. 20, figs. 21–23.
„ „ Millett, 1898, etc., FM. 1903, p. 689.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1910, p. 424, pl. viii. figs. 11, 12.

4 *Stations.*

One comparatively large and typical specimen at each Stn., except at Stns. 3 and 13, where several individuals were found.

ORBULINA d'Orbigny.

320. **Orbulina universa** d'Orbigny.

Orbulina universa d'Orbigny, 1839, FC. p. 3, pl. i. fig. 1.
„ „ d'Orbigny, 1839, FIC. p. 123, pl. i. fig. 1.
„ „ Schacko, 1883, UF. p. 431, pl. xiii. fig. 1.
„ „ Brady, 1884, FC. p. 608, pl. lxxviii., pl. lxxxi. figs. 8–26, pl. lxxxii. figs. 1–3.
„ „ Egger, 1893, FG. p. 374, pl. xiv. figs. 7–9, 11, 12, 38–40.
„ „ Millett, 1898, etc., FM. 1903, p. 690 (References).

6 *Stations.*

This species is extremely rare; only one really typical large specimen was observed at Stn. 3. At Stns. 2 *b*, 4, 12, and ? X one or two minute individuals were found, and at Stn. 1, where these minute forms were more numerous, one or two were found exhibiting *Globigerina* partially enclosed. The extreme rarity of this species is noticeable, as one would expect to find a considerable number of pelagic specimens brought into the shallow coastal waters from the Indian Ocean by the Equatorial current, which impinges on the Kerimba coast-line.

PULLENIA Parker & Jones.

321. **Pullenia obliquiloculata** Parker & Jones.

Pullenia obliquiloculata Parker & Jones, 1865, NAAF. pp. 368, 421, pl. xix. fig. 4.
„ „ Brady, 1879, etc., RRC. 1879, p. 294.
„ „ Brady, 1884, FC. p. 618, pl. lxxxiv. figs. 16–20.
„ „ Egger, 1893, FG. p. 372, pl. xiii. figs. 62–64.
„ „ Flint, 1899, RFA. p. 324, pl. lxx. fig. 6.

4 *Stations.*

The records of this species rest on one or two individuals at these Stns. They have no doubt come in on the drift of the Equatorial current.

SPHÆROIDINA d'Orbigny.

322. **Sphæroidina corticata,** sp. n. (Pl. LI. figs. 14–18.)

2 *Stations.*

Test free, hyaline, inequilateral, consisting of four chambers gradually increasing in size and all visible externally. Shell-wall very thick, coarsely punctate and produced between the foramina into granular cortications which give an extremely

rough or bark-like appearance to the test, especially on the more convex or superior side. Smoother on the less convex side, especially near the aperture, which is a small fissure at the point of intersection of the final and penultimate chambers. The depressions between the earlier and the ultimate chambers in the immediate neighbourhood of the aperture are more or less filled in with secondary shell-matter.

It occurs rarely at Stns. 11 and ? B. We have specimens of the same form from 'Challenger' Station 192 (off the Ki Islands, 129 fms.) and the Java Sea (45 fms.). It is a somewhat anomalous form, approaching *Globigerina helicina* d'Orbigny (C. P. & J. 1862, IF. p. 181, pl. xii. fig. 11) in the arrangement of its chambers, but differing entirely in the texture of the external surface of the shell and in the aperture, which is much nearer *Sphæroidina dehiscens* Parker & Jones (P. & J. 1865, NAAF. pl. xix. fig. 5). There is, however, no trace of any internal early chambers in the specimens which we have examined in balsam.

Length ·4 to ·5 mm., breadth (about) ·25, thickness (about) ·25, thickness of the shell-wall from ·02 to ·03 mm.

Candeina d'Orbigny.

323. **Candeina nitida** d'Orbigny.

Candeina nitida d'Orbigny, 1839, FC. p. 108, pl. ii. figs. 27, 28.
„ „ d'Orbigny, 1846, FFV. p. 193, pl. xxi. fig. 28.
„ „ Brady, 1884, FC. p. 622, pl. lxxxii. figs. 13–20.
„ „ Egger, 1893, FG. p. 373, pl. xiii. fig. 57.
„ „ Rhumbler, 1900, NPF. p. 31, fig. 33.
„ „ Millett, 1898, etc., FM. 1903, p. 692, pl. vii. fig. 2.

1 *Station.*

At Stn. 11 two large specimens were found, comparable in all respects with the figure given by Millett. This compressed and abnormal type is so entirely distinct from d'Orbigny's original figure and from the general appearance of the species, that we should have hesitated before attributing it to d'Orbigny's species but for Millett's previous determination. The test, apart from its regular construction, has, in the Kerimba specimens, an abnormally thick shell for *Candeina*, but the rows of secondary apertures in the sutural depressions are so well displayed that its generic position is clear. In view of the occurrence of similar specimens in such widely separated areas, and the entire absence of typical individuals in the Kerimba dredgings, it seems probable that this depressed form may be specifically distinct from d'Orbigny's thin-shelled type.

Family ROTALIIDÆ.

Subfamily SPIRILLININÆ.

SPIRILLINA Ehrenberg.

324. **Spirillina vivipara** Ehrenberg. (Pl. LI. figs. 19–23.)

Spirillina vivipara Ehrenberg, 1841, SNA. p. 442, pl. iii. fig. 41.
„ „ Parker & Jones, 1865, NAAF. p. 397, pl. xv. fig. 28.
„ „ Möbius, 1880, FM. p. 88, pl. viii. figs. 1, 2.
„ „ Brady, 1884, FC. p. 630, pl. lxxxv. figs. 1–5.
„ „ Egger, 1893, FG. p. 394, pl. xviii. figs. 56–58.
„ „ (*Arspirillinum vu-viviparum* m.!!) Rhumbler, 1908, etc., FPE. 1913, p. 428, text-fig. 142, pl. v. fig. 9; pl. vi. figs. 4–9.
„ „ Heron-Allen & Earland, 1913, CI. p. 107, pl. ix. fig. 1.

15 *Stations.*

Universally distributed, and abundant at some Stns. The specimens comprise practically all the variations of this simple but very mutable species, ranging from extremely complanate forms of the var. *complanata* Parker & Jones (J. P. & B. 1866, etc., MFC. 1896, p. 290, pl. iii. (1866) figs. 20–22) to comparatively high-domed forms with concave inferior surface. Typical individuals of *S. vivipara* of a very large size were obtained at Stn. 2 *a*. Both typical flat forms and the high-domed forms occur in company at most Stns., but at Stns. 3 and 7 only the flat type occurs, and at Stns. 9 and ?X only the domed. At Stn. 11 a single specimen (which we figure) was found of a very curious and marked variety with an acute peripheral edge produced into short flat spines. This has some superficial resemblance to the *S. spinigera* of Chapman (C. 1899, FFA. p. 10, pl. i. fig. 7, and C. 1900, FLF. p. 188, pl. xix. figs. 9 & 10), but differs from his figure and description in some minor points, especially in the nature of the primordial portion, the height of the dome, and the development of the spines. At Stns. 1 and 3 individuals were found intermediate between *S. vivipara* and *S. æqualis* Brady (which we also figure), characterized by massive and coarsely perforate shell-wall, the upper surface being slightly concave and the lower practically plane.

325. **Spirillina obconica** Brady.

Spirillina obconica Brady, 1879, etc., RRC. 1879, p. 279, pl. viii. fig. 27.
„ „ Brady, 1884, FC. p. 630, pl. lxxxv. figs. 6, 7.
„ „ Egger, 1893, FG. p. 395, pl. xviii. figs. 59–61.
„ „ Chapman, 1909, SNZ. p. 352.
„ „ Heron-Allen & Earland, 1913, CI. p. 108, pl. ix. figs. 8, 9.

1 *Station.*

One typical specimen.

326. **Spirillina lucida** Sidebottom.

Spirillina lucida Sidebottom, 1904, etc., RFD. 1908, p. 9, pl. ii. fig. 9.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 327.
„ „ Heron-Allen & Earland, 1913, CI. p. 108, pl. ix. figs. 4, 5.

1 *Station.*

A single typical specimen.

327. **Spirillina ornata** Sidebottom. (Pl. LI. figs. 24, 25.)

Spirillina ornata Sidebottom, 1904, etc., RFD. 1908, p. 9, pl. ii. figs. 7, 8.

1 *Station.*

One typical specimen. It differs from Sidebottom's description only in the texture, which is normally hyaline. The Delos specimens were "semi-opaque and of a pale milky yellow colour"; this would seem to point to the fact that Sidebottom's specimens were dead shells, especially as the peripheral edge in the Kerimba specimen is entire, whereas Sidebottom remarks that "the peripheral edge is more or less sinuous unless this is due to a fracture." The markings, which in the description of the Delos specimens are described as due to the shells being "decorated with minute raised ridges except in the final convolutions," appear under a high power to be due to the presence of paired foramina set in parallel rows across the width of the tube. These pairs of foramina often coalesce into a slit-like opening across the tube, and are possibly the "raised ridges" referred to by Sidebottom.

328. **Spirillina inæqualis** Brady.

Spirillina inæqualis Brady, 1879, etc., RRC. 1879, p. 278, pl. viii. fig. 25.
„ „ Brady, 1884, FC. p. 631, pl. lxxxv. figs. 8–11.
„ „ Egger, 1893, FG. p. 394, pl. xviii. figs. 40–42.
„ „ Millett, 1898, etc., FM. 1903, p. 693.

6 *Stations.*

Excellent typical specimens at many Stns., but the species is always rare. The best individuals were at Stns. 5 and 11.

329. **Spirillina limbata** Brady.

Spirillina limbata Brady, 1879, etc., RRC. 1879, p. 278, pl. viii. fig. 26.
„ „ Brady, 1884, FC. p. 632, pl. lxxxv. figs. 18–21.
„ „ Egger, 1893, FG. p. 395, pl. xviii. figs. 43, 44.
„ „ Flint, 1899, RFA. p. 326, pl. lxxi. fig. 5.

5 *Stations.*

Very sparingly distributed and always rare. The best specimens at Stn. 11, where it attains a very large size.

330. **Spirillina limbata,** var. **denticulata** Brady.

Spirillina limbata, var. *denticulata* Brady, 1884, FC. p. 632, pl. lxxxv. fig. 17.
„ „ „ Egger, 1893, FG. p. 396, pl. xviii. fig. 66.
„ „ „ Millett, 1898, etc., FM. 1903, p. 694.
„ „ „ Heron-Allen & Earland, 1913, CI. p. 109, pl. ix. fig. 10.

7 *Stations.*

Scantily distributed over the area, but good and typical specimens at many Stns., especially Stns. 1 and 2 *a*.

331. **Spirillina margaritifera** Williamson.

Spirillina margaritifera Williamson, 1858, RFGB. p. 93, pl. vii. fig. 204.
„ „ J. Wright, 1885–6, BLP. p. 321, pl. xxvi. fig. 12.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 440.

3 *Stations.*

Occurs at very few Stns., but it is not uncommon where it occurs. The best and largest specimens were at Stn. 11. At Stn. 1, where it was more frequent, the individuals were small.

332. **Spirillina decorata** Brady.

Spirillina decorata Brady, 1884, FC. p. 633, pl. lxxxv. figs. 22–25.
„ „ Egger, 1893, FG. p. 394, pl. xviii. figs. 64, 65.
„ „ Millett, 1898, etc., FM. 1903, p. 695.
„ „ Sidebottom, 1904, etc., RFD. 1908, p. 8, pl. ii. fig. 6.
„ „ Chapman, 1909, SNZ. p. 353.

1 *Station.*

One specimen at Stn. 11. Egger's specimens were from West Africa, Mauritius, and Australia.

333. **Spirillina semidecorata,** sp. n. (Pl. LI. figs. 26–31.)

2 *Stations.*

Test free, plano-convex, consisting of a tube acutely angular in section convoluted at an angle towards the centre of the shell. Convolutions numerous, probably not less than five or six, each convolution embracing its predecessors to a greater or less extent, so that, as a rule, little or nothing except the last whorl is visible on the superior surface. The central portion of the shell on the superior face is excavate in a greater or less degree according to the angle at which the tube is inclined in its convolution; thus in some specimens the final convolution entirely encloses the superior face of the shell except for a minute central crater, in others the superior edge of the tube, in each of the early convolutions, is visible in the central depression. The tube is apparently plicate, giving a very characteristic appearance to the upper surface, but this appearance may possibly be due to constrictions inside the tube. Peripheral

edge thick and subcarinate. Aperture obscure, if existent at all. Inferior surface plane, studded with tubercular growth either in the form of round or oval beads, rendering the number of convolutions uncertain. The last convolution on the inferior surface is usually free from secondary growth. The marginal view in specimens where the superior surface is not embracing is very characteristic and resembles an upstanding frill.

A single specimen of this highly specialized form was found at Stn. 1 and many at Stn. 11. We have met with the species at the 'Challenger' Stn. 185 (Raine Island, Torres Straits, 155 fms.), and at other localities, and we have Eocene specimens from Moorabool River, Victoria, N.S.W. Within certain limits it is subject to considerable variation. In some specimens the last convolution entirely encloses all its predecessors on the superior surface, leaving merely a central pin-hole, as it were, to mark the axis of convolution. In other instances, where the tube is convoluted at a less acute angle, the embracing character of the whorls is less marked, and the sharp superior edge of the tube can be seen in a diminishing spiral lining the sides of the central depression. The nature of the tubercular growth on the inferior surface appears to change from spherical to oval beads with the increasing diameter of the tube as the shell grows in size. The curiously plicate appearance of the external surface of the tube is probably due to internal constrictions rather than to merely external decoration, and may mark a transition-stage between *Spirillina* and *Patellina*. If such be the case, the species would usefully support Rhumbler's view, in which he is entirely supported by Schaudinn (S. 1895, PF. p. 181), that the genus *Patellina* should properly be merged with the genus *Spirillina* (R. 1895, NST. p. 85).

Breadth of base 0·30 to 0·35 mm.; height variable, ranging up to 0·1 mm.

Subfamily Rotaliinæ.

Patellina Williamson.

334. **Patellina corrugata** Williamson.

Patellina corrugata Williamson, 1858, RFGB. p. 46, pl. iii. figs. 86–89.
" " Brady, 1884, FC. p. 634, pl. lxxxvi. figs. 1–7.
" " Egger, 1893, FG. p. 393, pl. xiv. figs. 70–72.
" " Schaudinn, 1895, PF. p. 181 (fig.).
" " Chapman, 1907, RFV. p. 134, pl. x. fig. 7.
" " Heron-Allen & Earland, 1913, CI. p. 109, pl. ix. fig. 11.
" " (*Arpatellum düinst-corrugatum* m.!!) Rhumbler, 1909, etc., FPE. 1913, pp. 409–412, figs.; p. 437, pl. v. figs. 5–7; pl. vii. figs. 11–15.

11 *Stations.*

Very generally distributed, but the number of specimens always very limited, and most of the individuals were of the normal depressed type. At Stns. 1 and 4 the

final chambers were furnished with a spreading carina. At Stn. 3 one individual only was found of the high conical type; this conical type occurs of a comparatively large size at Stn. 11, where the depressed form was also found to be large and well developed. Specimens exhibiting the markedly non-septate initial portion which led Rhumbler to transfer the species to *Spirillina* (R. 1905, NST. p. 85) were found, but none with the rotaline commencement noted by Chapman (*ut supra*).

Cymbalopora Hagenow.

335. **Cymbalopora poeyi** (d'Orbigny).

Rotalia squammosa d'Orbigny, 1826, TMC. p. 272. no. 8.
Rosalina poeyi d'Orbigny, 1839, FC. p. 92, pl. iii. figs. 18–20. *R. squammosa*, p. 91, pl. iii. figs. 12–14.
Cymbalopora poeyi Carpenter, Parker, & Jones, 1862, IF. p. 215, pl. xiii. figs. 10–12.
" " Möbius, 1880, FM. p. 97, pl. x. figs. 1–5.
Discorbina poeyi Goës, 1882, RRCS. p. 107, pl. viii. figs. 264, 265.
Cymbalopora poeyi Brady, 1884, FC. p. 636, pl. cii. fig. 13.
" " Egger, 1893, FG. p. 381, pl. xviii. figs. 51, 52.
" " Chapman, 1900, FLF. p. 189.
" " Rhumbler, 1906, FLC. p. 71, pl. v. fig. 59.

16 *Stations.*

C. poeyi in one or other of its numerous forms is one of the most abundant species throughout the area, as, indeed, in all shallow-water tropical gatherings. The specimens may be roughly divided into high-domed and low-domed types, which usually occur together, though in varying proportions. As regards the high-domed type, very few specimens were obtained of the large and typical form described and figured by d'Orbigny as *Rotalia squammosa*, but the less convex *C. poeyi* is abundant at most of the Stns. The specimens are, however, as a rule, smaller than the individuals of the depressed type figured by Brady as *C. poeyi* var. (FC. pl. cii. fig. 14), some of which attain very large proportions. A smaller form, characterized by a high-domed test with rounded apex and having a well-marked rotaline initial portion, of the type of *Discorbina concinna*, followed by numerous acervuline chambers of a small and regular form, occurs at many of the Stns. This is indistinguishable from the initial portion of *C. milletti*, and is probably but a stage in the life-history of that form. The colour of the specimens of *C. poeyi* is very variable, normally of a deep brown tint, especially as regards the initial chambers, it is at some Stns. (notably Stn. 4) quite colourless. The number of lobes on the inferior surface does not appear to have any specific significance; they vary in specimens otherwise indistinguishable, from four (the usual number in the Kerimba types) to as many as seven or eight. Perhaps the majority of specimens, especially of the high-domed variety, have the four lobulations. Attached specimens are of rare occurrence, but even the small high-domed form (akin to *C. milletti*) has been seen (Stn. 12) in this condition.

In the Brady collections at Cambridge there is a slide labelled *C. humilis* Brady, containing specimens of the very depressed type which occurs in this material, both sessile and detached. The Cambridge specimens were all detached. Brady did not apparently publish any description or figure of this form, which is certainly not worth separating as a species.

336. **Cymbalopora tabellæformis** Brady.

Cymbalopora tabellæformis Brady, 1884, FC. p. 637, pl. cii. figs. 15–18.
" " Egger, 1893, FG. p. 382, pl. xviii. figs. 54, 55.
" " Millett, 1898, etc., FM. 1903, p. 697.
" " Chapman, 1900, FLF. p. 189.

11 *Stations.*

Very generally distributed, but nowhere in such profusion as its closely allied form *C. poeyi*. The points of distinction between *C. tabellæformis* and *C. poeyi* are somewhat unsatisfactory. Brady's chief distinctive feature is the difference of the aperture, which, in *C. poeyi*, is described as an orifice opening into the umbilical vestibule, and in *C. tabellæformis* as rows of sutural pores only. But many unquestionable specimens of *C. poeyi* have marginal or sutural pores in addition to the umbilical arched aperture. A more constant specific feature lies in the fact that in *C. tabellæformis* each chamber forms a perfect curve running from the flat superior face, on which all the chambers are exposed (though often obscured by shell-thickening), to the umbilical recess, in the manner, as we have elsewhere pointed out, of the tuber of the common garden Ranunculus (H.-A. 1915, RPF. p. 258, pl. 18. fig. 53).

All the specimens observed were free-growing, except at Stn. 1, where numerous individuals were found encrypted in fragments of molluscan shells. This phenomenon, which is hitherto unknown in the habits of any Foraminifer, has been made the subject of a special study in the paper above referred to, which has been published elsewhere. It is probable that a large number of the free specimens found at other Stns. have originally been encrypted in this manner, as they agree in all essential features with the specimens which we have removed from such crypts. They are nearly all of regular circular outline, very few approaching to the oval outline of Brady's type.

337. **Cymbalopora bulloides** (d'Orbigny).

Rosalina bulloides d'Orbigny, 1839, FC. p. 98, pl. iii. figs. 2–5.
Cymbalopora bulloides Carpenter, Parker, & Jones, 1862, IF. p. 216.
Tretomphalus bulloides Möbius, 1880, FM. p. 98, pl. x. figs. 6–9.
Cymbalopora bulloides Brady, 1884, FC. p. 638, pl. cii. figs. 7–12.
" " Murray, 1897, PF. p. 20, fig. 3.
" " Chapman, 1900, FLF. p. 189.
" " Earland, 1902, "On *Cymbalopora bulloides* (d'O.) and its Internal Structures," Journ. Quekett Micr. Club, ser. 2, vol. viii. pp. 309–322, pl. 16.

13 *Stations.*

Almost universally distributed. It occurs as usual in two very distinct types—a small form in which the early chambers are arranged on a discorbine plan, and a larger form in which a few discorbine chambers are succeeded by numerous acervuline chambers before the formation of the balloon. The two forms nearly always occur together, but in varying proportions. At some Stns., especially at Stns. 2 *b* and ? X, the discorbine type is the more abundant, at others the proportions are either equal or with a predominance of the acervuline type. In the discorbine type the balloon-chamber is often more or less elongated, so that the shell represents a cylinder with convex extremities. In the acervuline type, on the other hand, the whole test is usually more or less globular in form, the balloon representing one hemisphere or, perhaps, rather more. There is at certain stations a tendency to vertical compression of the test, the balloon being pronouncedly flattened—this is notably the case at Stn. 8. Lateral compression, on the other hand, is extremely rare, although instances were observed at several Stns.

The dual nature of the terminal chamber as an outer or balloon-chamber and an inner or float-chamber was first recorded by Earland in 1902, and forms the subject of a principal section of the paper above referred to.

338. **Cymbalopora milletti,** sp. n. (Pl. LI. figs. 32–35.)

Cymbalopora bulloides Millett, 1898, etc., FM. 1903, p. 697, pl. vii. fig. 4.

15 *Stations.*

The curious type figured by Millett in his Malay Monograph as a variety of *C. bulloides* occurs at practically all the Stns., and often in considerable numbers, even where the typical *C. bulloides* is wanting. We propose to raise it to specific rank and to associate it with the name of its author, being convinced, after a protracted examination, that the type possesses essential and constant idiosyncrasies. This decision has been arrived at after a careful examination, not only of our own specimens from all over the area of its distribution, but also of a large number of slides, prepared on board H.M.S. 'Challenger' by the late Sir John Murray and placed by him at our disposal.

The main points of distinction between the two forms may be summarized as follows:—(i.) The rotaline portion is invariably high-domed and mainly acervuline, consisting of a small but well-marked rotaline commencement followed by a number of small but regularly formed acervuline chambers. (ii.) The balloon-chamber presents a curiously wrinkled surface, and in its most typical condition the balloon is superficially divided into four segments by arborescent markings originating from four equidistant points on the peripheral margin of the balloon. Viewed as a transparent object in balsam, it appears that these arborescent markings, which give the balloon-chamber its peculiar wrinkled appearance, are occasioned by constrictions

or pleats in the inner or float-chamber, and that the float-chamber is adherent to the balloon excepting at the lobulations and along the ramifications of the arborescent markings. (iii.) The absence in the vast majority of cases of the umbilical entosolenian tube by which in the normal *C. bulloides* the inner or float-chamber communicates with the balloon and thence with the surrounding medium. (iv.) The absence of the coarse basal perforations on the balloon which are characteristic of the typical *C. bulloides*.

It would thus appear that in the typical *C. bulloides* the lower half of the shell consists of two distinct hemispherical chambers, one suspended within the other, without actual contact anywhere, the entosolenian tube of the balloon-chamber merely fitting into the depression formed by the corresponding tube of the float-chamber without actual fusion. In *C. milletti*, on the other hand, the internal float-chamber is adherent to and is fused with the balloon-chamber, except at a number of places where the four deep lobulations of the float-chamber pass from its upper peripheral margin to the base of the test, ramifying as they go. These ramifying passages give to the shell its typical wrinkled appearance.

Again, whereas in the typical *C. bulloides* there are always two well-marked forms, as already pointed out, *C. milletti* is, so far as we have observed, always acervuline and within very narrow limits of variation constant both as to size, general appearance, and colour. The test is always high-domed, and the acervuline chambers numerous and regularly formed as compared with acervuline specimens of the typical *C. bulloides*. Specimens are also in nearly all instances of a characteristic brown colour, and the initial discorbine chambers are of the type of *Discorbina concinna* Brady.

The distribution of *C. milletti* certainly extends all over the tropical Indo-Pacific area, but we have not met with it as yet in the tropical Atlantic.

In the Brady collection at Cambridge there is a slide of *C. bulloides* from Levuka, Fiji, which contains several specimens of this form. Brady's fig. 9, pl. cii. in FC. 1884, suggests this wrinkled form in its general appearance, though the essential markings are not reproduced.

Size variable—average specimens vary between ·3 and ·4 mm. in total height, of which about ·2 mm. represents the acervuline portion of the shell; breadth of balloon-chamber averages ·3 mm.

Discorbina Parker & Jones.

339. **Discorbina cora** (d'Orbigny).

Rosalina cora d'Orbigny, 1839, FAM. p. 45, pl. vi. figs. 19–21. (See also B. 1884, FC. p. 627; and H.-A. & E. 1913, CI. p. 111, & Table p. 113.)

7 *Stations*.

This very depressed and scale-like species occurs rarely. The only really typical specimen was at Stn. ?X attached to a shell-fragment. This individual was of

extreme tenuity. At Stn. 10 some good and fairly typical examples were found; at the remaining Stns. the individuals presented characteristics linking them with *D. globularis*, but in their outspreading growth and thinness they were certainly nearer to *D. cora* than to the other species.

340. **Discorbina nitida** (Williamson).

Rotalina nitida Williamson, 1858, RFGB. p. 54, pl. iv. figs. 106–108.
Rotalia nitida Brady, 1884, FC. pp. 627, 705.
Discorbina nitida Wright, 1891, SWI. p. 490.
,, ,, Sidebottom, 1904, etc., RFD. 1908, p. 13, pl. iv. fig. 6.
,, ,, Heron-Allen & Earland, 1908, etc., SB. 1911, p. 328.
,, ,, Heron-Allen & Earland, 1913, CI. p. 121.

11 *Stations.*

Generally distributed over the area, and, as a rule, extremely true to type and presenting but little variation. Most abundant at Stns. 1 and 7, where it is small but normal, and at Stn. 11, where the individuals are much larger than elsewhere in the gatherings. At this Stn. also two pronounced variations were observed, both of which have their origin in an excessive development of the carinated edge. In one form the carina separates the successive whorls, but is flush with the surface of the chambers; in the other the surface of each chamber is slightly inflated, so that the carina shows as a broad depressed sutural line.

341. **Discorbina concinna** Brady.

Discorbina concinna Brady, 1884, FC. p. 646, pl. xc. figs. 7, 8.
,, ,, Egger, 1893, FG. p. 388, pl. xv. figs. 22–24.
,, ,, Millett, 1898, etc., FM. 1903, p. 699.
,, ,, Chapman, 1900, FLF. p. 191.

16 *Stations.*

Very frequent and often abundant, the principal variation observed being in the colour, which ranges from colourless hyaline to deep red-brown. Brady suggests that his species may be only the immature or arrested stage of some better-known species. In view of the extreme abundance of specimens at some of the Stns., and the comparative rarity of such more advanced types as *D. rosacea* and *D. turbo*, to which *D. concinna* evidently is most nearly allied in structure, there does not seem to be much evidence in support of Brady's suggestion. As we propose to point out elsewhere, however, the small rotaline specimens of *Cymbalopora bulloides*, so frequent at some of the Kerimba Stations, are all of a *D. concinna* type, the individuals, indeed, when detached from the balloon-chamber, being indistinguishable from *D. concinna*. The same observation applies to the pelagic Cymbaloporæ gathered by Mr. Matthews at Corney Point, S. Australia (Earland, 1902; see *sub C. bulloides* refs.), and to some pelagic gatherings of *Cymbalopora* made by Sir J. Murray on the 'Challenger,' which

we have had the privilege of examining. The question therefore inevitably arises whether *D. concinna* is not merely a stage in the life-history of *Cymbalopora bulloides*.

Another slight variation noticeable in the Kerimba specimens is in the peripheral margin. According to Brady this should be acutely angular, but at many of the Kerimba Stns. specimens are to be found with a rounded peripheral edge, due to the fact that the inferior side is less markedly concave than usual. At Stn. ? X a few individuals were observed growing attached to shell-fragments.

342. **Discorbina praegeri** Heron-Allen & Earland.

Discorbina praegeri Heron-Allen & Earland, 1913, CI. p. 122, pl. x. figs. 8–10.

2 *Stations.*

A few weak, but fairly typical, specimens only.

343. **Discorbina isabelleana** (d'Orbigny).

Rosalina isabelleana d'Orbigny, 1839, FAM. p. 43, pl. vi. figs. 10–12.
Discorbina isabelleana Jones & Parker, 1872, FFR. p. 115.
" " Brady, 1884, FC. p. 646, pl. lxxxviii. fig. 1.
" " Egger, 1893, FG. p. 386, pl. xv. figs. 36–38.
" " Heron-Allen & Earland, 1908, etc., SB. 1909, p. 442.

7 *Stations.*

Common at the Stns., those at Stn. 11 being much the finer and better developed, and tinged with colour.

344. **Discorbina vilardeboana** (d'Orbigny).

Rosalina vilardeboana d'Orbigny, 1839, FAM. p. 44, pl. vi. figs. 13–15.
Discorbina vilardeboana Jones & Parker, 1872, FFR. p. 115.
" " Brady, 1884, FC. p. 645, pl. lxxxvi. fig. 12; pl. lxxxviii. fig. 2.
" " Heron-Allen & Earland, 1913, CI. p. 112.

1 *Station.*

A few typical high-domed specimens at Stn. 11. The species was observed elsewhere, but was not separated from *D. mediterranensis*.

345. **Discorbina rosacea** (d'Orbigny).

Rotalina rosacea d'Orbigny, 1826, TMC. p. 273. no. 15, Modèle no. 39.
Asterigerina rosacea d'Orbigny, 1850, etc., PP. 1852, vol. iii. p. 158. no. 2952.
Rotalia rosacea Parker, Jones, & Brady, 1859, etc., NF. 1865, p. 25, pl. ii. fig. 71.
Discorbina rosacea Brady, 1884, FC. p. 644, pl. lxxxvii. figs. 1, 4.
" " Egger, 1893, FG. p. 385, pl. xv. figs. 39–41.
" " Heron-Allen & Earland, 1913, CI. p. 124, pl. xi. figs. 7–9.

14 *Stations.*

Occurs at most Stns., never abundant, and, as a rule, small and poorly developed. Large and typical specimens were found in some number at Stns. 3 and 9, and less frequently at Stns. 8, ? X, and ? B.

346. **Discorbina planorbis** (d'Orbigny).

Asterigerina planorbis d'Orbigny, 1846, FFV. p. 205, pl. xi. figs. 1–3.
Discorbina (*Asterigerina*) *planorbis* Zittel, 1876, HP. p. 93, fig. 31.
„ *planorbis* Heron-Allen & Earland, 1913, CI. p. 124, pl. xi. figs. 10–12.

8 *Stations.*

Fairly generally distributed, but the specimens are poorly developed and few in number, the best and most numerous examples being found at Stns. 10, 11, and 12.

347. **Discorbina turbo** (d'Orbigny).

Rotalia (*Trochulina*) *turbo* d'Orbigny, 1826, TMC. p. 274, no. 39, Modèle no. 73.
Discorbina turbo Carpenter, Parker, & Jones, 1862, IF. p. 204, App. p. 311.
„ „ Brady, 1884, FC. p. 642, pl. lxxxvii. fig. 8.
„ „ Egger, 1893, FG. p. 389, pl. xv. figs. 42–44.
„ „ Sidebottom, 1904, etc., RFD. 1908, p. 11, pl. iii. figs. 1, 2.
„ „ Chapman, 1907, RFV. p. 134.

4 *Stations.*

Rarely distributed, the only good and typical specimens being found at Stns. 9 and 11. At Stn. 11 the sutures on the superior face are strongly limbate.

348. **Discorbina orbicularis** (Terquem).

Rosalina orbicularis Terquem, 1875, etc., APD. 1876, p. 75, pl. ix. fig. 4.
Discorbina orbicularis Balkwill & Millett, 1884, FG. p. 23, pl. iv. fig. 13.
„ „ Brady, 1884, FC. p. 647, pl. lxxxviii. figs. 4–8.
„ „ Balkwill & Wright, 1885, DIS. p. 349, pl. xiii. figs. 31–33.
„ „ Chapman, 1900, FLF. p. 191.
„ „ Egger, 1893, FG. p. 389, pl. xv. figs. 16–18, 76–78.
„ „ Sidebottom, 1904, etc., RFD. 1908, p. 13, pl. iv. fig. 7.
„ „ Heron-Allen & Earland, 1913, CI. p. 126.

12 *Stations.*

Fairly generally distributed and moderately abundant. The specimens are, as a rule, quite typical, presenting hardly any variation except in size.

349. **Discorbina mamilla** (Williamson).

Rotalina mamilla Williamson, 1858, RFGB. p. 54, pl. iv. figs. 109–111.
Discorbina rosacea Sidebottom, 1904, etc., RFD. 1908, pl. iv. fig. 5.
„ *mamilla* Heron-Allen & Earland, 1913, CI. p. 123, pl. xi. figs. 4–6.

4 *Stations.*

A few typical specimens, the best being at Stn. 11.

350. **Discorbina mediterranensis** (d'Orbigny).

Rosalina mediterranensis d'Orbigny, 1826, TMC. p. 271. no. 2.
Discorbina vilardeboana Brady, 1884, FC. p. 645, pl. lxxxvi. fig. 9.
„ *rosacea* Goës, 1882, RRCS. p. 105, pl. viii. figs. 251–257.
„ *mediterranensis* Fornasini, 1898, RFI. p. 264, text-fig.
„ „ Heron-Allen & Earland, 1913, CI. p. 118, pl. ix. figs. 12–14; pl. x. fig. 1.

12 *Stations.*

Occurs at most of the Stns., but only at a few in any abundance or marked development. Very rare and small at Stns. 4 and 5—rare, but large, at Stn. 6. The best specimens were found at Stns. 11, 12, and ? X, at all of which it occurred in maximum numbers. At Stn. 11 the individuals were very large and some of them showed signs of passing into *D. globularis*. At Stn. 12 specimens were well developed and plentiful, at Stn. ? X it was common both free and attached.

351. **Discorbina globularis** (d'Orbigny). (Pl. LI. figs. 36–39.)

Rosalina globularis d'Orbigny, 1826, TMC. p. 271, pl. xiii. figs. 1–4, Modèle no. 69.
Discorbina globularis Parker, Jones, & Brady, 1859, etc., NF. 1865, p. 30, pl. ii. fig. 69.
" " Möbius, 1880, FM. p. 96, pl. ix. fig. 18.
" " Brady, 1884, FC. p. 643, pl. lxxxvi. figs. 8, 13.
" " Egger, 1893, FG. pl. xv. figs. 7–9 ; (*Rosalina*) p. 365, pl. xiii. figs. 65–68.
" " Millett, 1898, etc., FM. 1903, p. 698.
" " Sidebottom, 1904, etc., RFD. 1908, p. 11, pl. iii. figs. 3–8; pl. iv. figs. 1, 2.
" " Chapman, 1900, FLF. p. 190.

16 *Stations.*

Occurs in greater or less abundance at every Stn., sometimes very common. The species presents an extraordinary range of variation, primarily in the degree of inflation of the chambers and consequent height of the spire, and secondarily in the degree of limbation of the sutures. Some of the specimens, notably at Stns. 1 and ? X, are of an extremely thin and scale-like form suggesting a passage into *D. cora*. At Stns. 1, 2, 6, 10, 11, a variety occurs characterized by a coarsely perforate superior face and an extremely thick but hyaline base without visible perforations, but in which each chamber is furnished at its umbilical edge with a single stout blunted tooth projecting into the umbilical cavity; from three to six teeth are visible in different specimens giving a very striking appearance to the under side of the shell. At Stns. 1 and 6 a depressed variety with extremely limbate sutures raised above the flat surface of the chambers was found. At Stn. ? B a single specimen which had apparently been in association with another individual, the whole of the base and the internal septa being absorbed.

352. **Discorbina binkhorsti** (Reuss).

Rosalina binkhorsti Reuss, 1861, FKM. p. 317, pl. ii. fig. 3.
Discorbina binkhorsti Jones & Parker, 1872, FFR. p. 114.
(See Brady, 1884, FC. p. 644, sub *D. valvulata*.)

1 *Station.*

A few specimens at Stn. 6 showing the typical depressed shell with strongly limbate sutures on the superior face.

353. **Discorbina tuberculata** Balkwill & Wright.

Discorbina tuberculata Balkwill & Wright, 1885, DIS. p. 350, pl. xiii. figs. 28–30.
" " Sidebottom, 1904, etc., RFD. 1908, p. 15, pl. v. fig. 5.
" " Heron-Allen & Earland, 1913, CI. p. 127.

1 *Station.*

One typical specimen from Stn. 11.

354. **Discorbina araucana** (d'Orbigny).

Rosalina araucana d'Orbigny, 1839, FAM. p. 44, pl. vi. figs. 16–18.
Discorbina araucana Brady, 1884, FC. p. 645, pl. lxxxvi. figs. 10, 11.
" " Egger, 1893, FG. p. 386, pl. xiv. figs. 4, 6.
" " Chapman, 1900, FLF. p. 190.
" " Sidebottom, 1904, etc., RFD. 1908, p. 12.
" " Heron-Allen & Earland, 1908, etc., SB. 1911, p. 327.

1 *Station.*

A few specimens only, which appear to be referable to this somewhat weak representative of the *D. rosacea* group.

355. **Discorbina valvulata** (d'Orbigny).

Rosalina valvulata d'Orbigny, 1826, TMC. p. 271. no. 4.
" " d'Orbigny, 1839, FIC. p. 136, pl. ii. figs. 19–21.
Discorbina valvulata Jones & Parker, 1872, FFR. p. 114.
" " Brady, 1884, FC. p. 644, pl. lxxxvii. figs. 5–7.
" " Egger, 1893, FG. p. 392, pl. xv. figs. 64–66.
" " Chapman, 1907, RFV. p. 137.

2 *Stations.*

A few poor specimens at Stn. 1, the sutures being very feebly limbate compared with the type; stronger and better specimens at Stn. 11.

356. **Discorbina valvulata,** var. **granulosa,** n. (Pl. LII. figs. 1–6.)

2 *Stations.*

Test nearly circular in outline, closely resembling *D. valvulata*, but with the superior surface thickly encrusted with secondary shell-matter rendering the septation and sutural lines very obscure. Under surface showing five to six inflated chambers separated by strongly limbate sutures and with a mass of secondary shell-matter in the umbilical depression. Coarsely perforated on the superior side, but no perforations visible on the inferior side. Colour a rich pale brown, lightening towards the final chambers and colourless on the inferior side.

This curious but very distinctive variety occurs very rarely at Stn. 11, and a single specimen at Stn. ? X. The granulation renders the variety easily distinguishable from d'Orbigny's type, *Rosalina valvulata* (d'O. 1839, FIC. p. 136, pl. ii. figs. 19–21).

Size very variable—specimens range between ·25 and ·45 mm. in greatest diameter; height of largest specimen ·32 mm.

357. **Discorbina allomorphinoides** (Reuss).

Valvulina allomorphinoides Reuss, 1860, WK. p. 223, pl. xi. fig. 6.
Discorbina allomorphinoides Brady, 1884, FC. p. 654, pl. xci. figs. 5, 8.
Valvulina allomorphinoides Egger, 1899, KOA. p. 43, pl. ii. figs. 4, 5.
Pulvinulina allomorphinoides Fornasini, 1900, FA. p. 394, fig. 44.
Discorbina allomorphinoides Millett, 1898, etc., FM., 1903, p. 703.

2 *Stations.*

Very rare. The specimens are small, but otherwise quite typical.

358. **Discorbina saulcii** (d'Orbigny).

Rosalina saulcii d'Orbigny, 1839, FAM. p. 42, pl. ii. figs. 9–11.
Discorbina saulcii Jones & Parker, 1872, FFR. p. 115.
" " Brady, 1884, FC. p. 653, pl. xci. fig. 6.
" " Chapman, 1900, FLF. p. 190.
" " Egger, 1893, FG. p. 392, pl. xv. figs. 51–53.
" " Heron-Allen & Earland, 1908, etc., SB. 1909, p. 444.
" " Sidebottom, 1910, RFBP. p. 26, pl. iii. fig. 11.

2 *Stations.*

Very rare, only a few specimens at the two stations.

359. **Discorbina reniformis,** sp. n. (Pl. LII. figs. 7–14.)

5 *Stations.*

Test smooth and ranging from reniform (or kidney-shaped) to nearly circular. Sutural lines flush with the surface, and hardly distinguishable, excepting in a few specimens, where, owing to the local absence of perforations, they are indicated by faint lines in the shell-substance. Aperture, when visible, a curved slit in the middle or slightly to one side of the edge of the test, where the final chamber abuts upon the initial whorl. Surface somewhat coarsely punctate; colour varying from light brown to glassy white. Viewed as a transparent object in balsam the test is seen to consist of about nine inflated chambers buried in, or enveloped with, an abnormally thick shell-wall full of coarse perforations. It seems probable that the wall of the test continues to thicken with the growth of the shell, thus obliterating the sutural lines, which are hardly visible in large specimens unless viewed as transparent objects in balsam. The chambers are arranged more or less symmetrically in a spiral; the rotaline twist is in a few cases normally developed, but, as a rule, is so slight that the spiral appears to be almost involute when examined on edge. The whole aspect of the shell in such specimens distinctly suggests a *Nonionina,* but we think the character of the orifice and the small degree of bilateral asymmetry sufficient to indicate their relationship with *Discorbina*, especially when a whole series of specimens is considered, including individuals presenting a marked rotaline difference between the superior and inferior faces. At the same time the species is of a very

abnormal type and does not bear any very close relationship to other discorbine species, its nearest ally perhaps being *D. allomorphinoides* Reuss, from which, however, it differs in the greater coarseness of its perforations, the continuity of its outline, and the comparative bilateral symmetry of the test. It seems also to be unique in its investing wall of shell-substance, which appears to be deposited subsequently to the formation of the chambers as an entirely investing layer of shell, obliterating all sutures and surface-markings.

This very obscure little form occurs at six Stns. only, one or two specimens at each, except at Stn. 11, where a good many finely developed specimens were found. We have also met with it in a dredging made in Apia Harbour (Samoa), 7 fms., where it is more abundant.

Length (max.) ·25 to ·30 mm., breadth (max.) ·25 mm., thickness ·2 mm.

360. **Discorbina chasteri** Heron-Allen & Earland.

Discorbina minutissima Chaster, 1892, CS. p. 65, pl. i. fig. 15.
„ „ Wright, 1903, BCD. pp. 174, 175.
„ *chasteri* Heron-Allen & Earland, 1913, CI. p. 128, pl. xiii. figs. 1–3.

6 *Stations.*

The specimens are few in number, but quite typical, and in some cases better developed than is usually the case in the British type-specimens. The round form is the more generally distributed, but at Stns. 5 and ? X the round and oval varieties occur in company. At Stn. 12 only the oval type was seen. The best individuals of the round type were observed at Stns. 6 and ? X, and the best oval at Stn. 12.

361. **Discorbina rugosa** (d'Orbigny).

Rosalina rugosa d'Orbigny, 1839, FAM. p. 42, pl. ii. figs. 12–14.
Discorbina rugosa Brady, 1884, FC. p. 652, pl. lxxxvii. fig. 3 ; pl. xci. fig. 4.
„ „ Egger, 1893, FG. p. 383, pl. xv. figs. 1–3.
„ „ Chapman, 1891, etc., GF. 1896, p. 590, pl. xiii. fig. 10.
„ „ Millett, 1898, etc., FM. 1903, p. 703.
„ „ Chapman, 1900, FLF. p. 190.
„ „ Chapman, 1907, RFV. p. 136.

11 *Stations.*

Occurs at most of the Stns., moderately frequent at some of them, good and quite typical specimens were seen at Stns. 4, 10, and 11. At Stn. ? X a very depressed form, with angular edge (but otherwise typical), was observed.

362. **Discorbina vesicularis** (Lamarck). (Pl. LII. figs. 15–18.)

Discorbites vesicularis Lamarck, 1804, AM. vol. v. p. 183 ; 1806, vol. viii. pl. lxii. fig. 7.
Discorbina vesicularis Carpenter, Parker, & Jones, 1862, IF. p. 204, pl. xiii. figs. 2, 3.
„ „ Brady, 1884, FC. p. 651, pl. lxxxvii. fig. 2.

Discorbina vesicularis Millett, 1898, etc., FM. 1903, p. 702.
" " Earland, 1905, FBS. p. 224, pl. xii. figs. 9, 10; pl. xiv. fig. 6.
" " Chapman, 1907, RFV. p. 135.
" " Heron-Allen & Earland, 1913, CI. p. 131.

5 *Stations.*

This species occurs at only a few Stns., but at these, and notably at Stn. ?X, it is fairly frequent and attains a size and luxuriance of growth almost equal to the splendid specimens to be found in South Australian shore-sands. With the exception of a record of Brady "Common in the shore-sands of Tamatave, Madagascar," and a few records of pauperate specimens round the British coast, the previously recorded distribution of this species appears to be confined to the Pacific-Australian seas.

363. **Discorbina dimidiata** Jones & Parker.

Discorbina dimidiata Carpenter, Parker, & Jones, 1862, IF. p. 201, fig. 32 B.
" " Parker & Jones, 1865, NAAF. pp. 385 & 422, pl. xix. fig. 9.
" " Chapman, 1907, RFV. p. 136, pl. x. fig. 8.
" " Heron-Allen & Earland, 1908, etc., SB. 1909, p. 444.

4 *Stations.*

Occurs very rarely, but a few large and quite typical individuals were found at Stns. 8 and 9, almost equal in size to the specimens so abundant in South Australian shore-sands. The presence of this typically Australian species on the African coast is very noteworthy.

364. **Discorbina polystomelloides** Parker & Jones. (Pl. LII. figs. 19–23.)

Discorbina polystomelloides Parker & Jones, 1865, NAAF. p. 421, pl. xix. fig. 8.
" " Brady, 1884, FC. p. 652, pl. xci. fig. 1.
" " Heron-Allen & Earland, 1908, etc., SB. 1911, p. 330.

12 *Stations.*

The original description of this species is not very full or satisfactory. Parker and Jones (*ut supra*) merely state that it "may be said to be a granulose form of *D. rimosa*, but it is larger, more symmetrical, and extremely rough, and the chinks between the chambers are partly bridged over, so as to form a rough canal system, as in some of the Polystomellæ."

The description of *Discorbina rimosa* Parker & Jones, published at the same time, is as follows (P. & J. 1865, NAAF. p. 421, pl. xix. fig. 6):—"This is smaller than *D. vesicularis* and close to it and *D. elegans* in alliance, somewhat oval in shape; shell-substance thick, pores large; septal plane notched for aperture; chambers very much larger in the newer than in the older part of the shell, and discrete; and on the upper side several of the newer chambers are separated by chinks. On the under side there are secondary chambers over the umbilicus, perfect, large, and astral, with chinks at their periphery."

The figure of *D. rimosa* is not in strict agreement with the verbal description. It represents a very finely perforated shell with apparently smooth and hyaline surface. The secondary chambers on the under side are well shown, but the aperture is very obscure. The chinks between the later chambers on the superior surface are very marked.

The figure of *D. polystomelloides* represents an extremely coarse and granulose-surfaced shell. The secondary chambers are barely suggested. There is a single distinctive aperture on the umbilical margin of the last chamber on the inferior side, but the figure does not demonstrate whether this aperture belongs to the primary or to the secondary series of chambers. The chinks are bridged by two or three retral processes which join the successive chambers.

Brady, while adding nothing to the verbal analysis of the species, published excellent figures of a type practically intermediate between Parker and Jones's figures of *D. rimosa* and *D. polystomelloides*. The early chambers are coarsely *granulose*, the later ones being comparatively smooth but coarsely *perforate*. The retral processes are prominent and numerous, and more or less obscure the chinks between the chambers. The secondary chambers are well shown, and there is a single large comma-shaped aperture *placed on the inferior side of the shell at the umbilical edge of the last chamber of the secondary series*. No opening into the large chambers of the primary or superior series is shown.

D. polystomelloides occurs at nearly every Stn., but, as a rule, very sparingly. At Stns. 6, 9, 10, and 12, however, the species is fairly plentiful in the coarse material and the specimens are especially large and finely developed. As a whole, the Kerimba specimens are of the Brady type of shell, the granulose surface being practically confined to the earlier chambers. At Stns. 9 and 12 this absence of granulation is especially marked. The specimens, although large and coarsely perforate, are smooth and comparatively thin-shelled, with the result that the internal structure can be clearly followed when specimens are examined in balsam.

This structure appears to be much more complicated than in the other asterigerine species of *Discorbina*, each series of chambers having a special and definite aperture. Whereas, however, in other asterigerine Discorbinæ the secondary chambers are situated on the inferior surface of the test, in *D. polystomelloides* they appear to be almost entirely *enclosed* in the test, owing to the production of the superior or primary chambers into processes which extend to the umbilical region on the inferior side of the test. Here is situated the general aperture, which is of the usual discorbine or "comma"-shape. This aperture is well shown in Brady's figure *c*, but is there attributed to the inferior or asterigerine series of chambers.

The asterigerine or secondary chambers are narrow and long. Radiating from the umbilicus nearly to the peripheral margin, they lie immediately under the "chinks" which separate the large superior chambers. These "chinks" open directly down

into the asterigerine chambers, each of which has also a special secondary opening in the shape of a tubular extension, which passes through the adjacent chamber of the superior series and so communicates with the next asterigerine chamber, finally opening into a broad funnel-shaped depression on the oral face of the final chamber.

This highly complex structure will be more apparent from the two diagrammatic figures which we publish. They show balsam-mounted specimens in optical section (as viewed from the upper and lower sides) in which the asterigerine chambers of the last whorl only are shaded, while the principal chambers remain clear.

The purport of this unique structure is not obvious, but it is evident that the double series of apertures and the immediate opening of the chinks into the asterigerine chambers must greatly facilitate the access of the protoplasm to the surrounding medium and so facilitate nutrition. This is borne out by the fact that many specimens exhibit food-contents of relatively immense size in the protoplasm remaining in the chambers.

The so-called retral processes, which are really struts of solid shell-substance, are poorly developed in most of the Kerimba specimens, and are often confined to the peripheral margin of the test, the chinks on the superior surface being uninterrupted.

365. **Discorbina rimosa** Parker & Jones.

Discorbina rimosa Carpenter, Parker, & Jones, 1862, IF. p. 205.
„ „ Parker & Jones, 1865, NAAF. pp. 385, 421, pl. xix. fig. 6.
„ „ Brady, 1884, FC. p. 642.
„ „ Millett, 1898, etc., FM. 1903, p. 702, pl. vii. fig. 7.

1 *Station.*

One specimen only, resembling Millett's figure of this species, which, it may be remarked, differs considerably from the original figure published by Parker and Jones. This represents a shell with a smooth surface, although their description states that "the pores are large and the shell-substance thick." These features are more highly brought out in Millett's figure. Parker and Jones, in describing *D. polystomelloides* (P. & J., NAAF. p. 421, pl. xix. fig. 8), state that it may be regarded "as a granular form of *D. rimosa*, but larger, more symmetrical, and extremely rough." It appears to us somewhat doubtful whether it is expedient to separate the two forms—*D. rimosa* is probably only a depauperate form of *D. polystomelloides.*

366. **Discorbina rarescens** Brady.

Discorbina rarescens Brady, 1884, FC. p. 651, pl. xc. figs. 2, 3, & ? 4.
„ „ Egger, 1893, FG. p. 388, pl. xv. figs. 45–47.
„ „ Chapman, 1900, FLF. p. 192.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 443.

2 *Stations.*

Two small but fairly typical specimens at Stn. 7, and many at Stn. 11.

367. **Discorbina pustulata** Heron-Allen & Earland. (Pl. LII. figs. 24–26.)

Discorbina pustulata Heron-Allen & Earland, 1913, CI. p. 129, pl. xii. figs. 5–7.

2 *Stations.*

It was with no little satisfaction that we found again in these dredgings our recently described and figured species, especially as the few specimens found at Kerimba were more distinctively developed than the Clare Island specimens. It occurs, one individual only at Stn. 5, and several at Stn. 11. We have little to add to the diagnosis and description originally given, except that the number of chambers visible in the final convolution appears to be normally five. In the Kerimba specimens the carina is much more strikingly developed than in the Irish form. There can no longer be any doubt as to the affinity of our species with *D. bertheloti* and *D. rarescens*.

Since the original description of the species (*supra*), Earland has, in looking through some old correspondence with the late Dr. Chaster, come across specimens of this species forwarded to him in 1892 by Chaster for examination. They consist of specimens from Southport, and similar specimens from anchor-mud, Colombo. The same slide contained specimens of *D. tuberculata* Balkwill & Wright, from Southport, correctly named, whereas the specimens of *D. pustulata* were separated as *Discorbina* sp. It is thus evident that the late Dr. Chaster was acquainted with the separate identity of the species as far back as 1892, but after this lapse of time, and owing to the death of the writer, it is impossible to ascertain why he did not describe and figure the form in his admirable paper on the Foraminifera of Southport. It is possible that the Southport specimens were discovered after the completion of his paper, as this was published in 1892 and was apparently communicated to the Southport Society of Natural Science at some time in 1890–1891. The occurrence of the species at Southport, Lancashire, and at Colombo is, however, definitely fixed by this correspondence, which had been forgotten and was only by chance referred to.

368. **Discorbina parisiensis** (d'Orbigny).

Rosalina parisiensis d'Orbigny, 1826, TMC. p. 271, Modèle no. 38.
Discorbina parisiensis Parker, Jones, & Brady, 1859, etc., NF. 1865, p. 25, pl. ii. fig. 70.
„ „ Wright, 1877, RFDA. p. 105, pl. iv. fig. 1.
„ „ Brady, 1884, FC. p. 648, pl. xc. figs. 5, 6, 9–12.
„ „ Egger, 1893, FG. p. 391, pl. xv. figs. 25–30.
„ „ Sidebottom, 1904, etc., RFD. 1909, p. 18, pl. v. fig. 10.
„ „ Earland, 1905, FBS. p. 221, woodcut, pl. xii. figs. 4–7, pl. xiv. fig. 5.

8 *Stations.*

Widely distributed, but seldom more than a few specimens at each Stn. All very small compared with the maximum development of the species, and varying considerably in the height of the spire and degree of inflation of the chambers. The best

individuals were at Stn. ?X, where it was frequent and very flat, the next best at Stn. 1, where it was large with inflated lobulate chambers. At Stn. ?B a few normal small individuals were found, also a single abnormally large specimen in which the whole of the umbilical cavity was filled up with loosely areolated secondary shell-substance. We have observed a similar variation, accompanied by equal development in size, in Arctic specimens from Davis Straits.

369. **Discorbina wrightii** Brady.

Discorbina parisiensis Wright, 1877, RFDA. p. 105, pl. iv. fig. 2.
„ *wrightii* Brady, 1881, HNPE. p. 104, pl. ii. fig. 6.
„ „ Earland, 1905, FBS. p. 223.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1904, p. 443.
„ „ Heron-Allen & Earland, 1913, CI. p. 131, pl. xii. fig. 4.

12 *Stations.*

This rather unsatisfactory little form occurs at most of the Stns. rarely in any numbers, and as usual nearly always showed signs of "association" (or budding). The specimens do not call for much remark beyond the fact that in many instances the basal surface is more deeply depressed than is usually the case, and sometimes less prominently striate than usual. We found specimens which we are figuring elsewhere, containing broods of perfectly formed polythalamous young, seen through a large aperture formed by resorption of the basal shell-wall (H.-A. 1915, RPF. p. 238, pl. 14. figs. 13, 14).

370. **Discorbina globosa** (Sidebottom). (Pl. LII. figs. 27–31.)

Pulvinulina globosa Sidebottom, 1904, etc., RFD. 1909, p. 9, pl. iv. fig. 3.

2 *Stations.*

At Stn. ?B a considerable number of specimens were obtained, which answer in most particulars to the species figured and described by Sidebottom from Delos as *Pulvinulina globosa*. If the identification is granted, we are unable to agree with Sidebottom in the allocation of his specimens to the genus *Pulvinulina*. They appear, so far as the Kerimba specimens can afford any clue, to be referable to *Discorbina*, both from the construction of their shells, the nature of the aperture, and the fact that many of the individuals show signs of having been in "association" (? budding), a feature common in that genus, but, we believe, unrecorded in *Pulvinulina*. The nearest ally of this form is in our opinion *D. wrightii*, from which it differs in the greater height of the spire and in the inflation of the chambers with consequent depression of the sutural lines. The Kerimba specimens, as will be seen by our figure, agree very well with Sidebottom's figure and description except in the perforation. In the Delos specimens the test is described as very smooth and finely perforated, but the Kerimba tests have relatively coarse perforations, giving a some-

what rough appearance to the superior surface of the shell. In many of the individuals all but the final chambers are of a delicate pink colour—in this point, again, the specimens seem to show their affinity to *Discorbina*. The aperture is very obscure owing to the presence of secondary shell-matter in the umbilical depression, the base is often but not invariably decorated with fine striæ leading from the peripheral edge into the umbilicus. Double (or budding) and triple (or associated) specimens were found at Stn. 7.

The specific name *globosa* was used by Marsson for a shell which he named *Discorbina globosa* (M. 1878, SIR. p. 163, pl. iv. fig. 32), but, as his specimens are referable either to *Pullenia obliquiloculata* or some nonionine isomorph of that species, the name *globosa* lapsed and is available for this species.

371. **Discorbina pulvinata** Brady.

Discorbina pulvinata Brady, 1884, FC. p. 650, pl. lxxxviii. fig. 10.
„ „ Egger, 1893, FG. p. 391, pl. xv. figs. 33–35.
„ „ Millett, 1898, etc., FM. 1903, p. 701.
„ „ Sidebottom, 1904, etc., RFD. 1908, p. 14, pl. v. fig. 4.

6 *Stations.*

Occurs rarely at the Stns., most abundantly at Stn. 3, where a variety was also observed in which the basal portion is smooth instead of striate as in the type. At Stn. 11 the species presented a variation approaching *D. cristata* Heron-Allen & Earland, the superior face of each chamber being decorated with vertical crests. At this Stn. also several specimens were observed which had been in association with others, the base and internal septa having been absorbed.

372. **Discorbina patelliformis** Brady. (Pl. LII. fig. 32.)

Discorbina patelliformis Brady, 1884, FC. p. 647, pl. lxxxviii. fig. 3, pl. lxxxix. fig. 1.
„ „ Egger, 1893, FG. p. 390, pl. xv. figs. 48–50.
„ „ Millett, 1898, etc., FM. 1903, p. 700.
„ „ Sidebottom, 1904, etc., RFD. 1908, p. 14, pl. v. fig. 3.

16 *Stations.*

Occurs at nearly every Stn. and often in considerable numbers, but, as a rule, the specimens present characteristics more or less tending in the direction of *D. tabernacularis*, from which species it is often difficult to separate them. Typical individuals were observed at Stns. 1, 2, 3, and 9. At Stn. 6 the species was fairly common and the individuals large, presenting two distinct types—a normally low and a very highly domed form. At Stns. 2, 5, 8, and 11 all the specimens were poor and hardly separable from *D. tabernacularis*, the external surface being covered with a thick shell-substance disposed in ridges radiating from the apex of the cone as in that species. Double (or budding) specimens of this form, which we figure, were found at Stn. 9.

373. **Discorbina corrugata** Millett.

Discorbina corrugata Millett, 1898, etc., FM. 1903, p. 700, pl. vii. fig. 5.

1 *Station.*

At Stn. ? X a few specimens were found which, in their deeply indented contour and angular faces, appear to be referable to Millett's species, but they differ from his figure in the fact that the sutural lines are visible all over the shell. They thus form a connecting-link between Millett's type and either *D. patelliformis* or *D. tabernacularis*, to which he admits that *D. corrugata* is closely allied. In the Kerimba specimens the ridges mark the centres of the chambers, the juncture of the sutural lines lying in the depressions between them as observed by Millett. We have typical specimens from shore-sands at Rottnest Island, West Australia, and Sandoway, Arakan Coast, Burmah.

374. **Discorbina tabernacularis** Brady.

Discorbina tabernacularis Brady, 1879, etc., RRC. 1881, p. 65.
" " Brady, 1884, FC. p. 648, pl. lxxxix. figs. 5–7.
" " Egger, 1893, FG. p. 390, pl. xv. figs. 58–60, 79.
" " Millett, 1898, etc., FM. 1903, p. 700.
" " Sidebottom, 1910, RFBP, p. 25, pl. iii. fig. 12.

15 *Stations.*

The species is less widely distributed than the allied form *D. patelliformis*, but at the Stns. where it occurs is often extremely abundant and presenting great variation. Most of the individuals have the surface of the cone much more corrugated than Brady figures it, and the apex is generally more acute, often terminating in a sharp point. The best individuals were at Stns. 1 and 11. At Stn. 2 *a* it was common and strongly costate, some individuals less conical than usual and hardly distinguishable from *D. patelliformis*. At Stns. 4, 5, 8, and 10 the specimens were rare and poorly developed. At Stn. 11 the species is abundant and splendidly developed, the individuals being separable into two groups, the larger very closely approaching *D. patelliformis* but strongly corrugated, the smaller being normal *D. tabernacularis*, but with the sutural lines strongly limbate in most of the individuals, as in Brady's fig. 7. Double (or budding) specimens were found at Stns. 3 and 11.

375. **Discorbina erecta** Sidebottom.

Discorbina erecta Sidebottom, 1904, etc. RFD. 1908, p. 16, pl. v. figs. 6, 7.

6 *Stations.*

Occasional specimens only of this rather distinctive type, the best and most typical being from Stns. 12 and ? X, at the latter Stn. relatively most abundant. At Stn. 2 the specimens passed into *D. tabernacularis* by suppression of the sutural lines and

thickening of the shell-substance. At Stn. 3 the individuals were much lower in the spire than in Sidebottom's figure, but were otherwise typical. The species is probably closely allied to *D. tabernacularis*.

376. **Discorbina acuminata** Chapman.

Discorbina acuminata Chapman, 1901, FFA. p. 385, pl. xxxvi. fig. 3.

9 *Stations*.

The propriety of separating this little form from *D. tabernacularis* is in our opinion very questionable. It does not present any characteristic (except the apical spine) which is not to be found in *D. tabernacularis*; and in any considerable range of specimens in that species, specimens with a more or less acuminate apex and a sunken base are not uncommon. The striæ radiating from the apex of the cone, which Chapman gives as a specific feature, are merely a weak form of the costæ typical of *D. tabernacularis*. Specimens agreeing with Chapman's figure and description were found at most of the Stations, but only in small numbers.

PLANORBULINA d'Orbigny.

377. **Planorbulina mediterranensis** d'Orbigny.

Planorbulina mediterranensis d'Orbigny, 1826, TMC. p. 280, pl. xiv. figs. 4–6, Modèle no. 79.
„ *farcta*, var. *mediterranensis* Parker & Jones, 1865, NAAF. p. 383, pl. xvi. fig. 21.
„ *mediterranensis* Parker, Jones, & Brady, 1859, etc., NF. 1871, p. 178, pl. xii. fig. 133.
„ „ Brady, 1884, FC. p. 656, pl. xcii. figs. 1–3.
„ „ Egger, 1893, FG. p. 380, pl. xiv. figs. 24–26.
„ „ Chapman, 1900, FLF. p. 192.

9 *Stations*.

Generally, but not universally, distributed. We have referred under *Gypsina* to the difficulty of separating the two genera when existing under exceptionally favourable circumstances. The specimens of *P. mediterranensis* are, as a rule, large and wild-growing, but perfectly typical and well-grown examples were found at Stn. 10. At Stn. 9 the specimens were all exceptionally large, but fairly typical; at Stn. 11 good specimens were found, both free and attached. At Stns. 2*a* and 4 the species is chiefly represented by a number of specimens just emerging from the early rotaline stage.

378. **Planorbulina acervalis** Brady.

Planorbulina acervalis Brady, 1884, FC. p. 657, pl. xcii. fig. 4.
„ „ Brady, Parker, & Jones, 1888, AB. p. 227, pl. xlvi. fig. 11
„ „ Flint, 1899, RFA. p. 328, pl. lxxii. fig. 7.
„ „ Sidebottom, 1904, etc., RFD. 1909, p. 2, pl. i. fig. 4.

4 *Stations.*

One at each Stn., excepting at Stn. ?X; all present the characteristic wild growth and projecting peripheral chambers in a marked degree. In the specimens from Stns. 11 and ?X, which had evidently grown attached, the marginal edges were produced into a ragged keel. The specimen at Stn. 11 was also highly domed in the central portion.

379. **Planorbulina larvata** Parker & Jones.

Planorbulina vulgaris, var. *larvata* Parker & Jones, 1859, etc., NF. 1860, p. 294.
" *larvata* Parker & Jones, 1865, NAAF. p. 379, pl. xix. fig. 3.
" " Brady, 1884, FC. p. 658, pl. xcii. figs. 5, 6.
" " Egger, 1893, FG. p. 381, pl. xiv. fig. 31.
" " Chapman, 1900, FLF. p. 193.
" " Heron-Allen & Earland, 1908, etc., SB. 1909, p. 679.

6 *Stations.*

The species is poorly represented, the only well-grown and quite typical examples being found at Stn. 11. At Stn. 12, where it was very common, it was found attached. The rarity of a species usually so common in shallow tropical waters is noteworthy.

TRUNCATULINA d'Orbigny.

380. **Truncatulina lobatula** (Walker & Jacob).

Nautilus lobatulus Walker & Jacob, 1798, AEM. p. 642, pl. xiv. fig. 36.
Truncatulina lobatula Williamson, 1858, RFGB. p. 59, pl. v. figs. 121–3.
" " Jones, Parker, & Brady, 1866, etc., MFC. 1866, pl. ii. figs. 4–10, pl. iv, fig. 19; Text and References, 1896, p. 304.
" " Brady, 1884, FC. p. 660, pl. xcii. fig. 10, pl. xciii. figs. 1, 4, 5, pl. cxv. figs. 4, 5 (References).
" " Millett, 1898, etc., FM. 1904, p. 491 (References).

17 *Stations.*

Universally distributed, but never common. The specimens are all of the regular and somewhat inflated type, except at Stn. 10, where they are of a depressed subcarinate type approaching *T. tenuimargo* Brady.

381. **Truncatulina variabilis** d'Orbigny.

Truncatulina variabilis d'Orbigny, 1826, TMC. p. 279. no. 8.
" " Terquem, 1878, FIR. p. 20, pl. i. (vi.) figs. 18–25.
" " Brady, 1884, FC. p. 661, pl. xciii. figs. 6, 7.
" " Egger, 1893, FG. p. 404, pl. xvi. figs. 57–59, 63, 64.
" " Fornasini, 1896, 'Rivista Italiana di Paleontologia,' p. 95, April 1896.
" " Sidebottom, 1904, etc., RFD. 1909, p. 2, pl. i. figs. 5, 6, pl. ii. figs. 1–3.
" " Heron-Allen & Earland, 1913, CI. p. 132.

8 *Stations.*

Generally distributed, but like the typical *T. lobatula* never abundant. The specimens may be divided into two very distinctive groups: (i.) wild-growing *Gypsina*-like variations of the common *T. lobatula*—these are all small and somewhat finely perforated; (ii.) the large and coarsely perforate Soldanian type with thickened everted lip to the aperture as figured by Sidebottom (*ut supra*). Very fine specimens of this type occur at Stn. 11, and more sparingly at Stns. 9 and 12. At Stn. 11 a single specimen was found of a plano-convex type, in which the later chambers are arranged in a straight lituoline series (*cf.* B. 1912, FPC. pl. xxv. fig. 4 and B. P. & J. 1888, AB. pl. xlv. fig. 17). It must be borne in mind that Soldani in his 'Testaceographia' (1789) devoted twenty-two whole plates (and part of two others) to drawings of these variations, on some of which d'Orbigny founded his species. Fornasini (*ut supra*) has also made a special study of its variations, to which we referred in our Clare Island Monograph.

382. **Truncatulina tenuimargo** Brady.

Truncatulina tenuimargo Brady, 1884, FC. p. 662, pl. xciii. figs. 2, 3.
„ „ Egger, 1893, FG. p. 399, pl. xvi. figs. 7–9.
„ „ Heron-Allen & Earland, 1898, etc., SB. 1909, p. 680, pl. xx. fig. 2.

7 *Stations.*

Generally distributed, but rare. At Stn. 3 a specimen was found with the inferior or rounded surface covered with pustular excrescences in the form of tubules originating from the perforation. This would appear to be isomorphous with our recently described *Discorbina pustulata* (see No. 367).

383. **Truncatulina refulgens** (Montfort).

Cibicides refulgens Montfort, 1808–10, CS. vol. i. p. 122, 31me genre.
Truncatulina refulgens d'Orbigny, 1826, TMC. p. 279. no. 5, pl. xiii. figs. 8–11, Modèle no. 77.
„ „ Brady, 1865, RFND. p. 105, pl. xii. fig. 9.
„ „ Brady, 1884, FC. p. 659, pl. xcii. figs. 7–9.
„ „ Egger, 1893, FG. p. 401, pl. xvi. figs. 31–33.

8 *Stations.*

Very sparingly distributed, and except at Stns. 10 and 12 very small, but the individuals are typical.

384. **Truncatulina mundula** Brady, Parker, & Jones.

Truncatulina mundula Brady, Parker, & Jones, 1888, AB. p. 228, pl. xlv. fig. 25.

3 *Stations.*

Very rare. Only a few typical specimens were observed of this characteristic type, which appears to occupy a position between *T. lobatula* and *T. haidingerii*.

385. **Truncatulina haidingerii** (d'Orbigny).

Rotalina haidingerii d'Orbigny, 1846, FFV. p. 154, pl. viii. figs. 7–9.
Truncatulina haidingerii Brady, 1884, FC. p. 663, pl. xcv. fig. 7.
" " Egger, 1893, FG. p. 401, pl. xvi. figs. 25–27.
" " Millett, 1898, etc., FM. 1904, p. 493 (References).
" " Heron-Allen & Earland, 1908, etc., SB. 1909, p. 680; and 1910, p. 425, pl. ix. figs. 6, 7.

12 *Stations.*

Generally distributed, but, as a rule, infrequent and poorly developed. The best specimens at Stns. 10 and 11, large and typical at the latter.

386. **Truncatulina robertsoniana** Brady.

Truncatulina robertsoniana Brady, 1879, etc., RRC. 1881, p. 65.
" " Brady, 1884, FC. p. 664, pl. xcv. fig. 4.
" " Egger, 1893, FG. p. 402, pl. xvi. figs. 34–36.
" " Heron-Allen & Earland, 1908, etc., SB. 1909, p. 681.

1 *Station.*

Very rare, small, but quite typical specimens. The records, apart from Egger's 'Gazelle' examples, so far as we are aware, are exclusively Atlantic and from comparatively deep water, but Egger records it from seas adjacent to Kerimba, viz. Mauritius Stn. 66–411 metres.

387. **Truncatulina ungeriana** (d'Orbigny).

Rotalina ungeriana d'Orbigny, 1846, FFV. p. 157, pl. viii. figs. 16–18.
Truncatulina ungeriana Reuss, 1865, FABS. p. 161. no. 10.
" " Brady, 1884, FC. p. 664, pl. xciv. fig. 9.
" " Egger, 1893, FG. pl. xvi. figs. 19–21.
" " Millett, 1898, etc., FM. 1904, p. 493 (References).
" " Heron-Allen & Earland, 1908, etc., SB. 1909, p. 681, pl. xx. fig. 1; and 1910, p. 426, pl. ix. figs. 8, 9.
" " Bagg, 1912, PFC. p. 83, pl. xxv. figs. 1–3.

9 *Stations.*

Very sparingly distributed, only occasional specimens occurring, and with the exceptions of those from Stns. 2 and 5 not very typical.

388. **Truncatulina rosea** (d'Orbigny).

Rotalia rosea d'Orbigny, 1826, TMC. p. 272. no. 7, Modèle no. 35.
Rotalina rosea d'Orbigny, 1839, FC. p. 72, pl. iii. figs. 9–11.
Rotalia rosea Parker, Jones, & Brady, 1859, etc., NF. 1865, p. 24, pl. iii. fig. 79.
Truncatulina rosea Brady, 1884, FC. p. 667, pl. xcvi. fig. 1.
" " Egger, 1893, FG. p. 397, pl. xvi. figs. 4–6.

1 *Station.*

A few typical specimens of this species, one of the few Foraminifera characterized

by pink coloration, and hitherto, with the exception of the 'Gazelle' record from West Australia, known exclusively from West Indian seas. The Kerimba specimens resemble Egger's figure more closely than d'Orbigny's Model, having a somewhat more depressed shell.

389. **Truncatulina akneriana** (d'Orbigny).

Rosalina akneriana d'Orbigny, 1846, FFV. p. 156, pl. viii. figs. 13–15.
Truncatulina akneriana Reuss, 1866, FABS. p. 160. no. 6.
„ „ Brady, 1884, FC. p. 663, pl. xciv. fig. 8.
„ „ Egger, 1893, FG. p. 400, pl. xvi. figs. 60–62.
„ „ Flint, 1899, RFA. p. 333, pl. lxxxvii. fig. 5.

1 *Station.*

A few well-marked specimens at Stn. 11, characterized by a pink coloration of the shell and somewhat coarse perforations.

390. **Truncatulina præcincta** (Karrer).

Rotalia præcincta Karrer, 1868, MFKB. p. 189, pl. v. fig. 7.
„ „ Seguenza, 1879, FTR. pp. 56, 64, etc. (*lists*).
Truncatulina præcincta Brady, 1884, FC. p. 667, pl. xcv. figs. 1–3.
„ „ Egger, 1893, FG. p. 403, pl. xvi. figs. 51–53.
„ „ Flint, 1899, RFA. p. 334, pl. lxxviii. fig. 1.

3 *Stations.*

Very rare and not very typical.

391. **Truncatulina culter** (Parker & Jones).

Planorbulina culter Parker & Jones, 1865, NAAF. p. 421, pl. xix. fig. 1.
Anomalina bengalensis Schwager, 1866, FKN. p. 259, pl. vii. fig. 111.
Truncatulina culter Brady, 1884, FC. p. 668, pl. xcvi. fig. 3.
„ „ Egger, 1893, FG. p. 401, pl. xvi. figs. 16–18.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 682.

3 *Stations.*

One small but typical specimen at Stn. 1, very rare at Stn. ? B, and several at Stn. 11. All the previous records of this species in the recent form are from deep water, distributed over the great oceans, but Schwager says that his species *Anomalina bengalensis* (*ut supra*), which he recorded from the pliocene of Kar-Nicobar, is still living on the shore of the Nicobar Islands.

392. **Truncatulina rostrata** Brady. (Pl. LII. figs. 33–36.)

Truncatulina rostrata Brady, 1879, etc., RRC. 1881, p. 65.
„ „ Brady, 1884, FC. p. 668, pl. xciv. fig. 6.
„ „ Chapman, 1900, FLF. p. 194.

1 *Station.*

A good many fine and well-developed specimens at Stn. 11. The records of this very striking species appear to be confined to the seas round New Guinea and the tropical Pacific, and its occurrence on the farther side of the Indian Ocean is very noteworthy.

393. **Truncatulina tubulifera,** sp. n. (Pl. LII. figs. 37–40.)

4 *Stations.*

At Stns. 1, 6, and 7 a few somewhat poorly developed specimens were found, of a type with which we have been acquainted for many years as occurring somewhat rarely in shallow-water tropical gatherings. At Stn. 11 many very fine specimens were found. It is undoubtedly closely allied to *T. reticulata* Czjzek, but differs in the character of its aperture, which is normally truncatuline instead of being situated on a produced neck.

Test free, biconvex, consisting of two to three convolutions, all visible on the superior face, the last convolution only on the inferior. Six to seven chambers in the last convolution. Sutures flush, but thickened. The walls of the chambers between the sutural lines are coarsely perforate, each perforation often produced into a raised tube. These tubes may coalesce so as to form a cristate growth following the curve of the chamber and opening at the top into a crater. The tubular outgrowths are especially marked on the superior face, often wanting on the inferior. Aperture a curved slit on the inner edge of the terminal chamber. Umbilical portion sometimes marked by a solid mass of shell-substance, but this is flush with the surface, and does not project as a stud.

The best examples of this form have been found in the late Capt. Seabrook's dredgings from the Macassar Straits—45 fms. Other good examples occur at 'Challenger' Stn. 185 (Raine Island, Torres Straits—155 fms.); smaller but typical specimens at Vavau, in the Friendly Islands (Pacific)—16 fms. The species is probably widely distributed all over the tropical Pacific and Indian Oceans.

The specimens illustrated were selected from the Macassar gatherings as being the most typical in our possession, the drawings having been made before the equally good specimens from Stn. 11 had been found.

Average width ·4 mm., height ·25 mm.

394. **Truncatulina reticulata** (Czjzek).

Rotalina reticulata Czjzek, 1848, FWB. p. 145, pl. xiii. figs. 7–9.
Siphonina fimbriata Terrigi, 1880, SGP. p. 212, pl. iv. fig. 69.
Truncatulina reticulata Brady, 1884, FC. p. 669, pl. xcvi. figs. 5–8.
" " Chaster, 1892, S. p. 66, pl. i. fig. 16.
" " Egger, 1893, FG. p. 402, pl. xvi. figs. 42–44.
" " Flint, 1899, RFA. p. 334, pl. lxxviii. fig. 3.

3 *Stations.*

One broken specimen at Stn. ? B, and several perfect specimens at Stns. 11 and ? A.

395. **Truncatulina glabra,** sp. n. (Pl. LII. figs. 41–47.)

14 *Stations.*

Test nearly spherical, consisting of about two to three convolutions of chambers; three to four chambers in the last convolution, which is inclined at an angle to the axis of the preceding ones, so that the early convolutions are almost, or entirely, enclosed. Shell-wall somewhat thick, but much thinner than in *T. echinata* Brady, and coarsely perforate. Sutural lines depressed. Aperture situated in a depression at the junction of the terminal chamber with the preceding convolution, usually a simple crescentic slit, sometimes furnished with a rim or a short neck as in *T. echinata.*

The general aspect of this shell, both as an opaque object, and still more when viewed as a transparent object in balsam, suggests a relationship with *Sphæroidina bulloides* d'Orbigny, but the rotaline formation of the chambers in very young shells, such as we figure, and the tendency in very large mature specimens to develop an everted rim to the aperture, tend to confirm its close affinity to *T. echinata,* of which it may be regarded as a smooth and depauperate variety.

It occurs in company with *T. echinata* and usually in equal proportions at most Stns., but at some Stns. it exhibits a preponderance and development which are very striking.

We have already found this form in shallow-water dredgings off Tahiti, so that it probably extends across the tropical Indo-Pacific area in suitable depths.

Brady was unquestionably well acquainted with this smooth type, but apparently regarded it as merely a stage in the life-history of the allied form *T. echinata.* His description of that form refers to it as "usually more or less beset with short blunt spines or tubercles." His slide of *T. echinata* in the Brady Collection at Cambridge, curiously enough, contains hardly any typically spinous individuals, but large numbers of typical *T. glabra* in all stages; his fig. 12 (pl. xcvi., FC.) represents an almost typical *T. glabra,* there being only a faint tendency to spinous development.

Diameter in all directions averages about 0·2 mm.

396. **Truncatulina echinata** Brady. (Pl. LIII. fig. 1.)

Ptanorbulina echinata Brady, 1879, etc., RRC. 1879, p. 283, pl. viii. fig. 31.
Truncatulina echinata Brady, 1884, FC. p. 670, pl. xcvi. figs. 9–14.
„ „ Egger, 1893, FG. p. 403, pl. xvi. figs. 40, 41.
„ „ Millett, 1898, etc., FM. 1904, p. 490.

15 *Stations.*

Universally distributed except at Stn. 7, and usually moderately abundant.

T. echinata is an extremely anomalous form, and its allocation to the genus *Truncatulina* rather than to *Sphæroidina* (to which in our opinion it has considerable affinities) must be based chiefly on the occurrence of anomalous specimens, in which the truncatuline features predominate. We would direct attention to Egger's figures and description, which represent compressed individuals much more closely allied to *T. reticulata* than to the type.

The Kerimba specimens illustrate practically all variations of the globular type, from tests covered with a few large blunt tubercles, through roughly spinous to practically smooth individuals with thick and coarsely perforated shells. At most Stns. a distinct type occurs, which we have separated under the specific name *T. glabra* (*q. v. ante*).

At Stn. 3 a double specimen, which we figure, was found; it appears to be due to the fusion of two individuals either at the primordial stage or, perhaps, at a slightly later stage of growth. The individuals have preserved their separate apertures.

It seems probable that the figures given by Carpenter in 1860 (C. 1856 etc., RF. 1860, p. 551, pl. xix. figs. 5 and ?6) and described as "young Calcarinæ showing their ordinary aspect" represent this species. They suggest it far more than they do *Calcarina*.

Anomalina d'Orbigny.

397. **Anomalina ammonoides** (Reuss).

Rosalina ammonoides Reuss, 1845–6, VBK. pt. i. p. 36, pl. xiii. fig. 66, pl. viii. fig. 53.
Planorbulina (*Anomalina*) *ammonoides* Jones & Parker, 1872, FFR. p. 106 & Table.
Anomalina ammonoides Brady, 1884, FC. p. 672, pl. xciv. figs. 2, 3.
" " Egger, 1893, FG. p. 378, pl. xiv. figs. 35–37.
" " Millett, 1898, etc., FM. 1904, p. 494 (References).
" " Chapman, 1900, FLF. p. 195.
" " Chapman, 1907, RFV. p. 138.

1 *Station*.

Two large and extremely typical specimens at Stn. 11. The occurrence of these individuals in this dredging, made in very shallow water, and the entire absence of the species at the other Stns., some of which present a more favourable depth, is noticeable.

398. **Anomalina polymorpha** Costa. (Pl. LIII. figs. 2–5.)

Anomalina polymorpha Costa, 1853, etc., PRN. 1856, p. 252, pl. xxi. figs. 7–9.
Discorbina perforata Seguenza, 1879–80, FTR. p. 148, pl. xiv. fig. 3.
Anomalina polymorpha Brady, 1884, FC. p. 676, pl. xcvii. figs. 3–7.
" " Chapman, 1895, FAS. p. 41.
" " Chapman, 1907, RFV. p. 138.

1 *Station*.

At Stn. 11 a good many individuals, which we believe to be referable to this form,

although they are devoid of the marginal spines usually associated with the species. Brady refers to the occurrence of similar non-spinous specimens. The shell-wall in the Kerimba individuals is very coarsely perforate, the aperture furnished with a produced thickened lip, and the whole shell is coloured, the initial chambers being very dark brown, passing through lighter shades to a final chamber almost devoid of tint. The sutural lines are limbate in the early chambers, depressed in the later ones. Brady's records of the species are all from greater depths than the Kerimba dredging, ranging from 50 to 450 fms. in the Atlantic and Southern Oceans and the South Pacific.

CARPENTERIA Gray.

399. **Carpenteria utricularis** (Carter).

Polytrema utriculare Carter, 1876, P. p. 210, pl. xiii. figs. 11–16.
Carpenteria utricularis Carter, 1877, CB. p. 176.
„ „ Brady, 1884, FC. p. 678, pl. xcix. figs. 6, 7, pl. c. figs. 1–4.
„ „ Egger, 1893, FG. p. 438, pl. xxi. fig. 18.
„ „ Chapman, 1899, FFA. p. 12, pl. ii. fig. 4, pl. iv. figs. 3, 4.
„ „ Chapman, 1900, FLF. p. 195.

1 *Station.*

At Stn. 11 a large fragment of the chamber-wall of a specimen of this species was found, identifiable owing to its characteristic reticulated surface. The absence of suitable material for examination is possibly responsible for the poverty of the records of this genus.

399 *a*. **Carpenteria monticularis** Carter.

Carpenteria monticularis Carter, 1877, CB. p. 211, pl. xiii. figs. 9–17.
„ „ Carter, 1877, AMNH. ser. 4, vol. xx. p. 68, woodcut.
„ „ Brady, 1884, FC. p. 677, pl. xcix. figs. 1–5.
„ „ Chapman, 1901, FFA. p. 393. no. 6.

1 *Station.*

Two young individuals from Stn. 11.

PULVINULINA Parker & Jones

400. **Pulvinulina repanda** (Fichtel & Moll).

Nautilus repandus Fichtel & Moll, 1798, TM. p. 35, pl. iii. figs. *a–d.*
Pulvinulina repanda Brady, 1884, FC. p. 684, pl. civ. fig. 18.
„ „ Egger, 1893, FG. p. 405, pl. xviii. figs. 34–36.
„ „ Goës, 1894, ASF. p. 95, pl. xvi. fig. 801.
„ „ Jones & Chapman, 1900, MCI. p. 228, pl. xx. fig. 1.
„ „ Chapman, 1900, FLF. p. 196.

6 *Stations.*

Rather scantily distributed, but occurring in some abundance at certain Stns., the best at Stn. 11. Some of the individuals pass almost imperceptibly into *P. lateralis.*

401. **Pulvinulina lateralis** (Terquem). (Pl. LIII. figs. 6–11.)

Rosalina lateralis Terquem, 1878, FIR. p. 25, pl. ii. (vii.) fig. 11.
Pulvinulina lateralis Brady, 1884, FC. p. 689, pl. cvi. figs. 2, 3.
" " Egger, 1893, FG. p. 413, pl. xviii. figs. 48–50.
" " Millett, 1898, etc., FM. 1904, p. 497.
" " Sidebottom, 1904, etc., RFD. 1909, p. 5, pl. ii. fig. 6, pl. iii. figs. 1, 2.

8 *Stations.*

Generally distributed, sometimes frequent, and attaining a very large size, especially at Stn. 3, where the typical cribrate aperture covered practically the whole inferior surface of the shell, which was very irregular in growth. Cushman's record (Proc. Boston Soc. Nat. Hist. 1908, vol. xxxiv. No. 2, p. 31, pl. v. figs. 11, 12) is interesting, as showing the occurrence of this species in a northerly habitat.

402. **Pulvinulina concentrica** Parker & Jones.

Pulvinulina concentrica Parker & Jones (MS.), Brady, 1864, RFS. p. 470, pl. xlviii. fig. 14.
" " Brady, 1884, FC. p. 686, pl. cv. fig. 1.
" " Sidebottom, 1904, etc., RFD. 1909, p. 7, pl. iii. fig. 5.
" " Heron-Allen & Earland, 1908, etc., SB. 1909, p. 683, pl. xx. fig. 4 *a–c*.
" " Heron-Allen & Earland, 1913, CI. p. 135.

1 *Station.*

A single typical specimen.

403. **Pulvinulina oblonga** (Williamson).

Nautilus auricula, var. β, Fichtel & Moll, 1798, TM. p. 108, pl. xx. figs. *d*, *e*, *f*.
Rotalina oblonga Williamson, 1858, RFGB. p. 51, pl. iv. figs. 98–100.
Pulvinulina oblonga Brady, 1884, FC. p. 688, pl. cvi. fig. 4.
" " Brady, Parker, & Jones, 1888, AB. p. 229, pl. xlvi. fig. 5.
" " Egger, 1893, FG. p. 415, pl. xvii. figs. 23–25.
" " Heron-Allen & Earland, 1913, CI. p. 136.

11 *Stations.*

Generally distributed, but never abundant. The best specimens, which were large and very typical, at Stn. 11.

404. **Pulvinulina oblonga**, var. **scabra** Brady.

Pulvinulina oblonga, var. *scabra* Brady, 1884, FC. p. 689, pl. cvi. fig. 8.

1 *Station.*

One quite typical specimen at Stn. 3.

405. **Pulvinulina auricula** (Fichtel & Moll).

Nautilus auricula, var. α, Fichtel & Moll, 1798, TM. p. 108, pl. xx. figs. *a*, *b*, *c*.
Pulvinulina auricula Parker & Jones, 1865, NAAF. p. 393.
Valvulina ovalis Terquem, 1882, FEP. p. 103, pl. xi. (xix.) fig. 10.

Pulvinulina auricula Goës, 1882, RRCS. p. 109, pl. viii. figs. 273–275.
„ „ Brady, 1884, FC. p. 688, pl. cvi. fig. 5.
„ „ Egger, 1893, FG. p. 415, pl. xvii. figs. 26–28.

2 *Stations*.

Some good specimens at Stn. 11, and one poor specimen at Stn. 1.

406. **Pulvinulina hauerii** (d'Orbigny).

Rotalina hauerii d'Orbigny, 1846, FFV. p. 151, pl. vii. figs. 22–24.
Pulvinulina hauerii Parker & Jones, 1865, NAAF. p. 393.
„ „ Brady, 1884, FC. p. 690, pl. cvi. figs. 6, 7.
„ „ Egger, 1893, FG. p. 414, pl. xvii. figs. 29–31.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 684, pl. xx. fig. 5.

3 *Stations*.

A few individuals, well-grown and typical.

407. **Pulvinulina brongniartii** (d'Orbigny).

Rotalia brongniartii d'Orbigny, 1826, TMC. p. 273. no. 27.
Rotalina brongniartii d'Orbigny, 1846, FFV. p. 158, pl. viii. figs. 22–24.
Pulvinulina brongniartii Millett, 1898, etc., FM. 1904, p. 498, pl. x. fig. 4.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 337.
„ „ Heron-Allen & Earland, 1913, CI. p. 136, pl. xii. figs. 8, 9.

3 *Stations*.

A few specimens only at each Stn., but good and typical.

408. **Pulvinulina menardii** (d'Orbigny).

Rotalia menardii d'Orbigny, 1826, TMC. p. 273. no. 26, Modèle no. 10.
Pulvinulina repanda, var. *menardii* Parker & Jones, 1865, NAAF. p. 394, pl. xvi. figs. 35–37.
„ *menardii* Owen, 1867, SFMO. p. 148, pl. v. fig. 16.
„ „ Brady, 1884, FC. p. 690, pl. ciii. figs. 1, 2.
„ „ Egger, 1893, FG. p. 411, pl. xvii. figs. 1–3, 7–12.
„ „ Millett, 1898, etc., FM. 1904, p. 499 (References).

3 *Stations*.

Occurs sparingly, the best specimens at Stn. 10. All the examples are small and probably derived from the Equatorial Drift.

409. **Pulvinulina tumida** Brady.

Pulvinulina menardii var. *tumida* Brady, 1877, FNB. p. 535.
„ *tumida* Brady, 1884, FC. p. 692, pl. ciii. figs. 4–6.
„ „ Egger, 1893, FG. p. 414, pl. xvii. figs. 4–6.
„ „ Chapman, 1895, FAS. p. 42.
„ „ Flint, 1899, RFA. p. 329, pl. lxxiii. fig. 5.
„ „ Millett, 1898, etc., FM. 1904, p. 499.

3 *Stations.*

Large and typical examples at Stn. 11 and many smaller ones at Stns. 1 and 3. Unless these specimens are derived from the Equatorial Drift, their presence in such shallow water is difficult to account for. *P. tumida* is a pelagic species, and, apart from this, its records are almost exclusively confined to tropical deep waters.

410. **Pulvinulina patagonica** (d'Orbigny).

Rotalina patagonica d'Orbigny, 1839, FAM. p. 36, pl. ii. figs. 6–8.
Pulvinulina patagonica Brady, 1884, FC. p. 693, pl. ciii. fig. 7.
„ „ Egger, 1893, FG. p. 413, pl. xvii. figs. 16–18.
„ „ Rhumbler, 1900, NPF. p. 13, figs. 4, 5.
„ „ Heron-Allen & Earland, 1913, CI. p. 137, pl. xiii. figs. 5–6.

1 *Station.*

A few fairly typical examples. Their presence in such shallow water is noteworthy. We are dealing with the identity of the Clare Island specimens, for which we propose to revive Brady's name *P. scitula* as a varietal name, in a paper which is now in preparation, on the Foraminifera of South Cornwall.

411. **Pulvinulina truncatulinoides** (d'Orbigny).

Rotalina truncatulinoides d'Orbigny, 1839, FIC. p. 132, pl. ii. figs. 25–27.
„ *micheliniana* d'Orbigny, 1840, CBP. p. 31, pl. iii. figs. 1–3.
Pulvinulina micheliniana Owen, 1867, SFMO. p. 148, pl. v. fig. 17.
„ *truncatulinoides* Rhumbler, 1900, NPF. p. 17, figs. 16–18.
„ *micheliniana* Millett, 1898, etc., FM. 1904, p. 500.
„ *truncatulinoides* Heron-Allen & Earland, 1908, etc., SB. 1909, p. 685.
(On the discrepancies between these specific names, see the last three references.)

2 *Stations.*

One large and absolutely typical specimen at Stn. 3 and a small and weak example at Stn. 1.

412. **Pulvinulina schreibersii** (d'Orbigny).

Rotalina schreibersii d'Orbigny, 1846, FFV. p. 154, pl. viii. figs. 4–6.
„ *badensis* Czjzek, 1847, FWB. p. 144, pl. xiii. figs. 1–3.
Pulvinulina schreibersii Parker & Jones, 1865, NAAF. p. 393.
„ „ Brady, 1884, FC. p. 697, pl. cxv. fig. 1.
„ „ Egger, 1893, FG. p. 409, pl. xviii. figs. 31–33, 67–69.
„ „ Sidebottom, 1904, etc., RFD. 1909, p. 8, pl. iii. fig. 8.

10 *Stations.*

Generally distributed, but never very strongly developed or typical. Most of the specimens are of a depressed type.

413. **Pulvinulina procera** Brady.

Pulvinulina procera Brady, 1879, etc., RRC. 1881, p. 66.
„ „ Brady, 1884, FC. p. 698, pl. cv. fig. 7.

7 *Stations.*

Scantily distributed, and, as a rule, only a few specimens at each Stn., the best being at Stns. 1, 6, and 12. All the individuals are small in size, but quite typical; in many of them the sutures are limbate all over the shell.

414. **Pulvinulina elegans** (d'Orbigny).

Rotalia (*Turbinulina*) *elegans* d'Orbigny, 1826, TMC. p. 276. no. 54.
Pulvinulina elegans Parker, Jones, & Brady, 1859, etc., NF. 1871, p. 174, pl. xii. fig. 142.
„ „ Brady, 1884, FC. p. 699, pl. cv. figs. 4–6.
„ „ Egger, 1893, FG. p. 410, pl. xviii. figs. 37–39.
„ „ Millett, 1898, etc., FM. 1904, p. 501 (References).

1 *Station.*

One weak specimen.

414 *a*. **Pulvinulina partschiana** (d'Orbigny). (Pl. LIII. figs. 12–14.)

Rotalina partschiana d'Orbigny, 1846, FFV. p. 153, pl. vii. figs. 28–30, pl. viii. figs. 1–3.
„ „ Bornemann, 1855, FSH. p. 340, pl. xvi. fig. 6.
Pulvinulina partschiana Brady, 1884, FC. p. 699, pl. cv. fig. 3 *a–c*, & p. 700, fig. 21.
„ „ Egger, 1893, FG. p. 410, pl. xvii. fig. 43, pl. xviii. figs. 25, 27.
„ „ Flint, 1899, RFA. p. 331, pl. lxxv. fig. 3.

1 *Station.*

At Stn. 11 a single fully developed individual, which we figure and which we have little hesitation in ascribing to this species, although the shallowness of the deposit renders its occurrence very noteworthy, *P. partschiana* being normally a deep-water type. It is characterized by a translucent hyaline brown shell with thick and opaque marginal edges. At the same Stn. a number of specimens occur which apparently represent the megalospheric type, perhaps in an arrested stage of development. In these latter individuals the later chambers tend to grow over the inferior or convex face of the shell in broad overlapping flaps, so that not more than two or at the most three chambers are visible. The shell-wall is much thicker in the megalospheric than in the microspheric specimens. The colour is, as a rule, the same ochreous-brown tint, but one or two white specimens, perhaps representing dead shells, also occur.

ROTALIA Lamarck.

415. **Rotalia beccarii** (Linné).

Nautilus beccarii Linné, 1767, SN. (ed. xii.) p. 1162. no. 276.
„ „ Linné, 1788, SN. (ed. xiii.) p. 3370. no. 4.
Rotalia (*Turbinulina*) *beccarii* d'Orbigny, 1826, TMC. p. 275. no. 42, Modèle no. 74 (*Rosalina*).

Rotalia beccarii Williamson, 1858, RFGB. p. 48, pl. iv. figs. 90–92.
„ „ Brady, 1884, FC. p. 704, pl. cvii. figs. 2, 3.
„ „ Egger, 1893, FG. p. 420, pl. xix. figs. 25–27.
„ „ Millett, 1898, etc., FM. 1904, p. 502 (References).

17 *Stations.*

Universally distributed and generally fairly abundant. The specimens vary considerably in size, the general average being rather small, but well-grown and typical individuals occur at Stns. 3, 7, 8, and 10. Nearly all the specimens are of a smooth and hyaline type with little excess of shell-growth; none of the highly limbate and tuberculate varieties occurs.

416. **Rotalia perlucida** Heron-Allen & Earland.

Rotalia beccarii (pars) Balkwill & Wright, 1885, DIS. p. 351.
„ *perlucida* Heron-Allen & Earland, 1913, CI. p. 139, pl. xiii. figs. 7–9.

10 *Stations.*

Good and typical examples at Stns. 1, 4, 7, and 12, and weaker individuals at many others. At Stns. 7 and 8 abnormal individuals, in which the earlier rotaline chambers were followed by irregular growths of no definite formation, were found. The *R. nitida* of Reuss (Kreidegebilde des Westlichen Böhmens., Prague, 1844, p. 214) is perhaps a similar or identical form, judging from the published diagnosis, but the first published figures (R. 1845–6, VBK. pt. i. p. 35, pl. viii. fig. 52 & pl. xii. figs. 8, 20) are too small and obscure to be identifiable with certainty. In any case, Reuss's name does not stand, as it had been used by d'Orbigny for a form indistinguishable from *Pulvinulina menardii*, the types of which we have examined in Paris (d'O. 1826, TMC. p. 274. no. 31).

417. **Rotalia orbicularis** (d'Orbigny).

Gyroidina orbicularis d'Orbigny, 1826, TMC. p. 278. no. 1, Modèle no. 13.
Rotalia orbicularis Brady, 1864, RFS. p. 470, pl. xlviii. fig. 16.
„ *beccarii*, var. *orbicularis* Parker & Jones, 1865, NAAF. p. 389, pl. xvi. fig. 34.
„ *orbicularis* Terquem, 1882, FEP. p. 60, pl. iv. (xii.) figs. 1–3.
„ „ Brady, 1884, FC. p. 706, pl. cvii. fig. 5, pl. cxv. fig. 6.
„ „ Egger, 1893, FG. p. 421, pl. xix. figs. 22–24.

15 *Stations.*

Universally distributed in company with *R. beccarii*, all the specimens being of a somewhat weakly developed type. Brady, in 1864, in describing d'Orbigny's species as new to the British fauna, identified his specimens with d'Orbigny's Model, and figured a test which closely follows the Model in its biconvex form and acuminate superior face. These features, however, are more marked in Brady's figure than in the Model or in any specimens which we have observed. Subsequent authors, including Brady himself (B. 1884, FC.), have departed considerably from the Model, and the

specific name is now generally associated with a weak form of *R. beccarii* in which the strongly marked umbilical stud is replaced by either an umbilical depression or a depression filled with secondary outgrowths from the chambers.

418. **Rotalia soldanii** d'Orbigny.

Rotalia (*Gyroidina*) *soldanii* d'Orbigny, 1826, TMC. p. 278. no. 5, Modèle no. 36.
„ *beccarii*, var. *soldanii* Parker & Jones, 1865, NAAF. p. 389, pl. xvi. figs. 31-33.
„ *soldanii* Hantken, 1875, CSS. p. 80, pl. ix. fig. 7.
„ „ Brady, 1884, FC. p. 706, pl. cvii. figs. 6, 7.
Rotalina soldanii Egger, 1893, FG. p. 420, pl. xix. figs. 16–18, 51.
Rotalia soldanii Millett, 1898, etc., FM. 1904, p. 503 (References).

1 *Station.*

Several small but typical examples, somewhat unexpected in such shallow water, the species being normally a deep-water type.

419. **Rotalia schroeteriana** Parker & Jones.

Faujasina sp. Williamson, 1853, MSF. p. 87, pl. x. figs. 1–6.
Rotalia schroeteriana Carpenter, Parker, & Jones, 1862, IF. p. 213, pl. xiii. figs. 7–9.
„ „ Brady, 1884, FC. p. 707, pl. cxv. fig. 7.
Rotalina schroeteriana Egger, 1893, FG. p. 422, pl. xix. figs. 10–12.
Rotalia schroeteriana Flint, 1899, RFA. p. 332, pl. lxxvi. fig. 1.

1 *Station.*

A single typical specimen.

420. **Rotalia schroeteriana,** var. **inflata** Millett.

Rotalia schroeteriana, var. *inflata* Millett, 1898, etc., FM. 1904, p. 504, pl. x. fig. 5.

1 *Station.*

One very small specimen, but showing the typical fimbriated margin.

421. **Rotalia papillosa** Brady.

Rotalia papillosa Brady, 1884, FC. p. 708, pl. cvi. fig. 9.
„ „ Flint, 1899, RFA. p. 332, pl. lxxvi. fig 2.
„ „ Millett, 1898, etc. FM. 1904, p. 505.

2 *Stations.*

One typical specimen at Stn. 3 and a few at Stn. 11. The rarity of this form, which is widely distributed and frequently common in shallow-water gatherings from the Indo-Pacific area, is noteworthy.

422. **Rotalia papillosa,** var. **compressiuscula** Brady.

Rotalia papillosa, var. *compressiuscula* Brady, 1884, FC. p. 708, pl. cvii. fig. 1, pl. cviii. fig. 1.

2 *Stations.*

A single typical specimen at Stn. 7 and a few at Stn. 3.

423. **Rotalia calcar** (d'Orbigny).

Calcarina calcar d'Orbigny, 1826, TMC. p. 276. no. 1, Modèle no. 34.
Rotalia armata d'Orbigny, 1826, TMC. p. 273. no. 22, Modèle no. 70.
Calcarina calcar d'Orbigny, 1839, FC. p. 81, pl. v. figs. 22–24.
Rotalia calcar Brady, 1884, FC. p. 709, pl. cviii. figs. 3 & ? 4.
Rotalina calcar Egger, 1893, FG. p. 423, pl. xix. figs. 1–3.
Rotalia calcar Earland, 1905, FBS. p. 228.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 691, pl. xxi. fig. 1.

11 *Stations.*

Generally distributed, but varying greatly at different Stns. both in abundance and development. The best and largest specimens were at Stns. 2 *b* and 11. At these Stns. the individuals attained a very large size, and were of a highly decorated type, both surfaces being studded with tubercular growth. All the intermediate stages were also observed. At Stns. 1, 9, 10, and 12 and ? X, many of the specimens were very small and flat on the superior face, differing from *R. venusta* Brady only in the development of the marginal spines, which were weakly developed.

424. **Rotalia venusta** Brady. (Pl. LIII. figs. 15–22.)

Rotalia venusta Brady, 1884, FC. p. 708, pl. cviii. fig. 2.
Rotalina venusta Egger, 1893, FG. p. 422, pl. xix. figs. 13–15.
Rotalia venusta Millett, 1898, etc., FM. 1904, p. 506.

15 *Stations.*

This is one of the most abundant and typical species in the Kerimba dredgings, occurring abundantly at most Stns., although, curiously enough, it is sometimes rare or absent. The species is subject to great variations, being normally inequilaterally biconvex, the superior face being the flatter of the two. Many of the Kerimba specimens, however, have the superior face highly convex, in others the inferior face, which usually has the central portion filled with secondary shell-matter, is excavate, yet others have a prominent umbilical stud. The peripheral edge is usually lobulate, but at some Stns. continuous, and there is a constant tendency to the formation of marginal spines, especially in young examples. This reaches its maximum development at Stn. ?X, where specimens with a continuous denticulate margin were observed. There can be little doubt that *R. venusta* is closely allied to *R. calcar* (d'Orbigny).

425. **Rotalia erinacea,** sp. n. (Pl. LIII. figs. 23–26.)

Discorbina imperatoria (d'Orbigny), var. *globosa* Millett, 1898, etc., FM. 1903, p. 701, pl. vii. fig. 6.

9 *Stations.*

Test free, inequilaterally biconvex, consisting of about three convolutions, each of five chambers. Superior face but slightly convex, chambers inflated, sutural lines depressed. Each chamber terminating on its superior face in a cusp or point, which is usually more or less extended in the form of a solid spine. Inferior face with a

lightly depressed umbilical recess often filled with granular matter. Surface of the test rough, coarsely perforate. Aperture obscure, a slit on the inner margin of the terminal chamber.

This rather striking little form is one of the constant features of the Kerimba dredgings, occurring at a great many Stns. and often in abundance. At most of the Stns. specimens are not consistently spinous, but present only a few spines, at irregular intervals, on the cuspid margins of the chambers. At Stn. ?X, however, where it reaches its optimum development, all the specimens are extremely aculeate and in many cases the cusp of each chamber is furnished with a pair of spines. In other instances, in addition to these stout marginal spines, the superior surface is hispid all over. A few are spinous as regards the early chambers only, those of the last whorl being cuspless and smooth. Millett's variety *Discorbina imperatoria*, var. *globosa*, which he describes as one of the characteristic forms of the Malay Archipelago, of which we possess the type-specimens, is identical with the Kerimba form. It appears to have but little resemblance to d'Orbigny's type *Rosalina imperatoria* (d'O., 1846, FFV. p. 176, pl. x. figs. 16–18), being distinctly rotaline in the arrangement of its chambers, but there is a marked divergence in the extent of the development of the spines, which even in the most advanced Kerimba specimens rarely attain the proportions of Millett's figure.

Our species may be regarded as an isomorph of *Rosalina imperatoria* d'Orbigny, to which Millett assigned his form. This, however, is a markedly discorbine type with a depressed umbilical recess and striate markings on the inferior side. It does not appear to have been met with in the recent condition except by Side-bottom, whose figures of *D. imperatoria* represent a discorbine type of shell quite distinct from both the Malay and Kerimba individuals (S. 1904, etc., RFD. 1908, p. 13, pl. v. figs. 1, 2).

In the Brady Collection at Cambridge there is a slide of specimens from Fiji (Levuka, Shore-sand) labelled *Rotalia dentata* P. & J. All the specimens are referable to our species *R. erinacea*. It is not easy to understand how Brady arrived at his determination, as both the figure and description of *R. dentata* (P. & J., 1865, NAAF. p. 387, pl. xix. fig. 13 *a–c*) differ in every essential feature from this type.

Millett's varietal name *globosa* cannot be adopted as the specific name for the type, as it has already been used for a distinct form (*Nonionina globosa* v. Hagenow, Neues Jahrb. f. Min. 1842, p. 574), which is *Rotalia globosa* Reuss (SAWW. 1861, vol. xliv. p. 330, pl. iii. figs. 4–6).

Breadth 0·15 to 0·22 mm., height about 0·15 mm.

426. **Rotalia murrayi,** sp. n. (Pl. LIII. figs. 27–34.)

6 *Stations.*

Test free, subglobular, consisting of three to four convolutions each of about six inflated chambers. Sutural lines depressed. The whole surface of the shell covered

with secondary growth in the form of short blunt spines which mark the outlines of the chambers. These processes are more numerous on the superior than on the inferior surface. The umbilical recess of the shell is filled with a dense growth of separate spines. Aperture obscure, but apparently a slit on the inner margin of the final chamber, hidden by secondary growths.

This strongly marked little species is sparingly distributed, but fairly abundant at the Stns. where it occurs, especially at Stns. 2 *b* and 8. It has some resemblance to *R. erinacea*, but differs therefrom in the greater number of chambers, the highly convex superior surface, and in the entire absence of prolonged spines, which are replaced by a dense growth of acute papillæ which give the appearance of a rasp to the surface of the shell when viewed under a high power. The species occurs in shore-sand from Sandoway, Arakan Coast, Burma, and also in shallow water at Segaar, New Guinea. From this latter locality we have also double (or budded) specimens.

Breadth ·25 to ·32 mm., height ·2 to ·23 mm.

426 *a*. **Rotalia dubia** d'Orbigny.

Rotalia dubia d'Orbigny, 1826, TMC. p. 274, no. 34.
„ „ Fornasini, 1908, SON. p. 46, pl. i. fig. 14.

(See our observations upon this form on p. 546.)

CALCARINA d'Orbigny.

427. **Calcarina spengleri** (Linné).

Nautilus spengleri Linné, 1767, etc., SN. 1788, p. 3371. no. 10.
Calcarina spengleri d'Orbigny, 1826, TMC. p. 276, no. 4.
„ „ Brady, 1884, FC. p. 712, pl. cviii. figs. 5, 7.
„ „ Egger, 1893, FG. p. 423, pl. xix. figs. 4–6.
„ „ Millett, 1898, etc., FM. 1904, p. 597.
„ „ Dakin, 1906, FC. p. 239.

1 *Station*.

One good and typical specimen from Stn. 11. The extreme rarity of this species is very noteworthy, as it is generally frequent, or even abundant, in tropical shallow waters—in the eastern seas, at least. Millett records it as not uncommon in some of the Malay gatherings, and we have found it abundant in shore-sands from Burma and in many dredgings in the Indian and Pacific Oceans.

428. **Calcarina defrancii** d'Orbigny.

Calcarina defrancii d'Orbigny, 1826, TMC. p. 276. no. 3, pl. xiii. figs. 5–7.
Rotalia defrancii Möbius, 1880, FM. p. 104, pl. xiv.
Calcarina defrancii Millett, 1898, etc., FM. 1904, p. 598.
„ „ Chapman, 1900, FLF, p. 197.

5 *Stations.*

Very much more sparingly distributed than the closely allied form *Rotalia calcar*, but attaining its optimum development, both as regards size and numbers, at the same Stns. (2 *b* and 11) as that species. At the remaining Stns. the specimens are few in number and poorly developed. At Stn. 2 *b* the form has a tendency to lose the marginal processes. At Stn. 11 two very well-marked varieties occur, (i.) practically biconvex, (ii.) very compressed and with an evolute rotaline spire.

429. **Calcarina hispida** Brady.

Calcarina hispida Brady, 1876, LC. p. 406.
„ *calcar*, var. *hispida* Carter, 1880, etc., SGM. 1880, p. 453.
„ *hispida* Brady, 1884, FC. p. 713, pl. cviii. figs. 8, 9.
„ „ Lister, 1895, LHF. p. 437, pl. viii. figs. 34–37.
„ „ Chapman, 1899, FFA. p. 15, pl. i. fig. 10.
„ „ Chapman, 1900, FLF. p. 196.

1 *Station.*

One rather coarsely hispid specimen from Stn. 11. The same remarks apply to the occurrence of this species as to *C. spengleri*, the two species in our experience being usually associated.

Subfamily TINOPORINÆ.

GYPSINA Carter.

Preliminary Note.—In dealing with material such as this, the difficulty of correlating a large and divergent series of specimens of what is one of the commonest and most widely distributed genera occurring in the dredgings with the data afforded by the diagnoses of previous authors is almost insuperable. The genus *Gypsina* has hitherto included those forms in which the rotaline commencement is inconspicuous, if not absent, and the later chambers are acervuline and without definite plan; but in the Kerimba material, while such specimens form perhaps the bulk of the material, there are countless individuals which present a regularity of growth and structure not compatible with such a simple type of structure. On the other hand, they cannot be referred to *Planorbulina* because, although resembling the generic type in the earlier portions of the shell, they pass, on full development, into a truly acervuline or Gypsina-mode of growth. The numerous species and varieties which have been separated by various authors, notably by Chapman, are of great value from the taxonomic point of view, but in our opinion have little significance beyond indicating the habitat and methods of life of the individual specimens. Whether it be free or attached in its plan of growth must largely decide the mode of development of the chambers in the adult shell: if attached, the nature of its host and its surroundings will influence the shape and form of the resultant organism. Thus a specimen

attached to a large smooth surface such as a rock or a molluscan shell, where it has free scope for development and full access to the surrounding medium, will preserve a depressed and scale-like form which may attain the enormous dimensions of those described by Miss Lindsey under the specific name of *G. plana* (Carter), 3–4 inches in diameter (Trans. Linn. Soc. London, Zoology, ser. 2, vol. xvi. pp. 45 *et seq.*), whereas an individual of the same stock confined to a cranny or confined space of any kind tends to form a solid mass of superimposed chambers. The resulting organisms are quite different in external appearance. We have no doubt whatever that the whole series of specimens which we have for purposes of identification listed under the following varietal names are no more than normal *G. inhærens* subjected to differing environmental conditions.

430. **Gypsina inhærens** (Schultze).

Acervulina inhærens Schultze, 1854, OP. p. 68, pl. vi. fig. 12.
Tinoporus lucidus Terrigi, 1880, SGP. p. 213, pl. iv. fig. 70.
Gypsina inhærens Brady, 1884, FC. p. 718, pl. cii. figs. 1–6.
,, ,, Goës, 1894, ASF. p. 91, pl. xv. fig. 787.
,, ,, Millett, 1898, etc., FM. 1904, p. 599.
,, ,, Chapman, 1900, FLF. p. 198.
,, ,, Rhumbler, 1906, FLC. p. 72, pl. v. fig. 60.
,, ,, Chapman, 1907, RFV. p. 140.

16 *Stations.*

Occurs almost universally and is often one of the most abundant species in the coarse siftings. The specimens exhibit the widest possible variety, ranging from fragments of what must have been enormous specimens of the large-chambered and coarsely areolated type *G. plana* (Carter) to thin encrusting layers often only a single cell thick, and nearly circular in outline, separable with difficulty from *Planorbulina mediterranensis* d'Orbigny, the rotaliform early chambers being distinctly visible on the inferior surface of the shell. Other specimens were found, especially at Stns. 2, 3, 4, 6, 10, and 12, in which the test was flat and roughly circular in outline, but with a secondary series of chambers piled over the central portion in acervuline fashion, rendering them hardly distinguishable from *Planorbulina larvata* Parker & Jones. At Stns. 3 and 5, the species was found encrusting calcareous algæ so as to form cylindrical masses. The presence of definite arched apertures at the side of each chamber, which has been regarded as a distinguishing feature of *Planorbulina* as contrasted with *Gypsina*, is not in all cases reliable. We have unquestionable examples of *G. inhærens* possessing normal planorbuline apertures to some of the marginal chambers and not to others. Chapman, in recording this species from the Cocos Keeling Atoll (C. 1902, CKA. p. 232), calls attention to the deep rose-colour of his specimens, a feature which we have discussed elsewhere (*post*, no. 432).

431. **Gypsina inhærens,** var. **plana** (Carter).

Polytrema planum Carter, 1876, P. p. 211, pl. xiii. figs. 18, 19.
Gypsina melobesioides Carter, 1880, etc., SGM. 1880, p. 445.
Polytrema planum Chapman, 1900, FLF. p. 201, pl. xx. figs. 6, 7.
„ „ Chapman, 1901, FFA. p. 396, pl. xxxv. figs. 2, 4.
Gypsina plana M. Lindsey, 1913, "On *Gypsina plana*, Carter, and the Relations of the Genus," Trans. Linn. Soc. Lond. (Zoology), ser. 2, vol. xvi. pp. 45–51.

5 *Stations.*

This wild-growing and exuberant variety, which is characterized by the abnormally large size of the individual chamberlets and by the coarse perforation of the thick shell-wall, often masked by a deposit of granular shell-substance, occurs at several Stns., notably Stns. 3, 10, 11, 12, and ? X. None of the specimens is perfect, all representing fragments of a much larger organism which has in nearly all cases been attached to some foreign body. In a few instances specimens in the attached state were found. The character of our material, which represented only the finer siftings of Dr. Simpson's dredgings, is doubtless responsible for the absence of perfect individuals, but judging from the fragments, many of which are $\frac{1}{6}$ inch and upward in diameter, the perfect colonies must have attained very large dimensions. As previously noted, we see no reason for separating these specimens from the normal *G. inhærens* except for facility of reference; the mere difference in the size of the chambers can have no biological significance, beyond marking exuberance of growth under optimum conditions of development.

432. **Gypsina rubra** (d'Orbigny). (Pl. LIII. figs. 35–37.)

Planorbulina rubra d'Orbigny, 1826, TMC. p. 280. no. 4.
„ „ Fornasini, 1908, SON. p. 44, pl. ii. fig. 3.

3 *Stations.*

D'Orbigny recorded this as a *nomen nudum* from specimens from the South Seas and Sarawak. We have examined his type-specimens in Paris, and they accord in all respects with the Kerimba specimens. Fornasini, working only on Berthelin's outline, thought that d'Orbigny's form was probably identical with *Planorbulina mediterranensis* d'Orb., but, of course, was not aware of the distinctive coloration and the strong secondary growth exhibited by the actual specimens.

At Stns. 9, 10, and 11 a few specimens exhibiting a very marked characteristic red coloration. At the latter Stn., where the best specimens were observed, young individuals were found resembling a coarsely perforate and somewhat irregular *Truncatulina lobatula*. This early stage is followed by a growth of chambers which may be either flattened and spreading, or solid and self-investing. In all cases the colour is throughout of a pale rose-pink, lightest in the last-formed chambers. The surface of the chambers is coarsely perforate and often obscured by a deposit of

secondary shell-substance in the form of beads, as in var. *plana*, but the pink colour, which is permanent, is a definite and discriminating feature. Chapman (C. 1900, FLF. p. 201), in dealing with *Polytrema plana* from Funafuti, records that the specimens are often discoloured or yellowish, but never pink or rose-coloured. On the other hand, in recording *Gypsina inhærens* from the Cocos Keeling Atoll, he points out that "the specimens are remarkable for their deep rose colour" (*vide ante*, no. 430).

M. Schultze (S. 1854, OP. p. 68, pl. vi. fig. 12) refers to *Gypsina* (*Acervulina*) *inhærens* as being brownish, owing to the colour of the living protoplasm. He also figures and describes a species, *Acervulina acinosa*, from the Philippine Islands, which may be related to our variety, but differs from it in the shape of the chambers, which are described as being globular and arranged like a bunch of grapes, red-brown in colour. Schultze's species also differs from our var. *rubra* in the surface of the chambers, which are represented as being smooth.

We have found specimens resembling our Kerimba types in shore-sands from Fremantle (W. Australia). It is probably widely distributed in shallow water across the Indo-Pacific region, as we have other fine specimens from Lord Howe Island (S. Pacific) in material recently sent us by Mr. R. D. Laurie. But by far the finest specimens of this form which we have hitherto seen are on two slides in the Brady Collection at Cambridge labelled *Planorbulina rubicunda* Brady. These are from Samoa (1885), Apia Beach and the Lufi-lufi reef respectively, the first being the finest. It consists of fragments of coral rock encrusted with a dense growth of the organism in all stages of development, from the small regular truncatuline shell to large masses $\frac{1}{3}$ inch in diameter. The surface of some of the chambers in the larger growths is covered with secondary shell-matter in the form of strong projecting spines; the colour is in various shades of pink, approaching to red in some of the specimens. Brady, although he recognized this distinctive form and gave it a name, never published a description of it. We have not adopted his suggested specific name, as d'Orbigny's has priority. Brady, no doubt, adopted his somewhat cumbrous specific name because he was aware that d'Orbigny had already utilized the name *rubra* for a *Planorbulina* which, in the absence of an examination of the type, was a *nomen nudum* to him. Reference to the type in Paris has proved that Brady's specimens were identical with d'Orbigny's.

433. **Gypsina vesicularis** (Parker & Jones).

Orbitolina vesicularis Parker & Jones, 1859, etc., NF. 1860, p. 31. no. 5.
Tinoporus lævis Brady, 1864, RFS. p. 470, pl. xlviii. fig. 17.
Gypsina vesicularis Carter, 1877, CB. p. 173.
" " Brady, 1884, FC. p. 718, pl. ci. figs. 9–12.
" " Egger, 1893, FG. p. 382, pl. xiv. figs. 20–23.
" " Chapman, 1900, FLF. p. 198, pl. xix. fig. 12.
" " Chapman, 1907, RFV. p. 140.
" " Heron-Allen & Earland, 1913, CI. p. 140, pl. xiii. fig. 11.

9 *Stations.*

Never very abundant, though occurring at most of the Stns. One exceptionally arge specimen at Stn. 12 and many good normal individuals at Stns. 9, 10, and 11. The comparative rarity of this form, generally so abundant in tropical waters, is noteworthy.

434. **Gypsina vesicularis,** var. **squamiformis** Chapman.

Gypsina vesicularis, var. *squamiformis* Chapman, 1900, FLF. p. 200, pl. xix. fig. 15.

4 *Stations.*

A few individuals, none of them quite in agreement with Chapman's diagnosis, which says that the shell consists of a single layer of chambers. In the Kerimba specimens the central portion of the test always shows a few additional chambers of an equally depressed and scale-like character superimposed on the initial chambers. Such specimens form a connecting-link between Chapman's variety and the planorbuline form of *G. inhærens* so abundant in the material. The variety is in our opinion much nearer to *G. inhærens* than to *G. vesicularis.*

435. **Gypsina vesicularis,** var. **monticulus** Chapman.

Gypsina vesicularis, var. *monticulus* Chapman, 1900, FLF. p. 200, pl. xix. fig. 14.

2 *Stations.*

One typical specimen at Stn. 9 and a weaker individual at Stn. 11. We have nothing to add to Chapman's note on this variety.

436. **Gypsina vesicularis,** var. **discus** Goës.

Tinoporus vesicularis (Parker & Jones), Goës, 1882, RRCS. p. 104, pl. vii. figs. 245–247.
Gypsina vesicularis, var. *discus* Goës, 1896, DOA. p. 74, pl. vii. figs. 4–6.
„ „ „ „ Chapman, 1900, FLF, p. 199, pl. xix. fig. 13.

2 *Stations.*

A few specimens at Stns. 3 and 11. The external surface in this species is very obscure, the chambers being small and the sutural lines thin, flush with the surface of the shell, and hardly visible. The sections shown by Goës represent a shell in which the median layer of chambers is markedly differentiated from the mass of later acervuline chambers, which are superimposed on both faces of the test, thus indicating, as the author points out, an affinity with the orbitoidal type of structure.

437. **Gypsina globulus** (Reuss).

Ceriopora globulus Reuss, 1847, Haidinger's Naturw. Abh. vol. ii. p. 33, pl. v. fig. 7.
Tinoporus baculatus, var. *sphæroidalis* Carter, 1877, CB. p. 215, pl. xiii. figs. 18, 20.
Gypsina globulus Brady, 1884, FC. p. 717, pl. ci. fig. 8.
„ „ Chapman, 1895, FAS. p. 44.
„ „ Chapman, 1900, FLF. p. 198.
„ „ Heron-Allen & Earland, 1913, CI. p. 140, pl. xiii. fig. 10.

8 *Stations.*

Rather sparingly distributed and never abundant, but large and excellent specimens were found at Stns. 9 and 11, good ones at Stns. 3 and 6, and a few small but quite typical individuals at Stn. 1. The species must not be confounded with Schultze's *Acervulina globosa* (S. 1854, OP. p. 68, pl. vi. figs. 13, 14).

Polytrema Risso.

438. **Polytrema miniaceum** (Linné).

Millepora miniacea Linné, 1788, SN. p. 3784. no. 6.
„ „ Defrance, 1824, Dict. Sci. Nat. vol. xxxi. p. 82.
„ „ Blainville, 1834, Manuel d'Actinologie, p. 410.
Polytrema miniacea Carpenter, Parker, & Jones, 1862, IF. p. 235, pl. xiii. figs. 18–20.
„ *miniaceum* Carter, 1876, P. p. 185, pl. xiii. figs. 1–6.
„ „ Möbius, 1880, FM. p. 85, pl. vii.
„ „ Brady, 1884, FC. p. 721, pl. c. figs. 5–9, pl. ci. fig. 1.
„ „ Chapman, 1899, FFA. p. 16, pl. iv. fig. 7 (References).
„ „ Dakin, 1906, FC. p. 240, fig. 12.

9 *Stations.*

Fairly generally distributed, and probably abundant upon coarse material in the area, but, as very little such was available for examination, the records are few. Among the finer material, however, several specimens were found in the early free stage described by Schlumberger (S. 1892, FAM. p. 210, fig. 5) and by Lister (L. 1903, F. p. 121). No specimens were found of the white or colourless variety described by Carter (C. 1877, CB. p. 213, pl. xiii. fig. 14) and found at the Cocos Keeling Atoll by Chapman (C. 1902, CKA. p. 232), excepting at Stn. 11. *P. miniaceum* is also recorded from the Gulf of Manaar by Carter (C. 1880, etc., SGM. 1880, p. 440). See also M. Schultze's "Ueber *Polytrema miniaceum*" (in Wiegmann's Archiv für Naturg. 1863, vol. i. pp. 81–102), in which, following de Blainville (*ut supra*), he identifies *P. corallina* of J. A. Risso (Hist. nat. des principales productions de l'Europe méridionale, Paris, 1826, vol. v. p. 340) with the species.

438 *a*. **Polytrema miniaceum,** var. **alba** Carter.

Polytrema miniaceum, var. *album* Carter, 1877, CB. p. 213, pl. xiii. figs. 14, 15.
„ „ „ *alba* Brady, 1884, FC. p. 721, pl. ci. figs. 2, 3.
„ „ „ „ Chapman, 1900, FLF. p. 201.
„ „ „ „ Chapman, 1901, FFA. p. 393. no. 11.

1 *Station.*

A few broken specimens at Stn. 11, and a young free rotaline individual.

Homotrema Hickson.

439. **Homotrema rubrum** (Lamarck).

Millepora rubra Lamarck, 1816, etc., ASV. vol. ii. p. 202.
Polytrema rubra Dujardin, 1841, HNZ. p. 259.
„ „ Carpenter, Parker, & Jones, 1862, IF. p. 235, pl. xiii. figs. 18–20.
Homotrema rubrum Hickson, 1911, P. pp. 445, 454, pl. xxx. fig. 2, pl. xxxi. fig. 9, pl. xxxii. figs. 19, 22, 28.

5 *Stations.*

Recognizable specimens were obtained, the best at Stn. 11. At Stn. ? X fragments of the terminal portion were observed with an investing crown of spicules. The species is probably universally distributed over the area, but, owing to the lack of suitable coarse material, the records are few. At Stn. 11 a single large colourless specimen was seen. Hickson in his paper (*supra*) remarks on the fact that the red colour in *Polytrema* and *Homotrema* is remarkably constant, but that he had met with many white specimens from various localities which he thought were in all cases dead, the whiteness being due to post-mortem discoloration. In the Kerimba specimens the shell is in a remarkably good state of superficial preservation, and it is difficult to understand that the colour can have disappeared after death in view of the fact that other specimens evidently long dead, and partially decomposed, have preserved their vivid red tint.

At Stn. 11 a few young individuals were found in a free condition, varying in colour from deep ruby-red to very pale pink. We have submitted these to Prof. Hickson, who has no hesitation in accepting the reference of the deep-coloured individuals to *Homotrema*, and is inclined to the opinion that the pale ones are similarly attributable. His diagnosis is confirmed by the measurements of the foramina.

Sporadotrema Hickson.

440. **Sporadotrema cylindricum** (Carter).

Polytrema cylindricum Carter, 1880, etc., SGM. 1880, p. 441, pl. xviii. fig. 1.
„ „ Brady, 1884, FC. p. 720.
Sporadotrema cylindricum Hickson, 1911, P. p. 447, pl. xxx. figs. 3–7, pl. xxxi. figs. 10–17, pl. xxxii. figs. 20, 21, 24, 29, 32, 33.

2 *Stations.*

A few large but undoubted fragments, orange-red in colour, at Stns. 9 and 11. The paucity of suitable material probably accounts for the isolated occurrence of these forms.

Family NUMMULINIDÆ.

Subfamily POLYSTOMELLINÆ.

NONIONINA d'Orbigny.

441. **Nonionina depressula** (Walker & Jacob).

Nautilus depressulus Walker & Jacob. 1798, AEM. p. 641, pl. xiv. fig. 33.
Nonionina granosa d'Orbigny, 1846, FFV. p. 110, pl. v. figs. 19, 20.
„ *depressula* Brady, 1884, FC. p. 725, pl. cix. figs. 6, 7 (References).
„ „ Egger, 1893, FG. p. 427, pl. xix. figs. 38, 39.
„ „ Millett, 1898, etc., FM. 1904, p. 599 (References).
„ „ Cushman, 1910, etc., FNP. 1914, p. 23, pl. xvii. fig. 3.

14 *Stations.*

Generally distributed and usually fairly abundant. Two distinct types occur, one a typical *N. depressula* characterized by fine perforations, the other a variety which may be referred to the *N. granosa* of d'Orbigny, which is characterized by its turgid chambers, coarse perforations, and secondary deposit of shell-substance in the form of beads round the umbilical depression. The two forms occur in company at nearly all Stns. and usually in about equal proportions, but at Stn. 11 typical *N. depressula* only was observed. At Stn. ? A only var. *granosa*. At Stn. ? B typical *N. depressula* was common, and var. *granosa* was rare. The best specimens of both forms were observed at Stn. 4.

442. **Nonionina asterizans** (Fichtel & Moll).

Nautilus asterizans Fichtel & Moll, 1798, TM. p. 37, pl. iii. figs. *e–h*.
Nonionina asterizans Parker & Jones, 1859, etc., NF. 1860, p. 101. no. 1.
Polystomella crispa, var. (*Nonionina*) *asterizans* Parker & Jones, 1865, NAAF. p. 403, pl. xiv. fig. 35, pl. xvii. fig. 54.
Nonionina asterizans Brady, 1884, FC. p. 728, pl. cix. figs. 1, 2.
„ „ Heron-Allen & Earland, 1913, CI. p. 143, pl. xiii. figs. 12, 13.

11 *Stations.*

Generally distributed, but never abundant, the specimens usually small and weakly developed, the best and largest being at Stn. ? X. We have discussed this somewhat unsatisfactory type at some length in our Clare Island Monograph (*ut supra*), and quite agree with Brady's remarks on the species in the Synopsis (B. 1887, SBRF. p. 924).

443. **Nonionina umbilicatula** (Montagu).

Nautilus umbilicatulus Montagu, 1803, TB. p. 191 ; Suppl. p. 78, pl. xviii. fig. 1.
Nonionina umbilicata Terquem, 1882, FEP. p. 42, pl. ii. (x.) fig. 7.
„ *umbilicatula* Brady, 1884, FC. p. 726, pl. cix. figs. 8, 9.
„ „ Egger, 1893, FG. p. 426, pl. xix. figs. 36, 37.
„ „ Millett, 1898, etc., FM. 1904, p. 600 (References).
„ „ Chapman, 1900, FLF. p. 202.

2 *Stations.*

Two typical specimens at Station 11, and one weak but recognizable individual at Station 3. The rarity of this form is noticeable as the records of its distribution are cosmopolitan; it is, however, in our experience, much more abundant in high latitudes than in tropical gatherings.

444. **Nonionina turgida** (Williamson).

Rotalina turgida Williamson, 1858, RFGB. p. 50, pl. iv. figs. 95–97.
Nonionina turgida Brady, 1884, FC. p. 731, pl. cix. figs. 17–19.
„ „ Egger, 1893, FG. p. 425, pl. xix. figs. 45, 46.
„ „ Millett, 1898, etc., FM. 1904, p. 602.
„ „ Heron-Allen & Earland, 1913, CI. p. 145.

1 *Station.*

Occurs at Stn. 1 only, moderately frequent and well developed.

445. **Nonionina scapha** (Fichtel & Moll).

Nautilus scapha Fichtel & Moll, 1798, TM. p. 105, pl. xix. figs. *d–f.*
Nonionina scapha Parker & Jones, 1859, etc., NF. 1860, p. 102. no. 4.
„ „ Brady, 1865, RFND. p. 106, pl. xii. fig. 10.
Polystomella crispa, var. (*Nonionina*) *scapha*, Parker & Jones, 1865, NAAF. p. 404, pl. xiv. figs. 37, 38, pl. xvii. figs. 55, 56.
Nonionina scapha Brady, 1884, FC. p. 730, pl. cix. figs. 14, 15, & ? 16.
„ „ Egger, 1893, FG. p. 424, pl. xix. figs. 42, 43.
„ „ Millett, 1898, etc., FM. 1904, p. 601 (References).

17 *Stations.*

Generally distributed and usually fairly abundant. There is as usual a considerable range of variation, but all the forms are of the compressed type, ranging from the highly compressed and complanate *N. grateloupi* d'Orbigny (d'O. 1839, FC. p. 46, pl. vi. figs. 6, 7, *N. gradeloupi*) through the more turgid *N. sloanii* (ibid. p. 46, pl. vi. fig. 18). None of the turgid *N. labradorica* Dawson, type (Canad. Nat. vol. v. 1860, p. 191, fig. 4) were observed. This last variety appears to be confined to cold-water records.

At Stns. 1, 4, and 6 specimens were observed closely approaching *N. boueana*; at Stn. 2 many of the specimens were near the inequilateral *N. turgida*.

446. **Nonionina boueana** d'Orbigny.

Nonionina boueana d'Orbigny, 1846, FFV. p. 108, pl. v. figs. 11, 12.
„ „ Brady, 1884, FC. p. 729, pl. cix. figs. 12, 13.
„ „ Terrigi, 1889, CP. p. 119, pl. x. fig. 5.
„ „ Egger, 1893, FG. p. 426, pl. xix. figs. 34, 35.
„ „ Fornasini, 1900, FA. p. 400, fig. 49.
„ „ Cushman, 1910, etc., FNP. 1914, p. 28, pl. xvi. fig. 1.

11 *Stations.*

Generally distributed, but never in any great abundance, excepting at Stn. 5, where the specimens were numerous and characterized by a somewhat depressed shell in which the umbilical beads usually found in the larger individuals are almost entirely lacking. At most of the Stns. the specimens were of small to medium size and thin-walled, but at Stns. 1, 2 *a*, 7, 10, and 12 some very large individuals were obtained. In most of the large specimens the umbilical portion is more or less obscured by a deposit of secondary shell-matter in beads, the small tests giving no evidence of such growth, which is presumably a characteristic of advanced age.

447. **Nonionina boueana,** var. **armata** Brady.

Nonionina boueana, var. *armata* Brady, 1884, FC. p. 730, pl. cxv. fig. 9.

2 *Stations.*

Single specimens at Stns. 2 *a* and 3. The occurrence of this variety at Kerimba is interesting, inasmuch as the only published record so far as we are aware is that of Brady, "abundant amongst the littoral sand of Madagascar."

448. **Nonionina pauperata** Balkwill & Wright.

Nonionina pauperata Balkwill & Wright, 1885, DIS. p. 353, pl. xiii. figs. 25, 26.
„ „ Heron-Allen & Earland, 1908, etc., SB. 1911, p. 342, pl. xi. figs. 16, 17.
„ „ Heron-Allen & Earland, 1913, CI. p. 144.

2 *Stations.*

One at each Stn. (2 *b* and 11), both small but quite typical.

Polystomella Lamarck.

449. **Polystomella decipiens** Costa.

Polystomella decipiens Costa, 1853, etc., PRN. 1856, p. 220, pl. xix. fig. 13.
„ „ Fornasini, 1897–8, FIC. p. 17, pl. ii. figs. 11, 12.
„ „ Fornasini, 1899, PFI. p. 646.
„ „ Fornasini, 1900, FA. p. 400, text-fig. 50.

2 *Stations.*

Among the specimens of *P. striato-punctata* were many which in their unlobulate periphery and inconspicuous retral processes, faintly indicating the septal lines, are conveniently referable to this somewhat obscure species. Costa's species conveys the impression of a depauperate form of *P. arctica* Parker & Jones, to which it bears a strong superficial resemblance. The most distinctive specimens were found at Stns. 6 and 7.

450. **Polystomella striato-punctata** (Fichtel & Moll).

Nautilus striato-punctatus Fichtel & Moll, 1798, TM. p. 61, pl. ix. figs. *a, b, c.*
Polystomella striato-punctata Parker & Jones, 1859, etc., NF. 1860, p. 103. no. 6.

Polystomella striato-punctata Brady, 1884, FC. p. 733, pl. cix. figs. 22, 23 (References).
„ „ „ Egger, 1893, FG. p. 433, pl. xix. figs. 49, 50.
„ „ „ Millett, 1898, etc., FM. 1904, p. 602 (References).
„ „ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 695.

16 *Stations.*

Universally distributed and often common, and attaining a considerable size. The shell-wall is always thin and delicate. Most of the usual varieties are present, but the majority of the specimens belong to the bilaterally compressed type with few, but distinctly marked, retral processes as illustrated by Schultze under the synonym *P. gibba* (S. 1854, OP. p. 66, pl. vi. figs. 1–4).

451. **Polystomella striato-punctata,** var. **selseyensis** Heron-Allen & Earland.

Polystomella striato-punctata Heron-Allen & Earland, 1908, etc., SB. 1909, p. 695, pl. xxi. fig. 2. Ditto, var. *selseyensis*, ibid. 1911, p. 448 (Catalogue).
„ „ Heron-Allen & Earland, 1913, CI. p. 146.

3 *Stations.*

Two weak specimens at Stn. 5 and others at Stns. 13 and ?A undoubtedly referable to our variety, which bears the same relation to *P. striato-punctata* as *Nonionina granosa* d'Orbigny bears to the typical *N. depressula* (W. & J.) in the coarser perforations and the presence of secondary beaded deposit in the umbilical recess.

452. **Polystomella crispa** (Linné).

Nautilus crispus Linné, 1767, p. 1162. no. 275; 1788, p. 3370. no. 3.
Polystomella crispa Lamarck, 1816, etc., ASV. 1822, vol. vii. p. 625. no. 1 (2nd Edn. 1845, etc. vol. xi. p. 302).
„ „ d'Orbigny, 1846, FFV. p. 125, pl. vi. figs. 9–14.
„ „ Williamson, 1858, RFGB. p. 40, pl. iii. figs. 78–80.
„ „ Möbius, 1880, FM. p. 101, pl. xi. figs. 4–7, & pl. xii.
„ „ Brady, 1884, FC. p. 736, pl. cx. figs. 6, 7 (References).
„ „ Millett, 1898, etc., FM. 1904, p. 603, pl. xi. fig. 2 (References).
„ „ Heron-Allen & Earland, 1913, CI. p. 146, pl. xiii. fig. 14.

10 *Stations.*

Fairly generally distributed, but never abundant. The specimens are, however, as a rule, good and well developed, notably at Stns. 5, 7, and 11. At Stn. 6 an adult individual with calcarate periphery was observed, near *P. aculeata* d'Orbigny (d'O. 1846, FFV. p. 131, pl. vi. figs. 27, 28) and similar to our Clare Island specimens.

453. **Polystomella subnodosa** (Münster).

Robulina subnodosa Münster, *fide* Roemer, 1838, CNTM. p. 391, pl. iii. fig. 61.
Polystomella subnodosa Reuss, 1855, TNMD. p. 240, pl. iv. fig. 51.
„ „ Brady, 1884, FC. p. 734, pl. cx. fig. 1.
„ „ Wright, 1886, SWI. p. 614.

Polystomella subnodosa Goës, 1894, ASF. p. 102, pl. xvii. figs. 817–819.
" " Chapman, 1900, FLF. p. 203.
" " Sidebottom, 1904, etc., RFD. 1909, p. 16, pl. v. fig. 6.
" " Bagg, 1912, FPC. p. 92, pl. xxviii. fig. 12.

14 *Stations.*

Generally distributed, often fairly abundant. The only marked variation observed is in the extent of development of the secondary umbilical shell-substance, which is much more prominently developed in some individuals than in others.

454. **Polystomella macella** (Fichtel & Moll).

Nautilus macellus Fichtel & Moll, 1798, TM. p. 66, pl. x. figs. *e–g*.
Polystomella macella Parker & Jones, 1859, etc., NF. 1860, p. 104. no. 8.
" " Brady, 1884, FC. p. 737, pl. cx. figs. 8, 9, 11, & ? 10.
" " Egger, 1893, FG. p. 432, pl. xx. figs. 22, 23.
" " Chapman, 1907, RFV. p. 142, pl. x. fig. 9 (var. *limbata*).
" " Heron-Allen & Earland, 1908, etc., SB. 1909, p. 696, pl. xxi. fig. 3.

17 *Stations.*

Universally distributed and usually abundant, often well developed, but never attaining the large size of the specimens found in many Australian shore-sands.

Fichtel and Moll's original figure and description represent a shell in which the sutural lines are depressed or excavate. Chapman has created a variety "*limbata*" in which the sutural lines are limbate, and the shell-surface near the sutural areas and in the umbilical region is covered with an exogenous shell-growth in the form of small papillæ or granulations. It is questionable whether this variation does not exist wherever *P. macella* occurs. No effort was made by us to discriminate when selecting the Kerimba specimens, but an examination of the type-slides reveals the presence of both forms wherever the species occurs, except at two Stns., where only a single specimen was picked out. This would seem to point to the fact that the two forms are normally concomitant.

455. **Polystomella craticulata** (Fichtel & Moll).

Nautilus craticulatus Fichtel & Moll, 1798, TM. p. 51, pl. v. figs. *h, i, k.*
Polystomella craticulata d'Orbigny, 1826, TMC. p. 284. no. 3.
" " Carpenter, Parker, & Jones, 1862, IF. p. 279, pl. xvi. figs. 1, 2.
Helicozoa craticulata Möbius, 1880, FM. p. 103.
Polystomella craticulata Brady, 1884, FC. p. 739, pl. cx. figs. 16, 17.
" " Egger, 1893, FG. p. 433, pl. xx. figs. 24, 25.

14 *Stations.*

Generally distributed and often common, but does not attain any very large size except at Stns. 3, 5, 6, and 9. At Stns. 8 and 10 the specimens were all very small.

456. **Polystomella verriculata** Brady.

Polystomella verriculata Brady, 1879, etc., RRC. 1881, p. 66.
„ „ Brady, 1884, FC. p. 738, pl. cx. fig. 12.
„ „ Chapman, 1907, RFV. p. 142, pl. x. fig. 10.
„ „ Sidebottom, 1904, etc., RFD. 1909, p. 15, pl. v. fig. 3.

2 *Stations.*

Brady's species is represented in these dredgings by two typical specimens only, one each at Stns. 8 and 10, characterized by the thin compressed shell with practically parallel faces, the surfaces of which are covered by a network of ridges interlacing between the limbate sutures. The peripheral edge is acute and entire. At Stn. 9 some specimens were found presenting characters intermediate between Brady's type and the type figured by Millett under Brady's specific name.

Millett's figure is, in our opinion, sufficiently distinct to be separated as a new species, for which we propose the name *P. milletti.* None of the clearly allied varieties described by E. J. Goddard from sand dredged 22 miles east of Sydney (80 fms.) (Rec. Austral. Mus. vol. vi. 1906–7, p. 306) and by H. I. Jensen under the name *P. hedleyi* (Proc. Linn. Soc. N.S.W. vol. xxix. 1905, p. 828, pl. xxiii. fig. 4; and vol. xxxii. 1907, p. 291), which would appear to connect *P. verriculata* and *P. milletti*, being decorated with "septal bridges very irregularly developed," were found at Kerimba.

457. **Polystomella milletti,** sp. n. (Pl. LIII. figs. 38–42.)

? *Polystomella verriculata* Millett, 1898, etc., FM. 1904, p. 604, pl. xi. fig. 3.

15 *Stations.*

Test free, consisting of two to three convolutions, the last consisting of ten to twelve chambers, somewhat inflated, sutural lines depressed, no retral processes visible. Periphery more or less lobate. Excavated in the umbilical region, which is filled up with a deposit of secondary shell-matter in the form of fine beads. This deposit obscures the segmentation of the early convolutions and renders them difficult to follow even in a balsam mount. The beaded structure extends from the umbilical region into the sutural depressions, but over the surfaces of the chambers the beads coalesce and form short ridges usually arranged in chevrons, with the angle pointing towards the periphery of the shell. On the septal face of the shell the beads are often produced into short sharp spines covering the entire surface of the face and its immediate neighbourhood.

This particularly handsome species is one of the most characteristic of the Kerimba types, occurring at practically every Stn. and often in considerable numbers. It appears to be very closely allied to, if not identical with, the form figured by Millett as *P. verriculata* Brady, although his specimens are described as "reticulate on the

surface," a statement which is borne out by the figure. The general contour of his shell with its inflated chambers and lobate periphery is, however, identical with the Kerimba form, and although the delicate costæ in the Kerimba specimens seldom coalesce so as to form a definite network, instances occur in which such is actually the case.

Breadth 0·3 to 0·5 mm.; thickness, variable, 0·1 to 0·2 mm.

Subfamily NUMMULITINÆ.

AMPHISTEGINA d'Orbigny.

458. **Amphistegina lessonii** d'Orbigny.

Amphistegina lessonii d'Orbigny, 1826, TMC. p. 304. no. 3, pl. xvii. figs. 1–4, Modèle no. 98.
„ *vulgaris* d'Orbigny, 1826, TMC. p. 305. no. 8, Modèle no. 40.
„ *lessonii* Möbius, 1880, FM. p. 99, pl. x. figs. 10–14, pl. xi. figs. 1–3.
„ „ Brady, 1884, FC. p. 740, pl. cxi. figs. 1–7.
„ „ Fornasini, 1903, AO. p. 142, pl. ii. fig. 1.
„ „ Chapman, 1900, FLF. p. 204.
„ „ Millett, 1898, etc., FM. 1904, p. 605 (References).
„ „ Dakin, 1906, FC. p. 240, pl. —. fig. 13.

15 *Stations.*

Occurs at nearly all Stns., very common at some, but nowhere in any of the thin evolute varieties. The most widely distributed variety is the large equally biconvex form (=*Amphistegina lessonii* d'Orb.), reaching its best development at Stns. 9 and 11. The plano-convex type (=*Amphistegina trilobata* d'Orb.) occurs in company with this in most of the dredgings (see F. 1903, AO. p. 143, pl. ii. fig. 3).

At a few Stns. biconvex specimens without the distinctive beaded markings round the aperture occur. These, which are otheriwse inseparable from the typical *A. lessonii*, are probably the *A. madagascariensis* of d'Orbigny, recorded by him from the adjacent island of Madagascar (*loc. cit.* p. 144, pl. ii. fig. 4).

459. **Amphistegina lessonii,** var. **radiata** (Fichtel & Moll).

Nautilus radiatus Fichtel & Moll, 1798, TM. p. 58, pl. viii. figs. *a–d.*
„ „ (*Nummulina*) Parker & Jones, 1859, etc., NF. 1860, pp. 105, 106.
Amphistegina radiata Chapman, 1895, FAS. pp. 45–47, pl. i. figs. 8–10, 12.

3 *Stations.*

Some specimens of the large and many-chambered biconvex form, separated by Chapman as referable to Fichtel and Moll's species, accompanied the type at three Stns. They are specially noticeable owing to their smooth surface and the transparent lines in the shell-substance, marking the sutural divisions.

459 *a*. **Amphistegina lessonii,** var. **gibba** d'Orbigny.

Amphistegina gibba d'Orbigny, 1826, TMC. p. 304. no. 6.
„ *mamillata* d'Orbigny, 1846, FFV. p. 208, pl. xii. figs. 6–8.
„ *gibba* Fornasini, 1903, AO. p. 144, pl. ii. fig. 4.

1 *Station.*

Several specimens of this plano-convex, or even concavo-convex (or "meniscoid"), form were found at Stn. 11, which is the best Stn. for *Amphistegina* in all its forms. This and *A. madagascariensis* (q. v. sub *A. lessonii*) are the only ones of the "eight so-called species" of Fornasini's note which it seems desirable for taxonomical reasons to admit. It comes under the forms described by Brady as "still more inequilateral, sometimes dome-shaped" (B. 1884, FC. p. 741, pl. cxi. fig. 7). Our specimens are as pronounced as those figured (*ut supra*) by d'Orbigny in 1846 as *A. mamillata*, and are identical with the type-specimens of *A. gibba* which we have examined in Paris.

Operculina d'Orbigny.

460. **Operculina ammonoides** (Gronovius).

Nautilus ammonoides Gronovius, 1781, ZG. p. 282. no. 1220, pl. xix. (Fasc. iii. Tab. 2) figs. 5, 6.
Operculina ammonoides Carpenter, Parker, & Jones, 1862, IF. App. p. 310.
„ „ Brady, 1884, FC. p. 745, pl. cxii. figs. 1, 2.
„ „ Egger, 1893, FG. p. 434, pl. xx. figs. 38, 39.
„ „ Heron-Allen & Earland, 1913, CI. p. 147.
„ „ Cushman, 1910, etc., NP. 1914, p. 37, pl. xiv. fig. 7.

2 *Stations.*

Extremely rare; one large and typical specimen at Stn. 11 and two smaller ones at Stn. ?B. This species, so abundant in northern waters, appears to become very rare in the tropics. Egger's records from tropical localities depend in all cases on a single specimen or so. Brady gives several localities in or near the tropics, but does not mention the frequency of its occurrence. It is not uncommon in some dredgings we have from off Cebu (Philippine Islands), but the specimens are all very small compared with our British records.

461. **Operculina complanata** (Defrance).

Lenticulites complanata Defrance, 1822, Dict. Sci. Nat. vol. xxv. p. 453.
Operculina complanata d'Orbigny, 1826, TMC. p. 281. no. 1, pl. iv. figs. 7–10, Modèle no. 80.
„ „ Möbius, 1880, FM. p. 104.
„ „ Brady, 1884, FC. p. 743, pl. cxii. figs. 3–5, 8.
„ „ Egger, 1893, FG. p. 435, pl. xx. figs. 40–42.
„ „ Millett, 1898, etc., FM. 1904, p. 605 (References).
„ „ Heron-Allen & Earland, 1908, etc., SB. 1909, p. 696, pl. xxi. fig. 4.

11 *Stations.*

Generally distributed, but never abundant except at Stn. 1, and entirely absent at some Stns. The specimens at each Stn., though often limited in number, generally present the two typical varieties, viz. the compressed and the lenticular forms, and both smooth and granulose. Perhaps the commoner and most widely distributed form is a small megalospheric and compressed variety usually with a subgranulose exterior. At Stn. 1 the species was found in varieties ranging from small thin complanate smooth tests to large lenticular forms, both smooth and highly granulose. At Stn. 2 all the specimens were of small to medium size, and all complanate. At Stn. 3 the large forms were all of the lenticular type and smooth, the thin type smaller and granulose. At Stn. 4 all the specimens were small and compressed. At Stn. 6 both compressed and lenticular, but only the compressed were granulose. At Stn. 9 the specimens were large, and both compressed and lenticular, granulose and smooth. The same variations are to be found throughout the gatherings.

462. **Operculina granulosa** Leymerie.

Operculina granulosa Leymerie, 1846, NC. p. 359, pl. xiii. fig. 12.
„ *complanata*, var. *granulosa* Brady, 1884, FC. p. 743, pl. cxii. figs. 6, 7, 9, 10.
„ *granulosa* Egger, 1893, FG. p. 435, pl. xx. figs. 36, 37, 43.
„ „ Chapman, 1895, FAS. p. 48.
„ *complanata*, var. *granulosa* Millett, 1898, etc., FM. 1904, p. 606.

3 *Stations.*

We have dealt with the specimens referable to this species under *O. complanata*.

Heterostegina d'Orbigny.

463. **Heterostegina depressa** d'Orbigny.

Heterostegina depressa d'Orbigny, 1826, TMC. p. 305, pl. xvii. figs. 5–7, Modèle no. 99.
„ *antillarum* d'Orbigny, 1839, FC. p. 122, pl. vii. figs. 24, 25.
„ *depressa* Brady, 1884, FC. p. 746, pl. cxii. figs. 14–20.
„ „ Egger, 1893, p. 433, pl. xx. figs. 34, 35.
„ „ Chapman, 1899, FFA. p. 18, pl. iii. figs. 6, 7
„ „ Chapman, 1900, FLF. p. 205.
„ „ Lister, 1903, F. p. 128, fig. 56.
„ „ Dakin, 1906, FC. p. 241, pl. —. fig. 14.

4 *Stations.*

Occurs only at Stns. 2 *a*, 4, 6, and 11. At Stn. 4 only minute specimens were seen; at Stn. 11 it was moderately frequent and well developed in the coarse siftings, many of the larger specimens being coloured green owing to the presence of symbiotic algæ in the protoplasmic body. The comparative rarity of this typical tropical shallow-water form in the Kerimba material is noteworthy.

NUMMULITES Lamarck.

464. **Nummulites cumingii** Carpenter.

Amphistegina cumingii Carpenter, 1856, etc., RF. 1859, p. 32, pl. v. figs. 13–17.
Nummulina radiata Carpenter, Parker, & Jones, 1862, IF. p. 275.
Nummulites cumingii Brady, 1884, FC. p. 749, fig. 22, pl. cxii. figs. 11–13.
Amphistegina cumingii Millett, 1898, etc., FM. 1904, p. 605.
Nummulites cumingii Bagg, 1908, FHI. p. 166.
,, ,, Cushman, 1910, etc., FNP. 1914, p. 39, pl. xiv. fig. 6.

3 *Stations.*

Extremely rare, one large typical specimen at Stn. 1 and a smaller at Stn. 6—a few doubtful (worn) specimens at Stn. ? A.

(Total, 477 species and varieties.)

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[*over*]

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		Family MILIOLIDÆ.																	
		Subfamily NUBECULARIINÆ.																	
		NUBECULARIA Defrance.																	
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2.	548	„ *depressa* Chapman	...	VR	...	...	...	...	...	...	...	VR	...	VR	...	...	...	...	...
3.	548	„ *tubulosa*, sp. n.	...	...	...	...	...	...	...	...	...	...	...	...	VR	...	F	...	1
4.	549	„ *lucifuga* Defrance	F	R	...	R	1	...	...	VR	VR	VR	R	R	R	VR	C	...	...
5.	549	„ „ var. *decorata*, nov.	...	...	...	...	...	...	...	...	...	VR	...	...	VR	...	R	...	...
6.	550	„ *divaricata* Brady	VR	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	..	...
7.	550	„ *bradyi* Millett	F	C	F	C	VC	1	C	VR	F	C	VR	R	R	...	R	×	R
		Subfamily MILIOLININÆ.																	
		BILOCULINA d'Orbigny.																	
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9.	551	„ „ var. *denticulata* Br.	...	1	...	VR	...	...	F	...	...	VR	...	F	R	...	VR	...	R
10.	551	„ „ var. *striolata* Br.	...	...	...	VR	...	...	...	...	...	...	...	VR	...	...	...	...	...
11.	551	„ *bulloides* d'Orbigny	VR	...	...	...	...	...	...	...	VR	...	...	...	...	...	...	...	...
12.	552	„ *elongata* d'O.	...	...	...	...	...	...	...	1	...	...	...	1	1	...	...	...	...
		SPIROLOCULINA d'Orbigny.																	
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15.	553	„ *foveolata* Egger	1	1	1	...	...	R	...	...	...	R	...	R	...	...	...	...	1
16.	553	„ *limbata* d'O.	C	F	...	VC	F	F	F	R	...	C	F	F	F	R	...	×	...
17.	554	„ *excavata* d'O.	C	VR	VR	VC	F	...	F	F	1	C	F	F	C	VR	R	×	F
18.	554	„ *impressa* Terq.	R	...	...	...	1	...	R	R	...	...	...	F	...	...	...	...	...
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20.	555	„ *planulata* (Lam.)	F	VR	...	VC	F	C	F	C	...	F	...	F	C	...	R	...	F
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22.	556	„ *tenuis* (Czjzek)	...	...	VR	VR	...	...	...	...	...	...	...	...	...	...	1	×	VR
22 *a*.	557	„ *acutimargo* Br.	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
23.	557	„ *crenata* Karrer	VR	F	...	VR	VR	...	F	...	1	...	...	VR	VR	...	...	×	...
		MILIOLINA Williamson.																	
24.	557	*Miliolina circularis* (Bornemann)	C	C	C	VC	F	C	F	C	C	...	R	C	VC	F	C	×	F
25.	558	„ „ var. *sublineata* Br.	...	...	F	F	F	F	F	VC	F	...	R	...	C	F	...	...	...
26.	558	„ „ var. *cribrostoma*, nov.	...	...	...	...	...	...	R	...	...	...	F	...	...	...	R	×	...
27.	559	„ *valvularis* (Rss.)	...	...	...	C	...	...	...	...	...	...	...	C	...	...	C	...	R
28.	559	„ *dilatata* (d'O.)	...	...	F	...	...	...	...	...	VR	...	...	...	...	...	C	...	...

29.	559	„	*labiosa* (d'O.)	...	1	VR	...	R	...	C	...	C	F	1	F	VC	...	VC	×	VR
30.	559	„	*subrotunda* (Montagu)	...	C	C	VC	F	C	F	C	VR	C	1	R	F	F	C	×	R
31.	560	„	*seminuda* (Rss.)	...	VR	...	VR	...	...	...	F	...	F	R	...	F	...	...	×	...
32.	560	„	*webbiana* (d'O.)	F	1	...	R	R	...	...	...	...	...	VR	F	...	...	F	×	...
33.	560	„	*fichteliana* (d'O.)	...	...	...	...	...	...	...	...	...	...	...	...	...	C	C	×	R
34.	560	„	*suborbicularis* (d'O.)	VR	...	...	...	VR	...	...	...	...	...	...	R	...	...	F	...	...
35.	561	„	*trigonula* (Lam.)	VC	VC	F	VC	VVC	VVC	VC	VC	VC	VC	C	VC	VC	F	VC	×	VC
36.	562	„	*insignis* Br.	1	VR	...	...	1	...	...	...	...	...	...	R	...	...	...	...	...
37.	562	„	*tricarinata* (d'O.)	R	R	VR	...	VC	C	F	VC	R	VC	F	C	VC	C	VC	×	...
38.	562	„	„ var. *plicata* (Terq.)	VC	VC	1	...	VVC	VC	VC	...	F	F	F	...	F	R	...	×	R
39.	563	„	„ var. *serrata*, nov.	...	...	...	...	...	...	...	VR	...	...	...	...	...	...	VR	...	...
40.	563	„	*terquemiana* Br.	F	...	...	...	...	...	...	VR	...	...	VR	R	VR	...	...	...	...
41.	563	„	*bertheliniana* Br.	...	...	F	...	1	...	1	...	VR	...	VR	VC	VR	VR	...	...	VR
42.	564	„	*cultrata* Br.	F	VC	R	C	F	C	F	VC	C	F	F	...	F	VR	C	×	F
43.	565	„	*durrandii* Mill.	C	VR	...	VR	VR	C	R	F	...	R	...	...	VR	...	...	...	...
44.	565	„	*rupertiana* Br.	C	F	...	C	VR	F	F	...	...	VR	...	R	...	...	...	×	VR
45.	566	„	*bosciana* (d'O.)	R	R	F	...	...	C	F	F	F	...	...	F	...	...	F	...	F
46.	566	„	*transversestriata* Br.	F	...	...	C	F	R	F	VR	1	VR	R	...	1	VR	C	...	...
47.	566	„	*funafutiensis* Chap.	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
48.	566	„	*oblonga* (Montagu)	F	F	VR	VC	F	C	VR	F	F	F	F	F	C	...	C	×	F
49.	567	„	*gracilis* (d'O.)	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...	VR
50.	567	„	*pygmæa* (Rss.)	...	...	...	...	VR	...	...	VR	VR	...	R	...	...	...	...	...	VR
51.	567	„	*exsculpta*, sp. n.	...	...	...	...	...	R	VR	...	1	R	...	...	VR	...	VR	...	...
52.	568	„	*rotunda* (d'O.)	R	C	...	VC	R	...	R	R	...	C	...	R	C	VR	C	...	...
53.	568	„	*anconensis* (Schultze)	VR	...	1	...	...	R	...	F	...	R	VR	R	C	...	C	...	C
53 *a*.	569	„	*cuneata* (Karrer)	...	...	...	...	...	...	...	...	...	R	VR	...	...	...	C	...	...
54.	569	„	*vulgaris* (d'O.)	...	...	...	R	...	...	...	F	...	C	...	...	...	...	...	×	C
55.	569	„	*seminulum* (Linné)	C	F	F	R	C	C	R	F	R	F	...	F	F	F	C	×	VR
56.	570	„	„ var. *cornuta* Sidebottom.	...	...	...	...	...	...	...	...	...	F	...	...	...	...	...	...	...
57.	570	„	*candeiana* (d'O.)	...	1	R	...	...	...	...	...	...	...	F	...	...	...	R	...	...
58.	571	„	*auberiana* (d'O.)	F	C	R	C	...	C	C	R	C	...	VR	VC	F	R	C	×	R
59.	571	„	„ var. *stenostoma* (Karr.)	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
60.	571	„	*cuvieriana* (d'O.)	...	F	C	...	...	...	F	VC	...	...	...	R	...	...	R	...	...
60 *a*.	572	„	*crassa* (d'O.)	...	...	...	...	...	...	...	...	...	...	...	F	...	...	...	...	...
61.	572	„	*bicostata* (d'O.)	...	...	VR	...	R	R	...	...	...	...	...	VR	R	...	R	...	...
62.	572	„	*undosa* (Karr.)	R	...	F	VR	R	R	VR	...	...	R	F	F	VR	...	VR	...	F
63.	573	„	*undulata* (d'O.)	VR	...	...	...	VR	R	R	...	...	F	...	...	...	R	...	...	...
64.	573	„	*reticulata* (d'O.)	F	C	...	C	...	F	R	1	...	...	VR	C	R	VR	...	×	...
65.	574	„	*parkeri* Br.	VR	...	F	...	...	...	1	...	...	VR	...	F	...	...	...	...	...
66.	574	„	*kerimbatica*, sp. n.	VC	...	R	VC	F	R	F	...	...	VC	F	VC	F	...	F	×	F
67.	575	„	*anguina* (Terq.), var. *agglutinans* Wiesner MS.	...	...	...	...	F	...	F	VR	1	...	...	...	...	R	...	...	...
68.	575	„	*agglutinans* (d'O.)	F	F	...	C	F	C	C	F	1	C	VR	F	F	C	VR	×	R
69.	576	„	*fusca* Br.	...	...	VR	...	...	...	...	...	F	...	...	...	...	F	R	...	R
70.	576	„	*contorta* (d'O.)	F	R	1	VC	VR	...	F	F	VR	VC	F	VC	C	R	C	×	C
71.	577	„	*sclerotica* (Karr.)	VR	F	1	...	R	F	...	R	...	C	...	...	F	...	F	...	F
72.	577	„	*disparilis* (d'O.)	...	...	...	...	...	R	...	...	...	R	...	...	R	...	...	...	...
73.	577	„	*limbata* (d'O.)	C	F	R	...	R	C	F	VC	R	C	F	F	VR	F	VR	...	...
74.	578	„	*ferussacii* (d'O.)	C	F	F	...	R	F	...	...	R	...	...	R	...	...	R	...	F
75.	578	„	*pulchella* (d'O.)	VR	...	...	C	1	F	R	...	...	R	...	...	F	...	...	...	...
76.	579	„	*linnæana* (d'O.)	C	F	F	R	F	F	F	...	...	VC	VR	R	...	...	...	×	R
77.	579	„	*costata* (d'O.)	F	...	...	VR	R	...	VR	F	...	C	VR	...	...	...	R	...	...
78.	579	„	*striata* (d'O.)	C	C	1	C	F	...	F	...	...	VC	F	C	VC	...	...	××	...
79.	580	„	*bicornis* (Walker & Jacob)	...	...	...	...	...	F	F	...	...	R	VR	R	...	...	VR	×	...
80.	580	„	*brongniartii* (d'O.)	...	...	...	VR	...	...	...	...	...	...	VR	...	...	...	1	...	...
81.	581	„	*boueana* (d'O.)	...	...	...	...	...	...	...	...	...	...	...	C	R	...	...	...	...
82.	581	„	*scrobiculata* Br.	1	R	...	...	...	...	...	...	...	...	...	F	...	...	...	×	...
83.	581	„	*triquetra* Br.	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	...	...
84.	581	„	*alveoliniformis* Br.	R	R	...	...	R	...	VC	...	...	VR	VR	F	...	...	1	...	...

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		Subgenus MASSILINA Schlumberger.																	
85.	582	*Massilina secans* (d'O.)	F	...	...	...	R	C	F	F	...	F	...	...	...	...	...	...	...
86.	582	„ „ var. *tenuistriata* Earland	...	...	...	...	...	...	...	...	...	...	...	F	...	R	F	...	...
87.	582	„ „ var. *reticulata*, nov.	C	F	...	F	F	F	F	1	...	F	VR	...	...	F	...	...	...
88.	583	„ „ var. *rugosa*, nov.	F	...	...	VC	...	...	...	...	...	VC	C	C	VVC	...	...	...	...
89.	583	„ *macilenta* (Br.)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	VR	×	...
90.	584	„ *alveoliniformis* Mill.	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	×	...
		Subgenus SIGMOILINA Schlumberger.																	
91.	584	*Sigmoilina ovata* Sideb.	R	F	F	VR	...	...	VC	...	F	...	R	R	...	...	...	×	...
92.	584	„ *edwardsi* Schlumberger	R	...	F	1	VR	...	R	...	...	...	...	R	...	...	...	...	...
		Subfamily HAUERININÆ.																	
		ARTICULINA d'Orbigny.																	
93.	585	*Articulina sulcata* Rss.	F	...	R	VR	VR	VR	VR	...	...	...	F	R	VR	...	...	×	F
94.	585	„ *sayra* d'O.	F	...	R	...	...	1	VR	VR	...	...	...	...	...	...	...	...	F
95.	586	„ *conico-articulata* (Batsch)	C	VC	F	F	F	C	F	C	VR	C	C	VR	C	1	R	×	VR
96.	587	„ *funalis* Br.	VR	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		VERTEBRALINA d'Orbigny.																	
97.	587	*Vertebralina striata* d'O.	F	F	...	C	VR	F	R	VR	VR	R	R	F	F	...	VC	...	C
		HAUERINA d'Orbigny.																	
98.	587	*Hauerina fragilissima* (Br.)	...	R	...	...	...	...	R	...	...	VR	R	1	VR	...	R	×	...
99.	588	„ *compressa* d'O.	F	F	F	VC	C	...	R	R	VR	R	F	VC	C	F	F	...	F
100.	589	„ *circinata* Br.	...	...	...	VR	F	...	...	...	...	R	1	R	...	...	...	...	...
101.	590	„ *ornatissima* (Karr.)	F	R	1	R	VR	...	VR	...	VR	VR	R	VR	VR	...	VR	×	VR
		PLANISPIRINA Seguenza.																	
102.	590	*Planispirina auriculata* Eg.	R	C	VR	R	VR	...	F	VR	...	VR	...	F	VR	...	VR	×	...
103.	590	„ *exigua* Br.	VR	F	...	VR	VR	...	F	...	...	VR	F	...	...	...	...	×	1
104.	591	„ *communis* Seguenza	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		Subfamily FISCHERININÆ.																	
		FISCHERINA Terquem.																	
105.	591	*Fischerina rhodiensis* Terq.	...	...	...	VR	...	...	...	...	...	...	...	VR	...	...	...	...	...
106.	591	„ *pellucida* Mill.	VR	...	1	VR	1	...	1	...	...	...	...	VR	...	...	...	...	...
107.	591	„ *helix*, sp. n.	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...

		Subfamily PENEROPLIDINÆ.																	
		CORNUSPIRA Schultze.																	
108.	592	*Cornuspira foliacea* (Philippi)	...	...	...	VR	...	1	...	...	R	...	VR	...	VR	...	...	...	...
109.	592	„ *selseyensis* Heron-Allen & Earland	...	R	...	...	F	F	R	R	F	VR	VR	...	VR	...	F	×	C
110.	593	„ *involvens* (Rss.)	...	F	VC	VR	F	F	C	F	R	VR	...	...	R	R	F	×	F
111.	593	„ *charoides*, sp. n.	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
		PENEROPLIS Montfort.																	
112.	601	*Peneroplis pertusus* (Forskål)	C	C	F	F	R	1	F	VR	...	F	R	R	VR	VR	R	...	R
113.	601	„ *planatus* (Fichtel & Moll)	C	C	R	VC	F	R	F	VR	VR	F	...	F	VR	...	F	×	R
114.	602	„ *carinatus* d'O.	...	VR	F	C	R	F	R	VR	VR	...	F	VR	...	1	VR	×	R
115.	602	„ *arietinus* (Batsch)	C	C	F	R	C	...	F	VR	VR	F	R	...	R	...	R	×	R
116.	602	„ *cylindraceus* (Lam.)	C	F	1	F	F	R	F	VR	VR	R	R	...	VR	...	VR	×	R
		Subgenus MONALYSIDIUM Chapman.																	
117.	603	*Monalysidium polita* Chap.	C	C	...	F	F	R	F	R	...	R	F	...	VR	...	VR	...	R
		ORBITOLITES Lamarck.																	
118.	604	*Orbitolites marginalis* Lam.	C	F	...	F	F	C	C	VR	R	C	R	VR	F	F	C	×	R
119.	605	„ *duplex* Carpenter	C	C	VC	VC	R	C	F	VR	...	VC	F	C	F	...	F	×	R
120.	606	„ *complanata* Lam.	C	C	...	...	F	...	...	...	...	VVC	R	...	VC	...	R	×	R
		ALVEOLINA d'Orbigny.																	
121.	606	*Alveolina boscii* (Defrance)	VR	...	...	R	...	...	R	...	...	VR	...	...	...	...	...	×	...
122.	607	„ *melo* (F. & M.)	VR	VR	...	VR	R	...	VR	...	1	VR	...	F	1	...	...	×	1
		Family ASTRORHIZIDÆ.																	
		Subfamily ASTRORHIZINÆ.																	
122 *a*.	607	*Astrorhiza limicola* Sandahl (see text)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		IRIDIA, gen. nov.																	
123.	607	*Iridia diaphana*, sp. n.	...	R	C	R	...	...	...	...	...	C	F	...	VR	VR	R	...	R
		Subfamily PILULININÆ.																	
		RHAPHIDOSCENE Vaughan Jennings.																	
124.	608	*Rhaphidoscene conica* Vaughan Jennings	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
		Subfamily SACCAMMININÆ.																	
		PSAMMOSPHÆRA Schulze.																	
125.	609	*Psammosphæra fusca* Schulze	VR	1	...	...	...	...	...	F	...	...	R	...	...	...	...	...	...
		Subfamily RHABDAMMININÆ.																	
		JACULELLA Brady.																	
126.	609	*Jaculella acuta* Br.	VR	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

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		HYPERAMMINA Brady.																	
127.	610	*Hyperammina vagans* Br.	VR	1	...	VR	...	...	...	...	...	1	...	VR	F	...	F	...	...
		ASCHEMONELLA Brady.																	
128.	610	*Aschemonella ramuliformis* Br.	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		RHIZAMMINA Brady.																	
129.	611	*Rhizammina algæformis* Br.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F	...	...
		SAGENINA Chapman.																	
130.	611	*Sagenina frondescens* Br.	...	...	...	...	...	...	...	...	...	...	F	F	F	...	F	...	VR
		HALIPHYSEMA Bowerbank.																	
131.	611	*Haliphysema tumanowiczii* Bowerbank	...	...	...	...	...	...	...	...	...	...	...	...	...	...	VR	...	...
		Family LITUOLIDÆ.																	
		Subfamily LITUOLINÆ.																	
		REOPHAX Montfort.																	
132.	612	*Reophax difflugiformis* Br.	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
		HAPLOPHRAGMIUM Reuss.																	
133.	612	*Haplophragmium agglutinans* (d'O.)	1	...	...	...	...	...	...	...	VR	...	...	...	...	...	...	...	...
134.	613	„ *compressum* Goës	...	...	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...
135.	614	„ *canariense* (d'O.)	VR	1	VR	VR	VR	...	VR	1	...	R	1	F	VR	...	VR	...	...
136.	614	„ *crassimargo* Norman	...	...	...	...	...	...	...	...	VR	...	...	...	...	...	...	...	...
137.	614	„ *globigeriniforme* P. & J.	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
137 *a*.	615	„ *anceps* Br.	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
(465)	615	(NOURIA, gen. nov.)																	
		PLACOPSILINA d'Orbigny.																	
138.	615	*Placopsilina cenomana* d'O.	VR	VR	...	...	...	...	...	...	...	R	...	R	...	...	F	...	...
		CRITHIONINA Goës.																	
139.	616	*Crithionina mamilla* Goës	...	...	...	...	...	...	...	...	...	...	...	...	...	...	VR	...	...

		BDELLOIDINA Carter.																	
140.	616	*Bdelloidina aggregata* Carter	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		HADDONIA Chapman.																	
141.	616	*Haddonia torresiensis* Chap.	...	...	...	...	...	...	...	...	...	R	...	VR	VR	...	...	...	...
		Subfamily TROCHAMMININÆ.																	
		THURAMMINA Brady.																	
142.	617	*Thurammina papillata* Br.	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...
		HIPPOCREPINA Parker.																	
143.	617	*Hippocrepina oviformis*, sp. n.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	VR
		HORMOSINA Brady.																	
144.	617	*Hormosina globulifera* Br.	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
		AMMODISCUS Reuss.																	
145.	618	*Ammodiscus tenuis* Br.	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
146.	618	„ *gordialis* (J. & P.)	VR	...	1	VR	...	R	VR	...	...	R	1	...	1	1	...	...	...
147.	618	„ *charoides* (J. & P.)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
		TROCHAMMINA Parker & Jones.																	
148.	619	*Trochammina squamata* J. & P.	1	VR	VR	F	VR	VR	R	...	...	...	VR	VC	F	VR	C	...	...
149.	619	„ *ochracea* (Williamson)	1	VR	...	...	...	...	...	1	...	...	...	F	...	...	VR	...	VR
150.	619	„ *plicata* (Terq.)	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
151.	620	„ *inflata* (Montagu)	...	...	...	...	...	VR	...	...	...	...	...	F	...	VR	VR	...	...
151 *a*.	620	„ *nitida* Br.	...	...	...	...	...	...	...	...	...	...	...	R	...	...	...	...	...
152.	620	„ *rotaliformis* Wright	...	C	1	...	VR	...	F	...	...	VR	R	VR	F	...	C	...	R
		CARTERINA Brady.																	
153.	620	*Carterina spiculotesta* (Carter)	1	1	...	VR	...	...	...	...	...	...	...	VR	VR	...	...	...	1
		Family TEXTULARIIDÆ.																	
		Subfamily TEXTULARIINÆ.																	
		TEXTULARIA Defrance.																	
154.	623	*Textularia folium* P. & J.	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
155.	623	„ *fusiformis* Chaster	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
156.	623	„ *inconspicua* Br.	C	...	...	R	VR	...	VR	VR	VR	VR	F	R	R	...	R	...	R
157.	624	„ „ var. *jugosa* Br.	F	R	...	...	VR	...	...	...	...	...	...	VR	R	...	R	...	...
158.	624	„ *rhomboidalis* Mill.	C	1	C	C	F	F	VR	F	R	C	F	C	F	...	C	...	F
159.	624	„ *crispata* Br.	...	...	...	1	...	...	...	...	...	...	...	VR	...	...	...	...	...
160.	624	„ *concava* (Karr.)	...	...	...	...	...	...	...	1	...	...	R	C	...	...	VR	×	...
161.	625	„ *sagittula* Def.	...	...	...	...	VR	...	VR	...	...	R	...	VC	R	...	R	...	...
162.	625	„ „ var. *jugosa* Br.	...	...	1	R	...	...	...	...	...	...	...	F	R	...	R	...	...
163.	625	„ *rugosa* (Rss.)	...	...	VR	...	...	...	...	...	...	F	...	VC	F	...	...	...	...
164.	626	„ *agglutinans* d'O.	VC	C	...	C	VC	VC	VC	F	C	VC	F	VC	VVC	...	C	×	C

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165.	627	*Textularia candeiana* d'O.	F	R	...	C	...	...	1	1	...	C	...	VR	VC	...	VR	×	...
166.	627	„ *porrecta* Br.	F	R	...	R	...	...	R	...	...	C	F	...	VC	...	...	×	...
167.	627	„ *luculenta* Br.	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
168.	627	„ *gramen* d'O.	VC	F	1	VC	C	C	F	F	C	...	C	VC	C	...	...	×	VC
169.	628	„ *haueri* d'O.	VC	C	F	C	VC	F	...	...	...	VC	C	C	VC	F	F	...	...
170.	628	„ *foliacea*, sp. n.	F	R	...	C	VR	...	F	...	...	F	F	C	VC	...	...	...	...
171.	629	„ *conica* d'O.	F	C	F	C	F	C	C	F	C	C	C	VC	VC	...	F	×	F
171a.	629	„ „ var. *corrugata*, nov.	...	...	...	...	...	...	...	...	...	...	...	F	...	...	...	...	...
172.	630	„ *trochus* d'O.	F	F	...	C	VR	...	C	...	VR	F	R	C	VC	...	R	...	F
173.	630	„ *turris* d'O.	...	...	...	...	...	...	...	...	...	F	...	F	C	...	...	...	...
174.	630	„ *barrettii* J. & P.	...	...	...	...	...	...	1	...	...	...	R	R	...	...	...	...	...
		VERNEUILINA d'Orbigny.																	
175.	630	*Verneuilina spinulosa* Rss.	C	R	F	VC	C	F	C	1	F	VC	C	VC	C	VC	C	×	F
176.	631	„ *pygmæa* Eg.	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
177.	631	„ *polystropha* (Rss.)	...	1	...	R	...	C	VR	R	...	VR	1	...	R	VR	...	×	...
		TRITAXIA Reuss.																	
178.	631	*Tritaxia lepida* Br.	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
		CHRYSALIDINA d'Orbigny.																	
179.	632	*Chrysalidina dimorpha* Br.	...	...	...	R	...	...	...	...	...	1	...	VR	VR	...	...	...	...
		BIGENERINA d'Orbigny.																	
180.	632	*Bigenerina nodosaria* d'O.	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...
		PAVONINA d'Orbigny.																	
181.	632	*Pavonina flabelliformis* d'O.	R	...	...	F	...	...	...	...	...	F	VR	F	1	...	...	...	...
		SPIROPLECTA Ehrenberg.																	
182.	634	*Spiroplecta wrightii* Silvestri	...	...	...	...	VR	...	VR	...	...	R	...	...	R	...	...	×	...
183.	634	„ *biformis* P. & J.	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1
		GAUDRYINA d'Orbigny.																	
184.	634	*Gaudryina pupoides* d'O.	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
185.	634	„ *filiformis* Berthelin	...	...	...	...	...	...	...	VR	...	...	...	...	...	...	R	...	...
186.	635	„ *scabra* Br.	C	F	F	R	R	VC	...	F	R	R	R	VR	VR	...	F	...	VR
187.	635	„ *rugosa* d'O.	...	...	...	...	...	...	...	...	...	...	...	F	...	VR	...	...	...

		VALVULINA d'Orbigny.																	
188.	635	*Valvulina conica* P. & J.	...	...	...	...	...	...	...	...	...	...	...	VR	...	VR	...	...	...
		CLAVULINA d'Orbigny.																	
189.	636	*Clavulina communis* d'O.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
190.	636	„ *obscura* Chaster	VR	C	F	...	...	R	VR	F	...	...	1	...	...	...	R	×	VR
191.	636	„ *cylindrica* Hantken	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
192.	637	„ *angularis* d'O.	...	...	1	...	...	...	...	...	...	VR	...	R	...	...	...	...	...
193.	637	„ „ var. *difformis* Br.	...	...	...	...	...	...	...	...	...	...	...	R	...	...	...	...	...
		Subfamily BULIMININÆ.																	
		BULIMINA d'Orbigny.																	
194.	637	*Bulimina pupoides* d'O.	VR	R	...	...	...	F	...	C	...	...	...	...	...	VR	...	...	...
195.	638	„ *affinis* d'O.	...	R	...	...	...	...	VR	...	...	...	...	...	...	...	...	...	...
196.	638	„ *elegans* d'O.	...	...	...	...	...	...	...	F	1	...	...	...	...	...	...	...	...
197.	638	„ *fusiformis* Will.	...	R	...	...	R	VR	R	...	1	VR	...	...	...	...	...	...	...
198.	638	„ *ovata* d'O.	...	...	...	...	...	1	...	...	...	...	...	...	...	VR	...	...	...
199.	639	„ *elegantissima* d'O.	VR	...	...	...	F	...	R	F	...	R	VR	...	...	...	VR	...	...
200.	639	„ „ var. *compressa* Mill.	VC	F	F	VR	R	F	...	R	1	...	...	F	1	...	VR	×	VR
201.	639	„ „ var. *seminuda* Terq.	VC	C	C	C	R	F	VR	...	VR	F	VR	C	R	...	R	×	VR
202.	640	„ *pulchella* d'O.	...	...	...	...	...	...	...	R	...	...	...	...	...	...	...	...	...
203.	640	„ *marginata* d'O.	...	...	...	...	...	...	...	VR	VR	...	...	...	...	R	...	...	...
204.	640	„ „ var. *biserialis* Mill.	...	...	...	...	...	...	...	VR	...	...	...	...	...	...	...	...	...
205.	640	„ *echinata* d'O.	...	...	..	...	...	...	...	...	...	...	1	...	...	...	...	...	...
206.	641	„ *inflata* Seg.	...	...	1	...	...	...	...	...	...	...	...	...	...	...	VR	...	...
207.	641	„ *williamsoniana* Br.	VR	...	...	1	...	...	...	...	...	...	...	VR	...	...	VR	...	...
208.	641	„ *convoluta* Will.	R	...	...	...	F	...	...	...	...	...	1	1	...	...	...	...	...
209.	642	„ „ var. *nitida* Mill.	R	VR	R	VR	1	1	F	...	...	VR	VR	VR	R	VR	R	×	1
210.	642	„ *squammigera* d'O.	R	...	..	...	R	R	VR	F	VR	F	...	VR	VR	...	...	...	...
		VIRGULINA d'Orbigny.																	
211.	642	*Virgulina schreibersiana* Cz.	F	F	VR.	VR	VR	R	F	F	...	VR	VR	...	R	VR	...	...	1
212.	643	„ „ var. *carinata*, nov.	...	...	...	...	...	...	...	R	...	...	...	...	...	...	...	...	...
		BIFARINA Parker & Jones.																	
213.	643	*Bifarina porrecta* (Br.)	R	...	...	...	...	...	...	...	...	VR	...	...	...	...	...	...	...
214.	643	„ *mackinnonii* Mill.	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
		BOLIVINA d'Orbigny.																	
215.	644	*Bolivina punctata* d'O.	C	VC	F	C	F	1	C	C	F	C	C	C	F	R	C	×	R
216.	644	„ *nobilis* Hant.	C	VC	C	VC	VC	C	C	VR	1	C	C	R	F	VR	VC	×	R
217.	645	„ *textilarioides* Rss.	...	1	1	...	...	F	VR	...	R	...	...	...	...	...	...	...	...
218.	645	„ *dilatata* Rss.	F	C	...	R	R	...	VR	VR	VR	...	R	...	...	...	...	×	...
219.	645	„ *difformis* (Will.)	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...
220.	645	„ *tortuosa* Br.	F	VR	F	VR	F	...	VR	VR	VR	...	R	R	...	VR	1	×	F
221.	646	„ *robusta* Br.	F	C	VR	R	R	VR	R	R	VR	VR	C	VC	VR	...	...	×	F
222.	646	„ *limbata* Br.	VR	F	F	R	...	R	VR	...	R	...	R	F	...	...	1	×	F
223.	647	„ *lobata* Br.	C	F	F	F	F	1	C	F	F	F	R	F	F	...	VR	...	F
224.	647	„ *convallaria* Mill.	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...
225.	647	„ *variabilis* (Will.)	C	...	...	R	R	C	R	...	1	...	VR	C	R	...	F	...	R
226.	648	„ *plicata* d'O.	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
227.	648	„ *inflata* H.-A. & E.	1	...	...	...	...	R	VR	F	1	VR	...	...	...	...	VR	...	R
228.	648	„ *simpsoni*, sp. n.	C	C	1	F	C	R	C	...	VR	F	C	VR	R	F	...	×	...

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		MIMOSINA Millett.																	
229.	650	*Mimosina rimosa*, sp. n.	F	...	...	VR	VR	1	VR	VR	...	F	...	1	R	F	...	...	...
230.	650	„ *affinis* Mill.	F	R	...	C	VR	C	R	VC	C	F	F	VR	F	R	VR	×	...
231.	650	„ *spinulosa* Mill.	C	C	1	C	C	VC	C	...	C	F	C	VR	C	R	VR	×	VR
232.	651	„ *echinata*, sp. n.	...	...	...	...	...	...	...	...	...	...	1	...	...	...	C	...	...
233.	651	„ *hystrix* Mill.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	VR	...	1
		Subfamily CASSIDULININÆ.																	
		CASSIDULINA d'Orbigny.																	
234.	652	*Cassidulina lævigata* d'O.	...	1	1	...	...	...	...	VR	1	...	...	...	1	VR	...	...	...
235.	652	„ *crassa* d'O.	C	F	F	VR	VR	F	F	C	F	VR	F	VR	R	...	VR	×	F
236.	652	„ *subglobosa* Br.	R	R	...	...	VR	VR	...	VR	1	VR	...	VR	...	...	...	...	...
237.	653	„ *bradyi* Norm.	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
238.	653	„ „ var. *elongata* Sideb.	...	...	...	1	...	...	...	...	...	1	...	1	...	...	...	...	...
239.	653	„ *nitidula* (Chaster)	...	...	1	...	...	...	...	F	...	...	...	VR	1	...	VR	...	...
		Subgenus ORTHOPLECTA Brady.																	
240.	654	*Cassidulina* (*Orthoplecta*) *clavata* Br.	...	...	1	...	...	VR	...	...	...	...	...	...	...	...	...	...	...
		Family LAGENIDÆ.																	
		Subfamily LAGENINÆ.																	
		LAGENA Walker & Boys.																	
241.	654	*Lagena globosa* (Montagu)	C	VR	1	R	F	C	F	R	F	R	1	...	R	R	F	×	1
242.	654	„ *apiculata* (Rss.)	VR	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
243.	655	„ *ampulla-distoma* Rymer Jones	VR	...	1	VR	...	...	VR	...	...	...	...	VR	...	...	...	...	...
244.	655	„ *aspera* Rss.	...	...	...	1	VR	...	...	...	...	...	...	...	...	...	VR	...	...
245.	655	„ *rudis* Rss.	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
246.	656	„ *lineata* (Will.)	...	...	...	...	VR	1	...	...	...	...	...	VR	...	...	...	...	...
247.	656	„ *costata* (Will.)	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
248.	656	„ *hexagona* (Will.)	R	1	...	...	VR	...	VR	...	...	1	...	...	F	...	...	...	1
249.	656	„ *reticulata* (Macgillivray)	1	...	...	...	...	...	...	...	...	VR	...	...	VR	...	...	...	...
250.	657	„ *spumosa* Mill.	...	...	...	...	...	...	...	...	...	...	...	1	VR	...	...	...	...
251.	657	„ *lævis* (Montagu)	VR	...	...	VR	1	...	C	R	...	R	...	...	...	...	VR	...	...
252.	657	„ „ var. *distoma* Silv.	...	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...
253.	658	„ „ var. *setigera* Mill.	...	...	...	...	...	...	...	F	...	...	...	...	...	...	...	...	...
254.	658	„ *crenata* P. & J.	1	...	...	VR	VR	...	...	F	...	VR	...	1	...	...	...	...	...
255.	658	„ *semistriata* Will.	...	...	...	...	...	VR	...	VR	...	R	...	...	...	VR	...	...	...
256.	659	„ *perlucida* Will.	...	...	...	...	F	...	...	...	...	...	...	...	VR	...	...	...	...
257.	659	„ *sulcata* (W. & J.)	VR	1	...	...	...	...	...	F	VR	...	...	...	F	...	VR	...	...

258.	659	„ *lyellii* (Seg.)	C	...	...	...	...	...	R	1	...	VR	1	...	VR	...	...	...	...
259.	659	„ *williamsoni* (Alcock)	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
260.	660	„ *striato-punctata* P. & J.	VR	...	...	...	VR	...	...	...	1	VR	...	...	VR	...	...	...	...
261.	660	„ *spiralis* Br.	1	VR	...	...	1	...	...	...	...	...	...	R	VR	...	1	...	...
262.	660	„ *clavata* (d'O.)	...	...	...	...	...	VR	R	R	...	...	...	...	...	...	...	...	...
263.	660	„ *gracillima* (Seg.)	R	VR	...	F	R	C	R	F	...	R	...	...	F	R	VR	...	1
264.	661	„ *lævigata* (Rss.)	VC	1	...	VR	VR	VC	C	C	C	R	1	VR	R	R	R	...	1
265.	661	„ *acuta* Rss.	...	...	...	...	1	...	...	VR	...	...	...	...	R	...	...	...	...
266.	661	„ *lucida* (Will.)	C	F	...	R	F	C	F	F	C	R	VR	F	VR	R	F	...	VR
267.	662	„ *fasciata* (Eg.)	...	...	...	VR	...	VR	...	...	...	...	...	...	...	...	...	...	...
268.	662	„ *annectens* Burrows & Holland	F	...	1	1	...	C	VR	R	C	VR	VR	...	...	VR	VR	×	...
269.	662	„ *quadrata* (Will.)	...	...	...	...	1	VR	...	...	1	...	...	1	...	...	...	...	...
270.	662	„ *malcomsonii* Wright	...	...	...	...	...	1	...	1	...	...	...	...	...	...	1	...	...
271.	663	„ *marginata* (W. & B.)	1	VR	...	VR	VR	...	1	...	...	...	...	VR	...	...	...	...	...
272.	663	„ *marginato-perforata* Seg.	VR	1	R	R	R	R	VR	...	R	...	...	VC	VR	...	F	...	...
273.	664	„ *staphyllearia* (Schw.)	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
274.	664	„ *radiato-marginata* P. & J.	...	...	...	...	...	...	...	...	...	...	...	VR	VR	...	...	...	...
275.	665	„ *wrightiana* Br.	F	...	...	F	1	...	1	...	VR	...	...	VR	VR	...	...	...	...
276.	665	„ *lagenoides* (Will.)	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
277.	665	„ *bicarinata* (Terq.)	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
278.	666	„ *rizzæ* (Seg.)	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...
279.	666	„ *orbignyana* (Seg.)	VC	R	...	F	F	...	C	1	VR	R	F	R	F	...	F	×	VR
280.	666	„ „ var. *walleriana* Wright	F	...	...	VR	...	...	...	...	...	...	...	...	...	...	...	...	...
281.	667	„ „ var. *kerimbatica*, nov.	1	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...
282.	667	„ *castrensis* Schw.	VR	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
283.	668	„ *clathrata* Br.	VR	VR	1	...	VR	VR	...	...	...	...	...	1	...	...	...	...	...
284.	668	„ *lacunata* B. & H.	C	...	VR	R	VR	...	...	...	...	...	...	1	...	R	...	...	...
285.	669	„ *auriculata* Br.	...	...	...	...	...	...	VR	...	...	VR	...	VR	...	...	R	×	1
		Subfamily NODOSARIINÆ.																	
		NODOSARIA Lamarck.																	
286.	669	*Nodosaria proxima* Silv.	F	...	...	...	...	...	VR	VR	...	...	1	...	VR	...	...	...	...
287.	670	„ *communis* d'O.	1	...	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...
288.	670	„ *spinulosa* (Montagu)	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
		LINGULINA d'Orbigny.																	
289.	670	*Lingulina carinata* d'O.	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
		FRONDICULARIA Defrance.																	
290.	671	*Frondicularia spathulata* Br.	...	...	....	...	...	...	...	...	...	...	...	1	...	...	...	...	...
		VAGINULINA d'Orbigny.																	
291.	671	*Vaginulina legumen* (Linné)	R	1	...	...	1	VR	...	...	...	...	...	...	1	...	...	...	...
		CRISTELLARIA Lamarck.																	
292.	671	*Cristellaria rotulata* (Lam.)	VR	...	...	...	...	...	VR	...	...	...	VR	...	...	...	...	...	...
293.	672	„ *cultrata* (Montfort)	...	...	..	...	1	...	VR	...	...	...	...	...	...	...	...	...	...
		Subfamily POLYMORPHININÆ.																	
		POLYMORPHINA d'Orbigny.																	
294.	672	*Polymorphina lactea* (W. & J.)	1	...	...	...	...	...	...	...	...	...	VR	VR	...	...	...	...	...
295.	672	„ *oblonga* Will.	...	...	1	...	1	1	...	1	...	...	...	...	...	...	...	...	...

No.	Page	SPECIES.	Tunghi Bay. Stn. 1.	Maiyapa Bay. Stn. 2 *a*.	Wamizi Pass. Stn. 2 *b*.	Mtundo Bay. Stn. 3.	Mazimbwa Bay and Tambuzi Bay. Stn. 4.	Nanegtuo Bay and Luseti Bay. Stn. 5.	Kero-Nyuni Bay. Stn. 6.	Pekawi Bay. Stn. 7.	Molandulo Bay. Stn. 8.	Ibo Bay. Stn. 9.	Montepes Bay. Stn. 10.	Manangoroshi to Lurio Points. Stn. 11.	Lurio Point to North Point. Stn. 12.	Pemba Bay. Stn. 13.	Montepes Bay. Stn. ?X.	Residues from collecting jars (ex spirit and formalin). Stn. ?A.	Stn. ?B.
296.	672	*Polymorphina compressa* d'O.	R	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...
297.	673	„ *communis* d'O.	R	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...
298.	673	„ *sororia* Rss.	VR	...	VR	R	1	...	...	VR	VR	VR	...	...	...	...	1	...	...
299.	673	„ *regina* Br. P. & J.	...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...
300.	673	„ *complexa* Sideb.	...	...	...	...	...	...	VR	...	...	1	...	...	1	...	1	...	...
		UVIGERINA d'Orbigny.																	
301.	674	*Uvigerina auberiana*, var. *glabra* Mill.	VR	...	...	R	F	VR	R	C	...	F	VR	...	VR	...	VR	×	...
302.	675	„ *tenuistriata* Rss.	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
303.	675	„ *pygmæa* d'O.	...	...	...	VR	...	...	...	...	...	...	...	1	VR	R	...	...	...
304.	675	„ *porrecta* Br.	VR	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
305.	675	„ *selseyensis* H.-A. & E.	...	...	..	...	...	...	...	...	...	...	...	...	...	...	1	...	...
306.	676	„ *angulosa* Will.	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
		SAGRINA Parker & Jones.																	
307.	676	*Sagrina columellaris* Br.	F	...	...	VR	...	VR	VR	...	1	...	...	...	...	...	VR	...	1
308.	676	„ *virgula* Br.	1	...	...	VR	...	...	1	1	...	VR	VR	VR	VR	...	...	...	...
309.	676	„ *striata* (Schw.)	...	...	...	...	...	...	...	...	...	...	VR	VR	...	R	...	...	...
310.	677	„ *raphanus* P. & J.	VR	...	...	VR	...	F	...	...	...	VR	...	C	...	...	...	...	...
311.	677	„ *tessellata* Br.	VR	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
		Family GLOBIGERINIDÆ.																	
		GLOBIGERINA d'Orbigny.																	
312.	678	*Globigerina bulloides* d'O.	C	F	VR	F	F	VR	F	F	R	F	F	F	C	...	F	×	VR
313.	678	„ *triloba* Rss.	R	R	...	R	...	...	...	...	...	...	F	...	...	...	...	...	...
314.	678	„ *dubia* Eg.	...	...	1	...	1	VR	...	...	...	...	VR	F	F	VR	...	...	...
315.	678	„ *cretacea* d'O.	R	...	...	VR	...	...	...	VR	...	...	VR	...	R	VR	VR	...	...
316.	679	„ *inflata* d'O.	VR	...	...	VR	...	...	...	...	...	...	...	VR	F	...	...	...	...
317.	679	„ *rubra* d'O.	R	VR	...	VR	VR	...	VR	VR	R	F	R	F	F	R	VR	×	...
318.	680	„ *conglobata* Br.	VR	...	...	F	...	...	VR	VR	...	...	VR	R	F	VR	...	...	...
319.	680	„ *æquilateralis* Br.	...	...	...	VR	1	...	...	...	...	...	...	...	...	R	...	×	...
		ORBULINA d'Orbigny.																	
320.	681	*Orbulina universa* d'O.	VR	...	VR	VR	1	...	...	...	...	...	...	...	VR	...	1	...	...
		PULLENIA Parker & Jones.																	
321.	681	*Pullenia obliquiloculata* P. & J.	1	...	...	VR	...	...	...	...	...	...	...	VR	R	...	...	...	...

		SPHÆROIDINA d'Orbigny.																	
322.	681	*Sphæroidina corticata*, sp. n.	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	VR
		CANDEINA d'Orbigny.																	
323.	682	*Candeina nitida* d'O.	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		Family ROTALIIDÆ.																	
		Subfamily SPIRILLININÆ.																	
		SPIRILLINA Ehrenberg.																	
324.	683	*Spirillina vivipara* Ehrb.	R	F	F	R	VR	...	R	VR	VR	VR	VR	C	VR	...	VR	×	R
325.	683	„ *obconica* Br.	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
326.	684	„ *lucida* Sideb.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
327.	684	„ *ornata* Sideb.	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
328.	684	„ *inæqualis* Br.	VR	...	VR	VR	...	F	VR	...	...	...	...	VR	...	...	...	...	...
329.	684	„ *limbata* Br.	VR	...	...	VR	...	...	VR	...	...	...	...	VR	...	F	...	...	...
330.	685	„ „ var. *denticulata* Br.	VR	VR	1	...	...	1	VR	...	...	...	...	R	...	...	...	...	F
331.	685	„ *margaritifera* Will.	R	...	...	...	...	1	...	...	...	...	...	R	...	...	...	...	...
332.	685	„ *decorata* Br.	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
333.	685	„ *semidecorata*, sp. n.	VR	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		Subfamily ROTALIINÆ.																	
		PATELLINA Williamson.																	
334.	686	*Patellina corrugata* Will.	VR	VR	VR	VR	VR	VR	VR	...	...	VR	...	R	VR	...	...	...	1
		CYMBALOPORA Hagenow.																	
335.	687	*Cymbalopora poeyi* (d'O.)	C	C	VC	VC	VC	VC	VC	C	C	F	...	VC	C	F	VC	×	C
336.	688	„ *tabellæformis* Br.	C	...	F	R	R	VR	1	R	...	...	...	F	F	...	F	...	VR
337.	688	„ *bulloides* (d'O.)	C	...	C	VR	F	...	F	R	R	VR	...	F	F	...	C	×	C
338.	689	„ *milletti*, sp. n.	C	...	C	VR	C	VC	F	F	F	VR	...	R	VR	1	F	×	C
		DISCORBINA Parker & Jones.																	
339.	690	*Discorbina cora* (d'O.)	1	1	...	R	...	...	...	...	...	VR	F	...	...	...	VR	...	R
340.	691	„ *nitida* (Will.)	F	VR	1	...	...	VR	VR	F	...	R	VR	R	VR	...	...	...	VR
341.	691	„ *concinna* Br.	C	R	C	F	F	F	VR	F	F	C	C	C	VC	F	C	...	F
342.	692	„ *praegeri* H.-A. & E.	...	...	...	...	...	...	VR	...	...	...	...	...	...	...	...	...	VR
343.	692	„ *isabelleana* (d'O.)	...	R	C	...	...	...	VR	...	1	...	F	R	VR	...	...	...	...
344.	692	„ *vilardeboana* (d'O.)	...	...	...	...	...	...	...	...	...	...	...	F	...	...	...	...	...
345.	692	„ *rosacea* (d'O.)	...	1	1	F	VR	F	C	F	1	C	R	R	...	...	VR	×	VR
346.	693	„ *planorbis* (d'O.)	VR	...	...	...	...	VR	VR	VR	...	...	R	VR	R	...	...	...	R
347.	693	„ *turbo* (d'O.)	R	...	...	...	...	...	VR	...	...	VR	...	F	...	...	...	...	...
348.	693	„ *orbicularis* (Terq.)	R	F	...	F	VR	...	F	...	F	VR	F	F	R	...	...	×	F
349.	693	„ *mamilla* (Will.)	1	...	1	...	...	...	VR	...	...	...	...	VR	...	...	...	...	...
350.	693	„ *mediterranensis* (d'O.)	R	VR	R	...	VR	VR	VR	F	R	...	VR	F	F	...	C	...	...
351.	694	„ *globularis* (d'O.)	C	F	C	F	F	F	F	VR	F	R	F	F	R	...	C	×	C
352.	694	„ *binkhorsti* (Rss.)	...	...	...	...	...	...	VR	...	...	...	...	...	...	...	...	...	...
353.	695	„ *tuberculata* Balkwill & Wright	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
354.	695	„ *araucana* (d'O.)	...	...	...	...	...	...	...	...	VR	...	...	...	...	...	...	...	...
355.	695	„ *valvulata* (d'O.)	VR	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...

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356.	695	*Discorbina valvulata*, var. *granulosa*, nov.	...	...	...	...	...	...	...	...	...	...	...	R	...	...	1	...	...
357.	696	„ *allomorphinoides* (Rss.)	VR	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
358.	696	„ *saulcii* (d'O.)	VR	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...	...
359.	696	„ *reniformis*, sp. n.	VR	...	...	...	...	1	1	...	...	...	...	VR	...	...	...	...	VR
360.	697	„ *chasteri* H.-A. & E.	...	...	...	...	1	VR	F	...	...	...	1	...	VR	...	VR	...	...
361.	697	„ *rugosa* (d'O.)	VR	...	...	R	R	VR	VR	...	...	...	R	F	VR	...	R	×	F
362.	697	„ *vesicularis* (Lam.)	R	...	...	R	...	...	...	VR	...	...	...	...	...	VR	F	...	...
363.	698	„ *dimidiata* J. & P.	...	...	...	1	...	1	...	...	1	VR	...	...	...	...	...	...	...
364.	698	„ *polystomelloides* P. & J.	R	1	F	R	1	...	F	...	VR	R	F	F	C	...	VR	...	...
365.	700	„ *rimosa* P. & J.	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
366.	700	„ *rarescens* Br.	...	...	...	...	...	...	...	VR	...	...	...	VR	...	...	...	...	...
367.	701	„ *pustulata* H.-A. & E.	...	...	...	...	...	1	...	...	...	...	...	VR	...	...	...	...	...
368.	701	„ *parisiensis* (d'O.)	VR	...	R	R	VR	...	...	...	...	VR	...	...	...	...	R	×	F
369.	702	„ *wrightii* Br.	R	...	F	F	R	...	...	R	1	...	R	F	VR	...	R	×	F
370.	702	„ *globosa* (Sideb.)	...	...	...	...	...	...	...	VR	...	...	...	...	...	...	...	...	F
371.	703	„ *pulvinata* Br.	VR	...	1	R	...	...	...	...	...	...	...	VR	...	...	VR	...	1
372.	703	„ *patelliformis* Br.	F	VC	C	VC	F	C	C	VR	F	C	C	VC	VR	...	F	×	C
373.	704	„ *corrugata* Mill.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	VR	...	...
374.	704	„ *tabernacularis* Br.	F	VR	R	C	F	R	R	...	R	F	R	VC	R	...	F	×	C
375.	704	„ *erecta* Sideb.	F	...	...	VR	...	...	...	...	...	...	...	F	VR	...	R	...	F
376.	705	„ *acuminata* Chap.	VR	...	VR	C	R	...	VR	...	...	...	R	R	VR	...	F	...	...
		PLANORBULINA d'Orbigny.																	
377.	705	*Planorbulina mediterranensis* d'O.	C	VC	...	...	R	VC	...	...	VR	VVC	F	C	...	R	...	...	...
378.	705	„ *acervalis* Br.	...	...	...	1	...	...	...	...	...	...	...	1	...	...	F	×	...
379.	706	„ *larvata* P. & J.	...	...	1	...	...	...	...	...	...	...	VR	F	VC	...	F	...	VR
		TRUNCATULINA d'Orbigny.																	
380.	706	*Truncatulina lobatula* (W. & J.)	R	R	VR	C	VR	1	VR	R	VR	VR	VR	F	VR	VR	F	×	VR
381.	706	„ *variabilis* d'O.	VR	...	...	...	VR	...	...	...	1	VR	VR	R	R	...	...	...	VR
382.	707	„ *tenuimargo* Br.	1	1	...	VR	...	...	...	...	...	VR	VR	...	VR	...	R	...	...
383.	707	„ *refulgens* (Montfort)	VR	1	VR	...	...	...	...	...	...	...	R	VR	R	1	...	×	...
384.	707	„ *mundula* Br., P., & J.	...	...	...	VR	...	...	...	...	...	...	...	VR	...	...	...	...	1
385.	708	„ *haidingerii* (d'O.)	VR	1	VR	F	VR	...	VR	...	VR	...	VR	F	...	...	VR	×	VR
386.	708	„ *robertsoniana* Br.	...	...	VR	...	...	...	...	...	...	...	...	...	...	...	...	...	...
387.	708	„ *ungeriana* (d'O.)	VR	VR	F	VR	...	VR	...	...	1	VR	VR	VR	...	...	...	...	...
388.	708	„ *rosea* (d'O.)	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
389.	709	„ *akneriana* (d'O.)	...	...	...	...	...	...	...	...	...	...	...	F	...	...	...	...	...
390.	709	„ *præcincta* (Karr.)	...	...	F	...	...	...	...	...	...	...	...	VR	...	...	...	...	F
391.	709	„ *culter* (P. & J.)	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	VR
392.	709	„ *rostrata* Br.	...	...	...	...	...	...	...	...	...	...	...	F	...	...	...	...	...

393.	710	„ *tubulifera*, sp. n.	VR	...	...	...	...	...	1	1	...	...	...	VR	...	...	...	...	...
394.	710	„ *reticulata* (Cz.)	...	...	...	...	...	...	...	...	...	...	...	R	...	...	...	×	1
395.	711	„ *glabra*, sp. n.	C	1	1	VC	R	1	VC	...	F	VR	F	R	F	...	R	...	R
396.	711	„ *echinata* Br.	C	R	1	VC	R	1	VC	...	F	VR	F	R	F	...	VR	×	R
		ANOMALINA d'Orbigny.																	
397.	712	*Anomalina ammonoides* (Rss.)	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
398.	712	„ *polymorpha* Costa	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		CARPENTERIA Gray.																	
399.	713	*Carpenteria utricularis* (Carter)	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
399 *a*.	713	„ *monticularis* Carter	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		PULVINULINA Parker & Jones.																	
400.	713	*Pulvinulina repanda* (F. & M.)	...	...	...	R	...	...	VR	...	...	...	R	F	R	...	1	...	...
401.	714	„ *lateralis* (Terq.)	R	1	...	F	VR	...	VR	...	...	R	VR	...	F	...	...	...	...
402.	714	„ *concentrica* P. & J.	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
403.	714	„ *oblonga* (Will.)	VR	1	1	F	VR	...	VR	VR	1	...	...	R	VR	...	VR	...	...
404.	714	„ „ var. *scabra* Br.	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
405.	714	„ *auricula* (F. & M.)	VR	...	...	...	...	...	...	...	...	...	...	R	...	...	...	...	...
406.	715	„ *hauerii* (d'O.)	...	...	...	R	...	...	...	...	...	VR	...	...	VR	...	...	...	...
407.	715	„ *brongniartii* (d'O.)	...	...	...	...	...	...	VR	F	...	...	...	...	...	...	VR	...	...
408.	715	„ *menardii* (d'O.)	...	...	...	VR	...	...	1	...	...	...	VR	...	...	...	...	...	...
409.	715	„ *tumida* Br.	VR	...	...	VR	...	...	...	...	...	...	...	F	...	...	...	...	...
410.	716	„ *patagonica* (d'O.)	...	...	...	...	...	...	...	...	...	...	...	...	R	...	...	...	...
411.	716	„ *truncatulinoides* (d'O.)	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
412.	716	„ *schreibersii* (d'O.)	...	VR	...	...	R	C	F	R	...	VR	...	VR	VR	F	...	...	C
413.	717	„ *procera* Br.	1	...	...	F	...	1	VR	...	...	...	VR	F	VR	...	...	...	...
414.	717	„ *elegans* (d'O.)	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
414 *a*.	717	„ *partschiana* (d'O.)	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		ROTALIA Lamarck.																	
415.	717	*Rotalia beccarii* (Linné)	C	C	VR	C	R	F	R	VC	F	VR	F	C	R	VC	C	×	C
416.	718	„ *perlucida* H.-A. & E.	C	...	...	...	C	VR	...	F	R	...	F	...	VR	R	R	×	...
417.	718	„ *orbicularis* (d'O.)	R	F	...	C	R	VR	R	C	F	VR	VR	R	R	...	R	×	F
418.	719	„ *soldanii* d'O.	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
419.	719	„ *schroeteriana* P. & J.	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
420.	719	„ „ var. *inflata* Mill.	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
421.	719	„ *papillosa* Br.	...	...	...	...	...	...	...	1	...	...	...	VR	...	...	...	...	...
422.	719	„ „ var. *compressiuscula* Br.	...	...	...	VR	...	...	...	1	...	...	...	...	...	...	...	...	...
423.	720	„ *calcar* (d'O.)	C	R	VC	F	R	...	1	...	...	R	VR	F	R	...	F	...	...
424.	720	„ *venusta* Br.	C	C	F	VC	F	...	C	VR	F	VC	VVC	F	VC	...	F	×	R
425.	720	„ *erinacea*, sp. n.	...	...	...	R	...	...	VR	VVC	VC	VC	VR	...	VR	...	C	...	VR
426.	721	„ *murrayi*, sp. n.	...	...	C	...	...	VR	...	F	C	...	...	...	...	F	...	...	VR
426 *a*.	722	„ *dubia* d'O.	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		CALCARINA d'Orbigny.																	
427.	722	*Calcarina spengleri* (Linné)	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
428.	722	„ *defrancii* d'O.	VR	1	F	...	...	...	...	...	...	...	...	F	...	...	R	...	...
429.	723	„ *hispida* Br.	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...

No.	Page	SPECIES.	Tunghi Bay. Stn. 1.	Maiyapa Bay. Stn. 2 *a*.	Wamizi Pass. Stn. 2 *b*.	Mtundo Bay. Stn. 3.	Mazimbwa Bay and Tambuzi Bay. Stn. 4.	Namegno Bay and Luseti Bay. Stn. 5.	Kero-Nyuni Bay. Stn. 6.	Pekawi Bay. Stn. 7.	Molandulo Bay. Stn. 8.	Ibo Bay. Stn. 9.	Montepes Bay. Stn. 10.	Manangoroshi to Lurio Points. Stn. 11.	Lurio Point to North Point. Stn. 12.	Pemba Bay. Stn. 13.	Montepes Bay. Stn. ?X.	Residues from collecting jars (ex spirit and formalin). Stn. ?A.	Stn. ?B.
		Subfamily TINOPORINÆ.																	
		GYPSINA Carter.																	
430.	724	*Gypsina inhærens* (Schultze)	C	VC	R	VC	R	R	F	VC	F	...	F	C	VVC	F	VC	×	C
431.	725	„ „ var. *plana* (Carter)	...	...	...	F	...	...	...	...	...	...	F	C	VVC	...	F	...	...
432.	725	„ *rubra* (d'O.)	...	...	...	...	...	...	...	...	...	VR	F	C	...	...	...	...	...
433.	726	„ *vesicularis* (P. & J.)	VR	1	...	...	...	VR	1	...	...	R	R	C	F	...	VR	...	...
434.	727	„ „ var. *squamæformis* Chap.	...	...	...	...	...	...	...	...	...	VR	VR	F	...	...	1	...	...
435.	727	„ „ var. *monticulus* Chap.	...	...	...	...	...	...	...	...	...	VR	...	F	...	...	...	...	...
436.	727	„ „ var. *discus* Goës	...	...	...	VR	...	...	...	...	...	...	...	VR	...	...	...	...	...
437.	727	„ *globulus* (Rss.)	VR	1	VR	VR	...	...	VR	...	...	VR	...	C	...	...	VR	...	...
		POLYTREMA Risso.																	
438.	728	*Polytrema miniaceum* (Linné)	VR	...	1	...	...	...	R	...	...	1	F	F	VR	...	F	...	VR
438 *a*.	728	„ „ var. *alba* Carter	...	...	...	...	...	...	...	...	...	...	...	R	...	...	...	...	...
		HOMOTREMA Hickson.																	
439.	729	*Homotrema rubrum* (Lam.)	...	...	...	...	...	...	VR	...	...	...	VR	R	...	...	VR	...	1
		SPORADOTREMA Hickson.																	
440.	729	*Sporadotrema cylindricum* (Carter)	...	...	...	...	...	...	...	...	...	VR	...	R	...	...	...	...	...
		Family NUMMULINIDÆ.																	
		Subfamily POLYSTOMELLINÆ.																	
		NONIONINA d'Orbigny.																	
441.	730	*Nonionina depressula* (W. & J.)	C	C	F	F	C	C	C	VC	F	F	R	R	F	...	...	...	C
441 *a*.	730	„ „ var. *granosa* d'O.	1	...	...	...	R	...	...	VVC	...	...	...	...	R	...	...	×	R
442.	730	„ *asterizans* (F. & M.)	R	VR	1	C	F	...	...	F	...	C	F	...	F	F	C	...	...
443.	730	„ *umbilicatula* (Montagu)	...	...	...	1	...	...	...	...	...	...	...	VR	...	...	...	...	...
444.	731	„ *turgida* (Will.)	VR	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

445.	731	„ *scapha* (F. & M.)	C	C	R	C	VC	C	VR	R	R	VC	R	R	C	F	R	×	VR
446.	731	„ *boueana* d'O.	R	VR	...	F	C	R	VR	F	...	R	VR	...	VR	F	...	...	...
447.	732	„ „ var. *armata* Br.	...	VR	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
448.	732	„ *pauperata* (B. & W.)	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...
		POLYSTOMELLA Lamarck.																	
449.	732	*Polystomella decipiens* Costa	...	...	...	...	...	...	F	VC	...	...	...	...	...	...	...	...	...
450.	732	„ *striato-punctata* (F. & M.)	F	F	C	F	F	C	F	VC	F	C	VR	...	R	C	F	×	F
451.	733	„ „ var. *selseyensis* (H.-A. & E.)	...	...	...	...	...	VR	...	...	...	...	...	...	...	R	...	×	...
452.	733	„ *crispa* (Linné)	...	R	...	R	...	F	F	C	...	F	1	C	...	R	VR	...	...
453.	733	„ *subnodosa* (Münster)	F	VR	...	C	R	F	F	C	...	F	R	F	...	F	F	×	F
454.	734	„ *macella* (F. & M.)	VR	F	R	C	R	F	R	R	R	F	F	C	F	R	C	×	R
455.	734	„ *craticulata* (F. & M.)	C	C	C	R	...	F	F	F	R	VR	R	F	...	R	R	×	...
456.	735	„ *verriculata* Br.	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...
457.	735	„ *milletti*, sp. n.	F	R	C	F	VR	F	VR	F	F	...	...	F	VR	F	C	×	R
		Subfamily NUMMULITINÆ.																	
		AMPHISTEGINA d'Orbigny.																	
458.	736	*Amphistegina lessonii* d'O.	C	C	F	C	C	...	C	...	VR	C	VC	C	C	C	R	×	VR
459.	736	„ „ var. *radiata* (F. & M.)	...	...	VR	...	...	...	...	...	...	...	R	F	...	...	...	...	...
459 *a*.	737	„ „ var. *gibba* d'O.	...	...	...	...	...	...	...	...	...	...	...	VR	...	...	...	...	...
		OPERCULINA d'Orbigny.																	
460.	737	*Operculina ammonoides* (Gronovius)	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	VR
461.	737	„ *complanata* (Defrance)	F	F	C	VR	VR	...	C	...	...	R	F	R	R	...	...	×	...
462.	738	„ *granulosa* Leymerie	VR	VR	...	VR	...	...	...	...	...	...	...	...	...	...	...	...	...
		HETEROSTEGINA d'Orbigny.																	
463.	738	*Heterostegina depressa* d'O.	...	1	...	...	F	...	R	...	...	...	...	F	...	...	...	...	...
		NUMMULITES Lamarck.																	
464.	739	*Nummulites cumingii* Carpenter	VR	...	...	...	...	...	VR	...	...	...	...	...	...	...	...	×	...
		NOURIA, gen. nov.																	
465.	615	*Nouria polymorphinoides*, sp. n.	VR	VR	...	VR	...	...	VR	...	...	VR	...	...	...	...	...	...	...
465 a.	615	„ *harrisii*, sp. n.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
465 b.	615	„ *compressa*, sp. n.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		TOTALS	253	176	146	214	185	153	208	164	132	188	179	277	202	97	193	115	147

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The number of authorities referred to in the synonymies of the four hundred and seventy odd species described in this Monograph is so great (exceeding two hundred) that it has been necessary to make every effort to economise space. The principle, therefore, first adopted by us in the Clare Island Monograph has been followed here.

Names of authors, titles of articles, and full bibliographical references to the Transactions and Proceedings in which they are to be found are given once and for all in this Bibliography, some lengthy titles being shortened, as follows:—

AMNH.=Annals and Magazine of Natural History.
JRMS.=Journal of the Royal Microscopical Society, London.
JQMC.=Journal of the Quekett Microscopical Club, London.
MASIB.=Memorie della Reale Accademia delle Scienze dell' Istituto di Bologna.
QJGS.=Quarterly Journal of the Geological Society, London.
SAWW.=Sitzungsberichte der Kaiserliche Akademie der Wissenschaften Wien. (D=Denkschrift.)

The titles of all papers and books are indicated by initials only, after the date of publication, and the first letter of the author's name:—thus, C. 1892, PTC.=F. Chapman, 'Microzoa from the Phosphatic Chalk of Taplow,' the page, etc., only being given, and all further details being found under that initial and date in the Bibliography. In the case of long or short series of papers, the date of the first is given and the initials are followed by the year in which the paper referred to appeared: thus, M. 1898, &c. FM. 1900=the papers of Millett's series beginning in 1898, which were published in JRMS. in 1900.

The confusion which results from some authors giving the year in which a part of a volume was published, or a paper was read, as opposed to the year in which the complete volume was published, has been arbitrarily settled in this Monograph by giving, wherever practicable, the date given by Sherborn in his 'Bibliography of the Foraminifera, 1565–1888,' a second volume of which (1888–1913) we hope shortly to issue.

In some cases we have been compelled to fix our own dates arbitrarily—as, for instance, in some of J. Wright's papers, *e. g.*, W. 1885–6, BLP., in which the plate is lettered 1884–5. Brady, when quoting d'Orbigny's Cuba Monograph of 1839, nearly always gave the page in the Spanish edition of 1840. We have invariably given the pagination of the original French edition of 1839. When plates have two numbers, as in some of the Memoirs of the Société Géologique de France, both numbers are given *e. g.*, T. 1878, FIR. pl. ix. (xiv.).

Again, much confusion has crept into synonymies by reason of the fortunately obsolete practice of re-paginating reprints, a practice which reaches its worst development and results in Parker & Jones' 'Nomenclature of the Foraminifera' (P. & J., etc., 1859, etc., NF.); we have endeavoured in every case to give the original page of the journal in which the papers were published.

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* This paper is variously referred to as being dated 1849 and 1850. It was read in May 1849, and all the separate copies were dated on a special title-page 1849, but the volume of which it forms part was issued in 1850 and is so dated.

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PLATE XL.

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PLATE XL.*

Figs. 1, 2. *Nubecularia tubulosa*, sp. n. Colonies growing on coralline fragments. × 83.

3, 4. *Nubecularia tubulosa.* Early stages showing the spiral commencement. × 62.

5. *Nubecularia tubulosa.* Terminal portion of tubes showing apertures. × 62.

6. *Nubecularia lucifuga*, var. *decorata* nov. Colony adherent to a worn disc of *Orbitolites complanata* Lamarck. × 15.

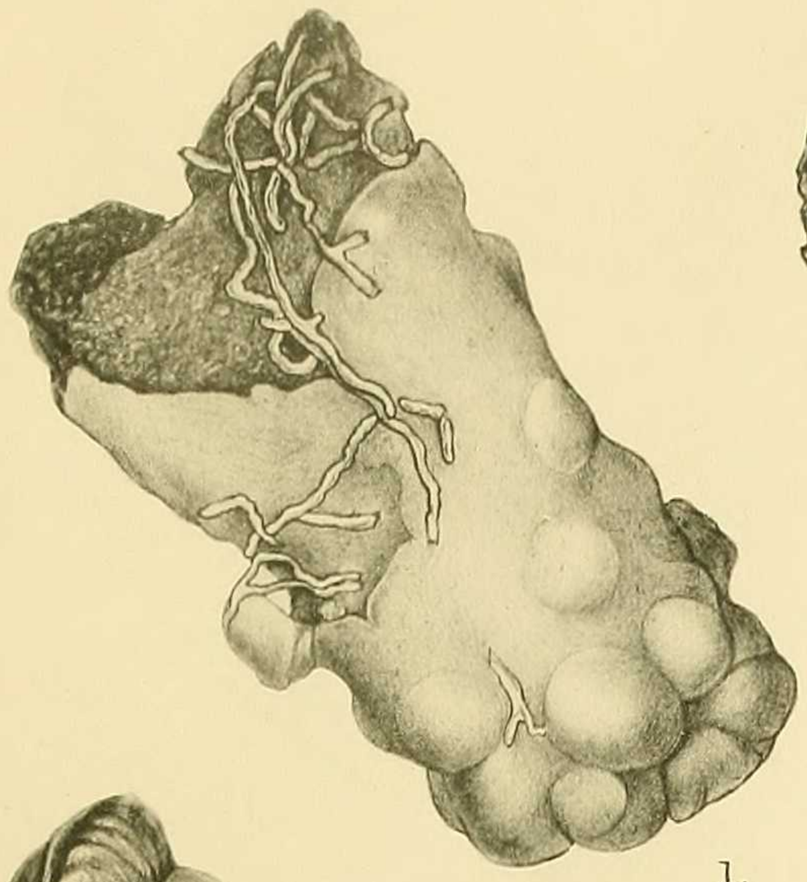
7. *Nubecularia lucifuga*, var. *decorata.* A single specimen more highly magnified, showing surface-decoration and aperture. × 45.

8–10. Nubecularine or monstrous growths, probably akin to *Miliolina labiosa* d'Orb. × 62.

11–13. *Biloculina ringens*, var. *denticulata* Brady. Fig. 11. Edge views. Fig. 12. Side view. Fig. 13. Oral view. × 45.

14–17. *Spiroloculina limbata* d'Orbigny. Figs. 14, 15. Side view. Fig. 16. Edge view. Fig. 17. Oral view. × 45.

* The drawings for the Plates to this Monograph have been executed from the specimens by Miss Mabel Rhodes, Mr. W. Thornton Shiells, and Mr. John R. Ford.



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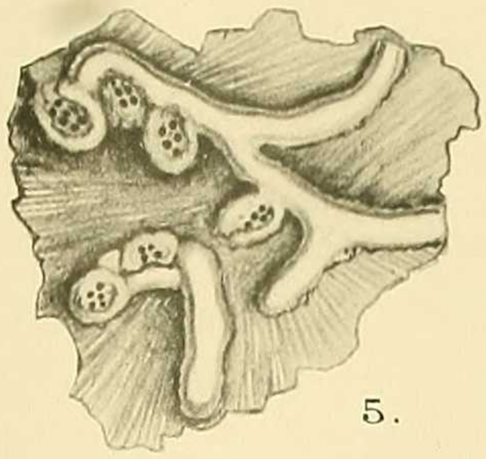

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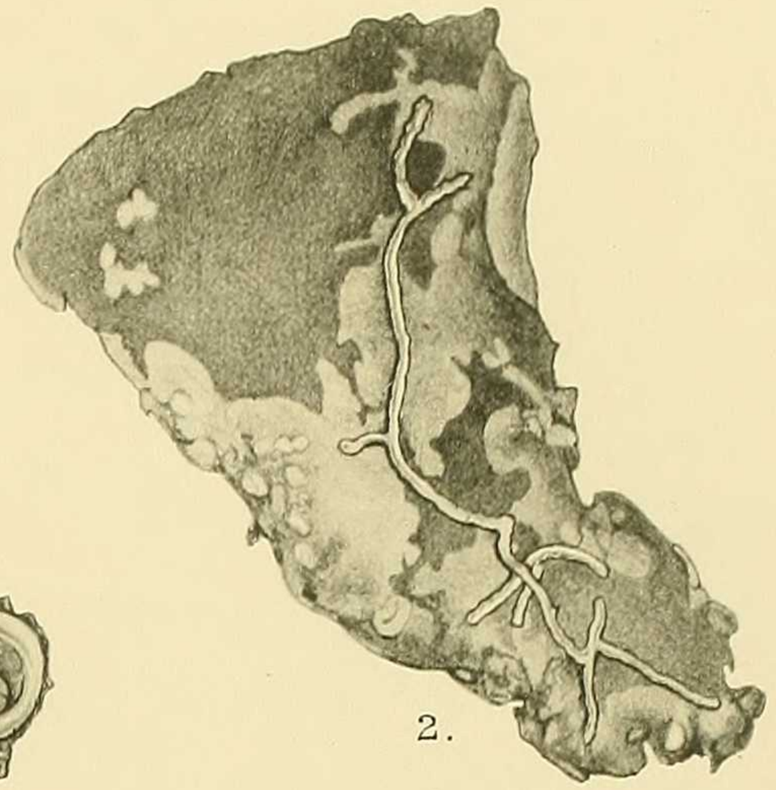

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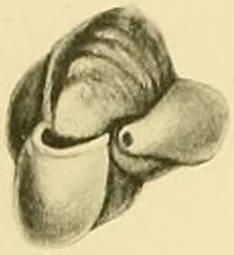

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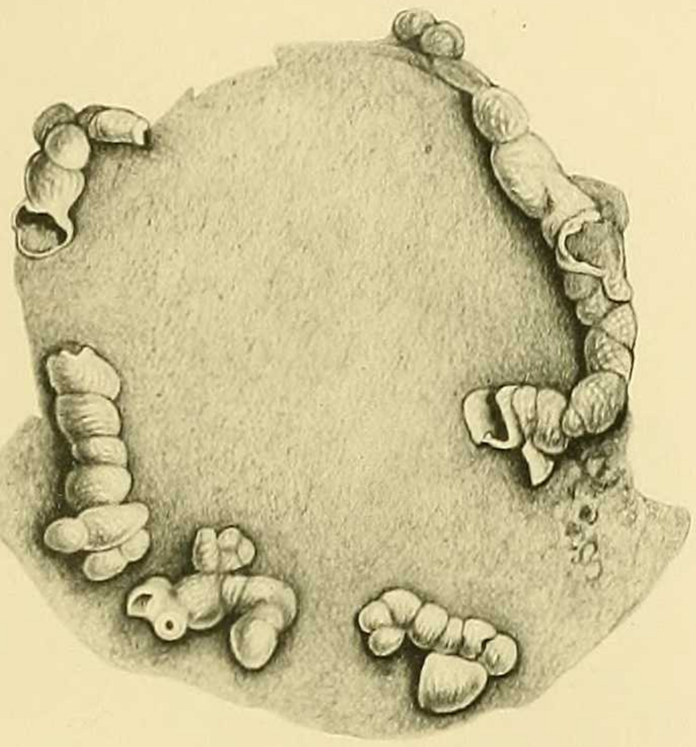

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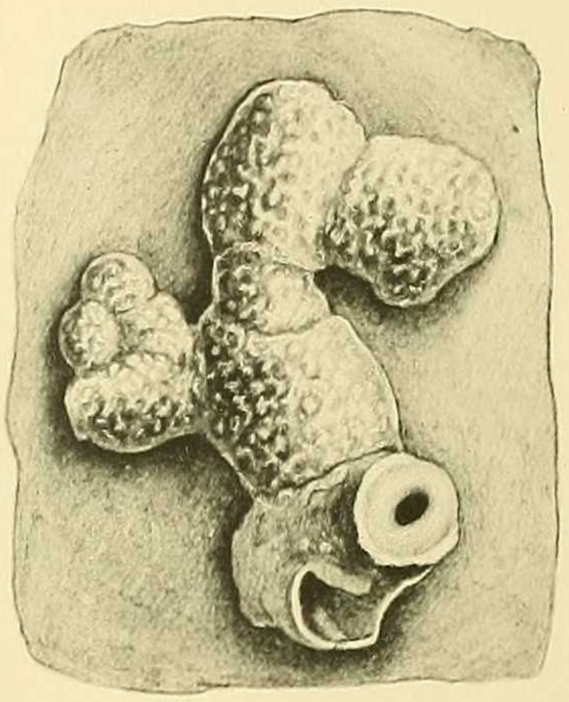

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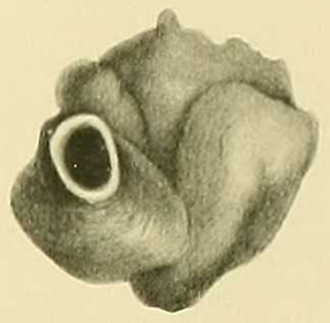

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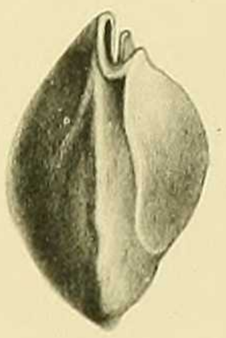

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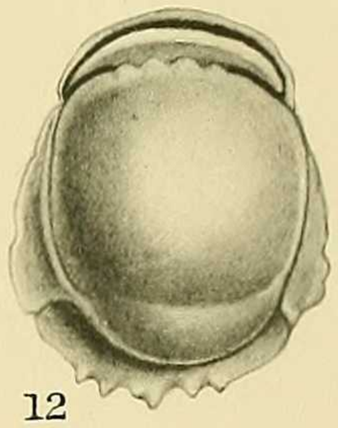

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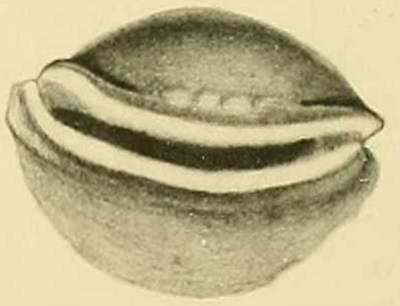

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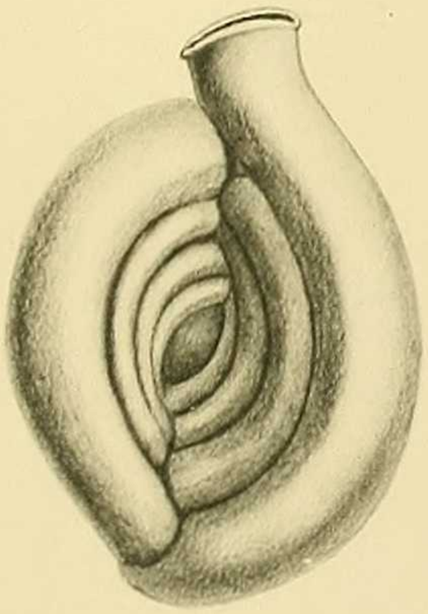

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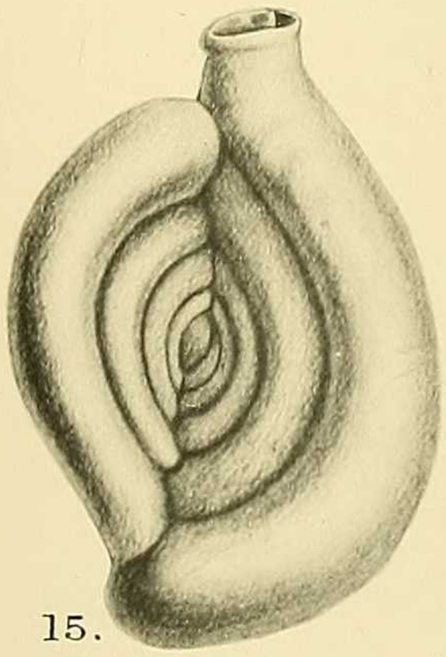

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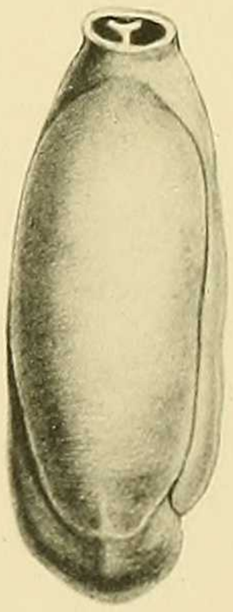

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FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE XLI.

PLATE XLI.

Figs. 1–5. *Spiroloculina planissima* (Lamarck). Figs. 1, 2. Side views. Fig. 3. Ditto, showing the ridge on the final chamber. Fig. 4. Edge view. Fig. 5. Oral view. × 45.

6–8. *Spiroloculina crenata* Karrer. Fig. 6. Edge view. Fig. 7. Side view. Fig. 8. Oral view. × 62.

9–11. *Miliolina circularis*, var. *sublineata* Brady. Figs. 9, 10. Side views. Fig. 11. Oral view. × 62.

12–16. *Miliolina circularis*, var. *cribrostoma* nov. Figs. 12–15. Side views. Fig. 16. Oral view. × 45.

17–21. *Miliolina tricarinata*, var. *plicata* Terquem. Fig. 17. Front view. Figs. 18–20. Side views. Fig. 21. Oral view. × 45.

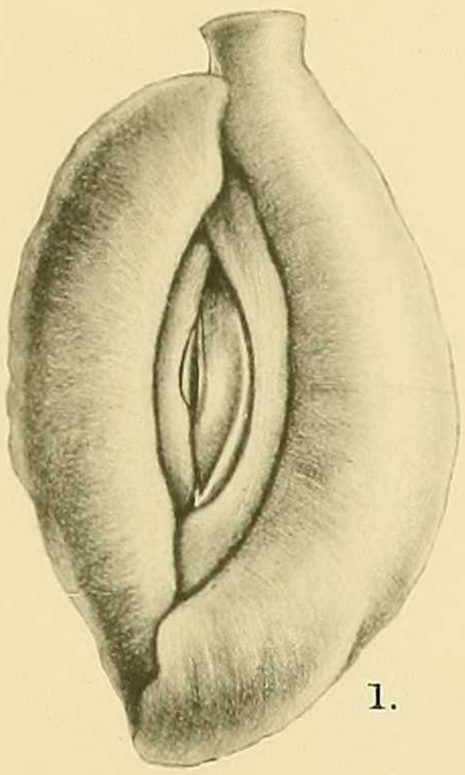
22. *Miliolina tricarinata*, var. *plicata* Terquem. Oral view of a particularly dehiscent specimen. × 45.

23–25. *Miliolina tricarinata*, var. *serrata* nov. Fig. 23. Side view. Fig. 24. Oral view. Fig. 25. Edge view. × 62.

26–28. *Miliolina terquemiana* Brady. Long form. Fig. 26. Edge view. Fig. 27. Dorsal view. Fig. 28. Oral view. × 45.

29–31. *Miliolina terquemiana* Brady. Inflated form. Fig. 29. Side view. Fig. 30. Edge view. Fig. 31. Oral view. × 45.

32–35. *Miliolina bertheliniana* Brady. Fig. 32. Side view. Fig. 33. Edge view. Fig. 34. Dorsal view. Fig. 35. Oral view. × 45.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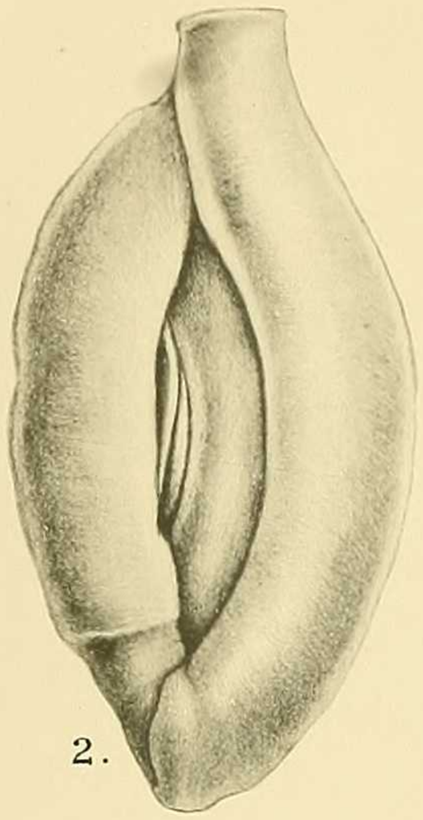
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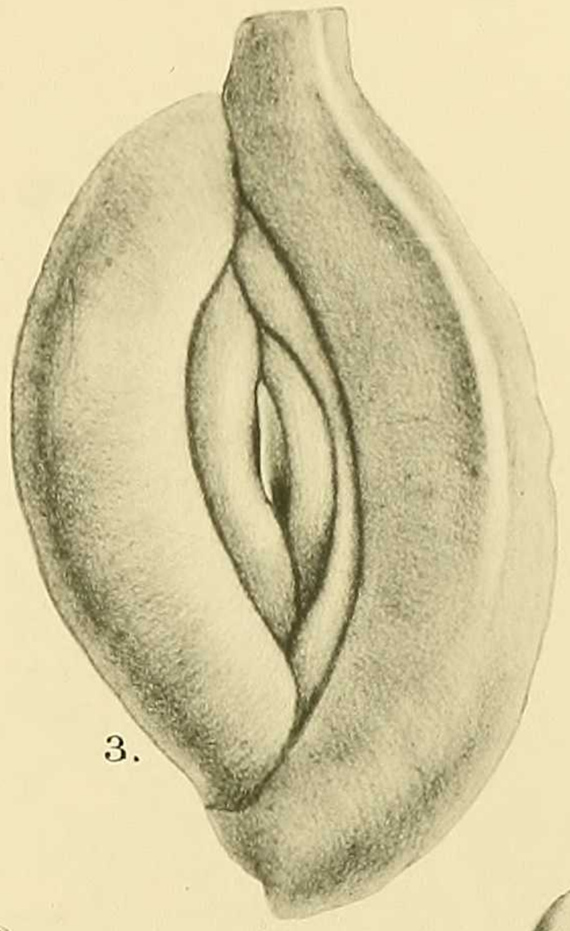
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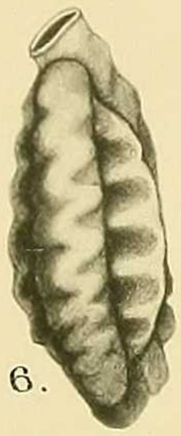
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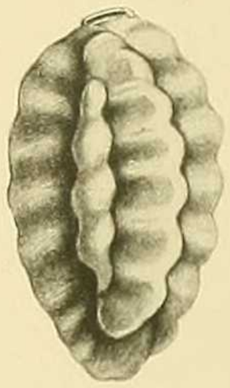
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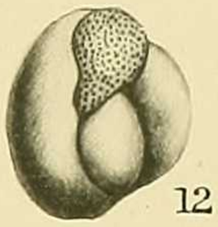
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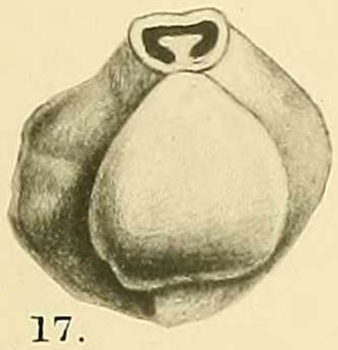
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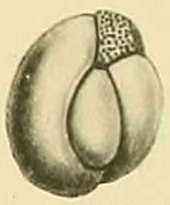
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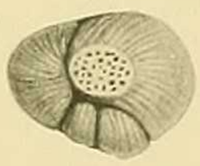
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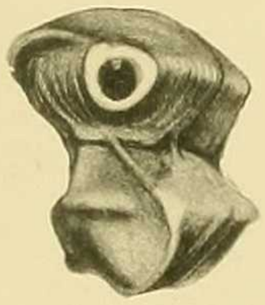
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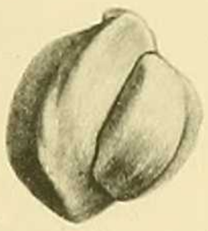
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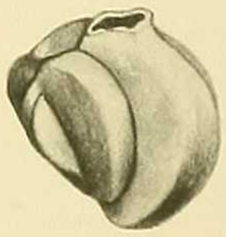
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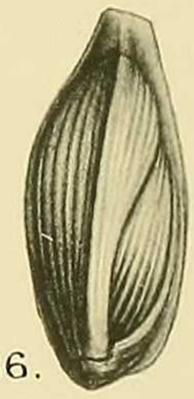
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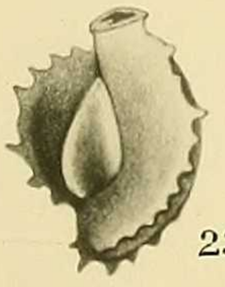
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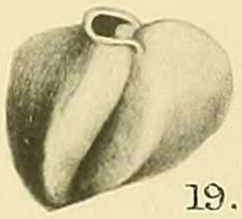
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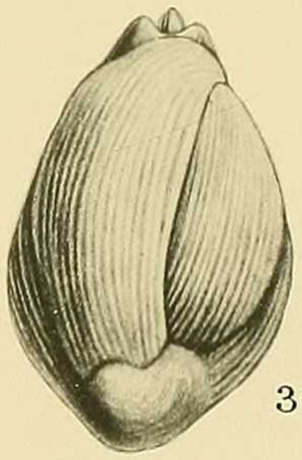
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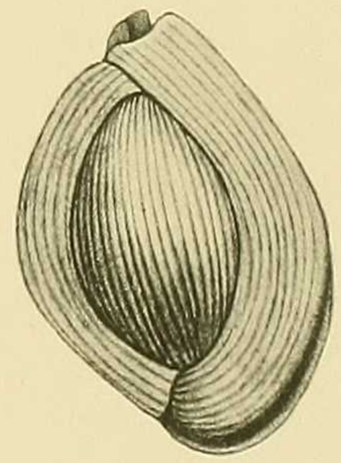
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FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE XLII.

PLATE XLII.

Figs. 1–5. *Miliolina cultrata* Brady. Smooth form. Figs. 1–3. Side views. Fig. 4. Edge view. Fig. 5. Oral view. × 62.

6–10. *Miliolina cultrata* Brady. Striate var. (=*M. milletti*, var. *carinata-striata* Wiesner). Figs. 6–8. Side views. Fig. 9. Edge view. Fig. 10. Oral view. × 62.

11–16. *Miliolina durrandii* Millett. Fig. 11. Young form, side view. Fig. 12. Ditto, edge view. Figs. 13–15. Side views in different stages of growth. Fig. 16. Oral view. × 45.

17–20. *Miliolina transversestriata* Brady. Figs. 17, 18. Side views. Fig. 19. Oblique view. Fig. 20. Oral view. × 45.

21, 22. *Miliolina funafutiensis* Chapman. Fig. 21. Side view. Fig. 22. Oral view. × 62.

23–26. *Miliolina exsculpta*, sp. n. Figs. 23, 24. Side views. Fig. 25. Edge view. Fig. 26. Oral view. × 45.

27–30. *Miliolina rotunda* (d'Orbigny). Figs. 27, 28. Front views. Fig. 29. Edge view. Fig. 30. Oral view. × 45.

31. *Miliolina seminulum* (Linné). Abnormal specimen with an "articuline" additional chamber. × 45.

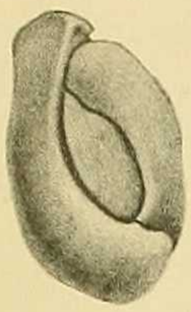
32. *Miliolina auberiana*, var. *stenostoma* Karrer. Side view. × 45.

33–36. *Miliolina cuvieriana* (d'Orbigny). Figs. 33, 34. Side views (not typical). Fig. 35. Edge view. Fig. 36. Oral view. × 62.

37–40. *Miliolina crassa* (d'Orbigny). Figs. 37, 38. Side views. Fig. 39. Edge view. Fig. 40. Oral view. × 62.

41. *Miliolina crassa.* Side view of a small acute-edged variety approaching *M. auberiana* in section. × 62.

42–45. *Miliolina bicostata* (d'Orbigny). Figs. 42–44. Side views. Fig. 45. Oral view. × 62.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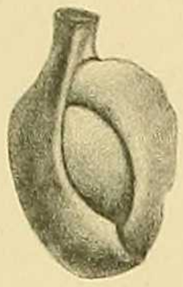
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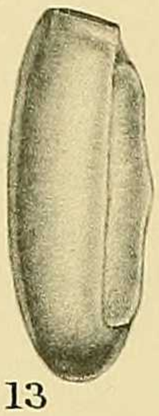
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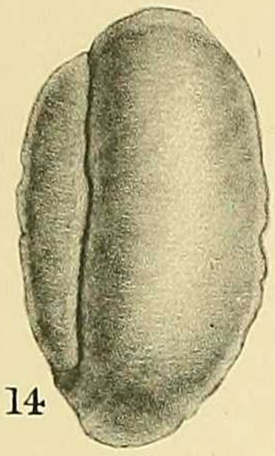
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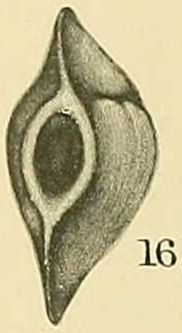
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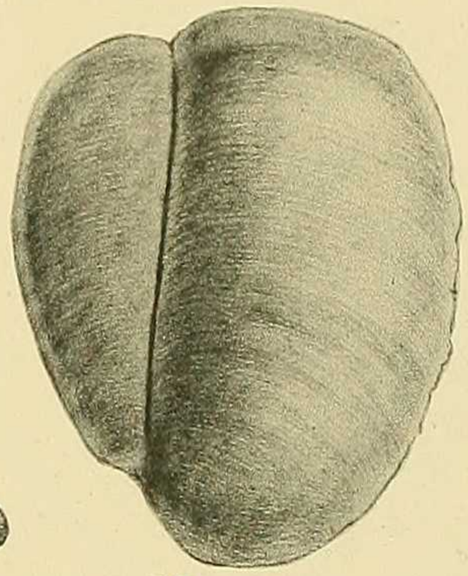
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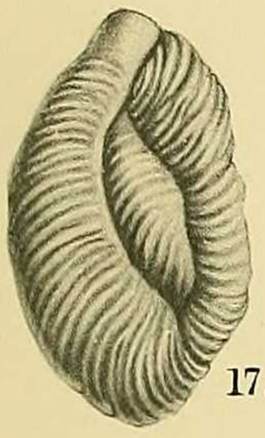
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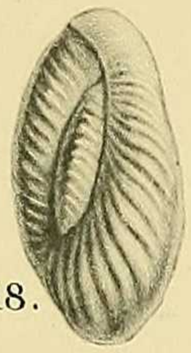
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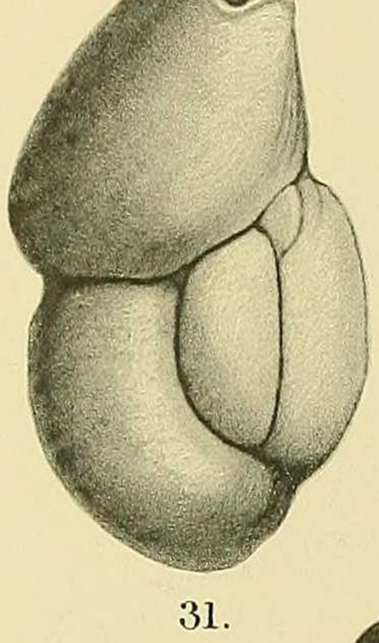
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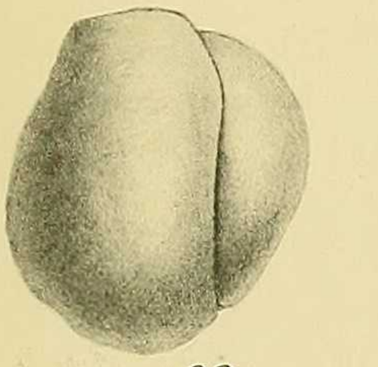
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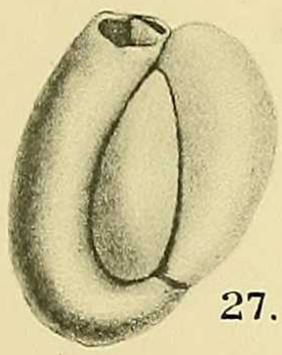
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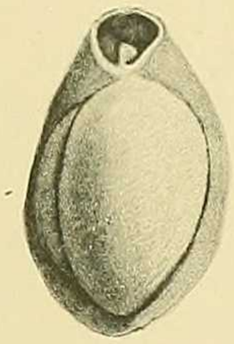
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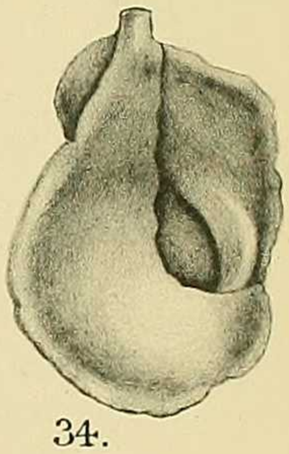
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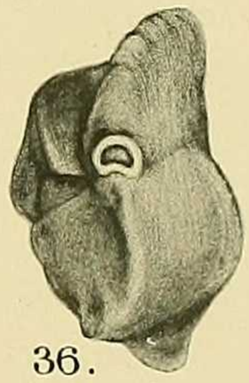
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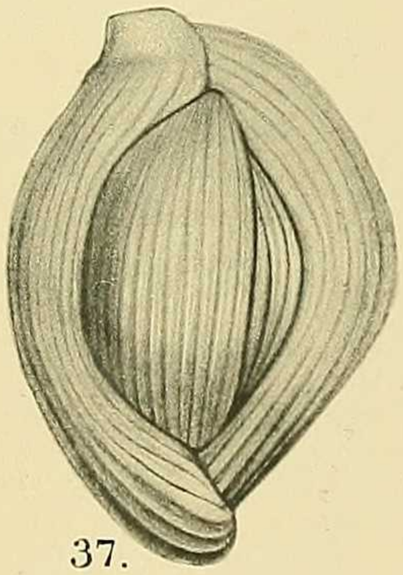
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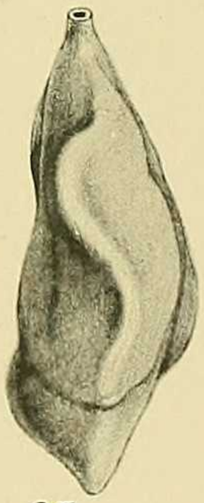
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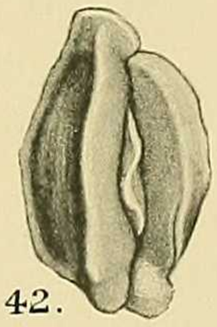
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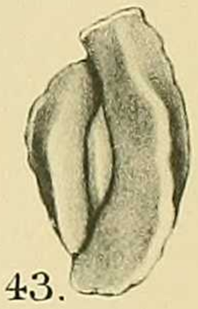
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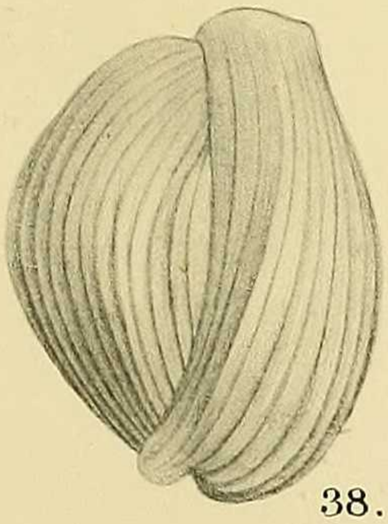
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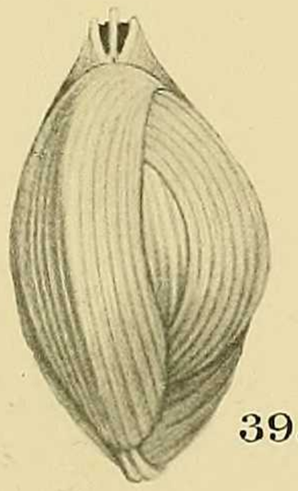
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FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE XLIII.

PLATE XLIII.

Figs. 1–4. *Miliolina undosa* (Karrer). Figs. 1–3. Side views. Fig. 4. Oral view. × 45.

5–8. *Miliolina undulata* (d'Orbigny). Figs. 5–7. Side views. Fig. 8. Oral view. × 45.

9, 10. *Miliolina reticulata* (d'Orbigny) (cf. *Quinqueloculina sagra* d'Orb.). Fig. 9. Side view. Fig. 10. Oral view. × 45.

11, 12. *Miliolina parkeri* Brady. Side views. × 62.

13–23. *Miliolina kerimbatica*, sp. n. Figs. 13–16, 19, 20. Side views of various forms. Figs. 17, 18, 22, 23. Edge views. Fig. 21. Oral view. × 45.

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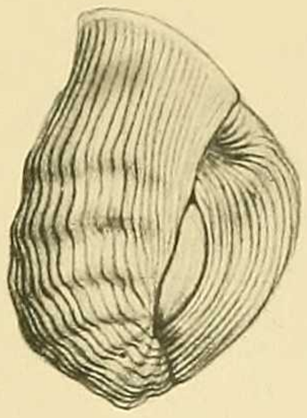

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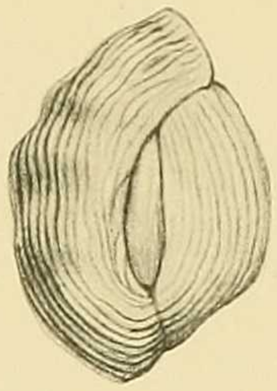

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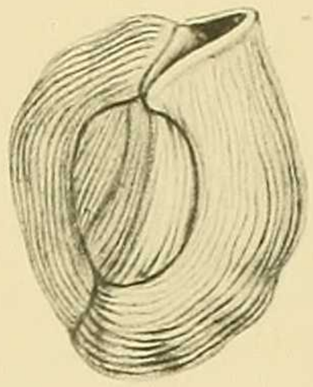

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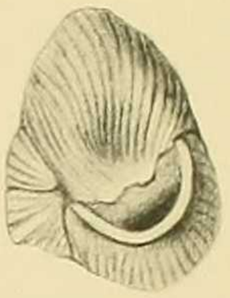

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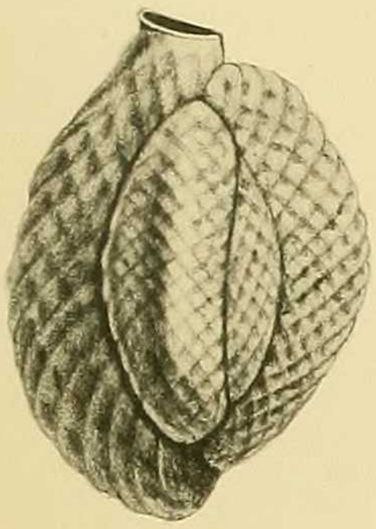

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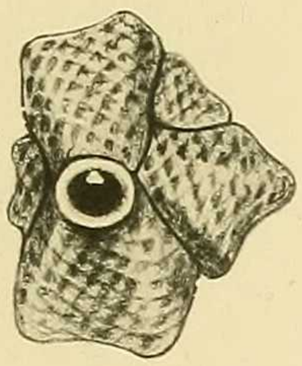

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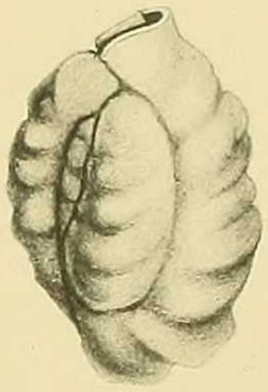

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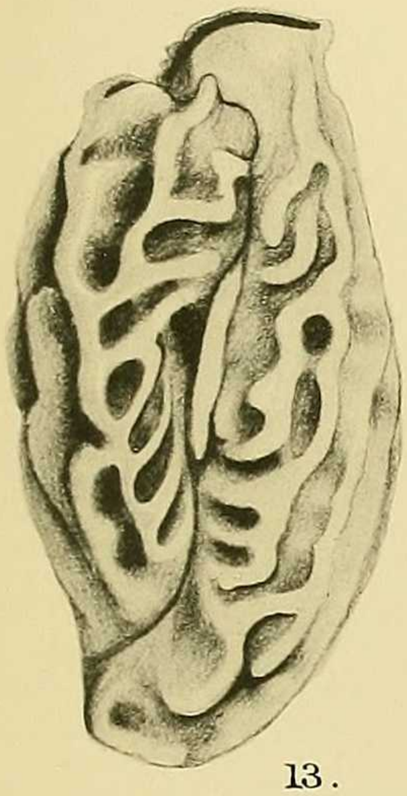

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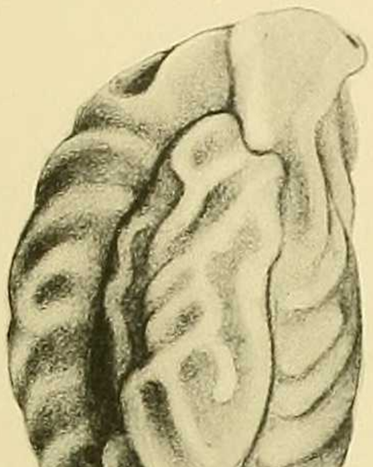

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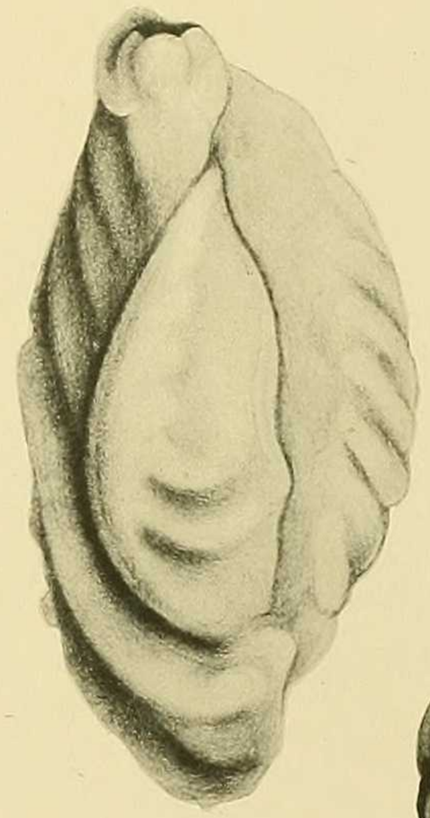

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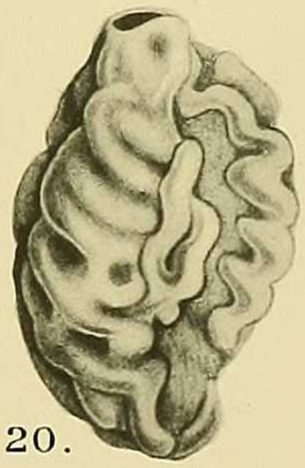

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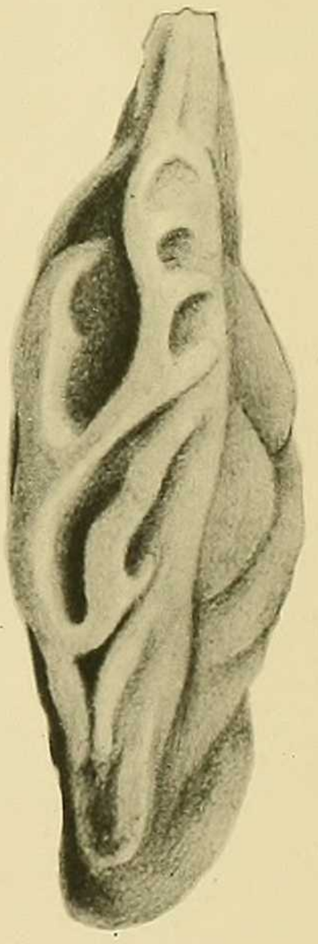

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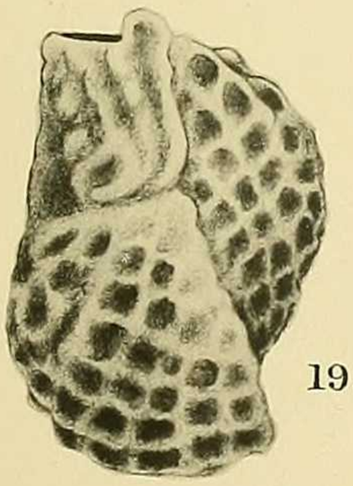

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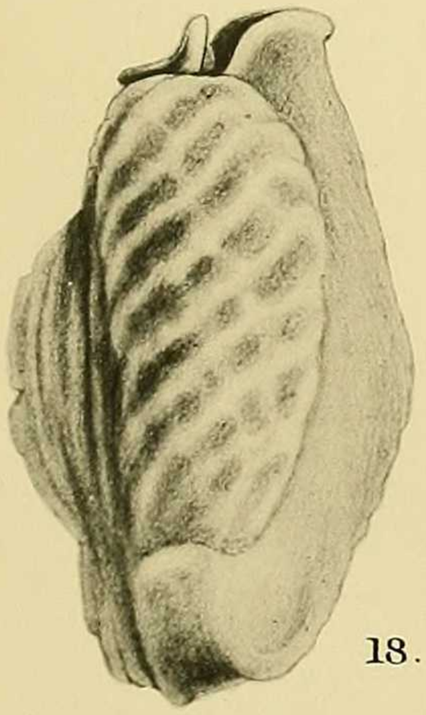

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FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE XLIV.

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PLATE XLIV.

Figs. 1–4. *Miliolina sclerotica* (Karrer). Figs. 1, 2. Side views. Fig. 3. Edge view. Fig. 4. Oral view. × 27.

5–8. *Miliolina limbata* (d'Orbigny). Fig. 5. Front view. Fig. 6. Back view. Fig. 7. Dorsal view. Fig. 8. Oral view. × 45.

9–12. *Miliolina costata* (d'Orbigny). Fig. 9. Front view. Fig. 10. Back view. Fig. 11. Edge view. Fig. 12. Oral view. × 45.

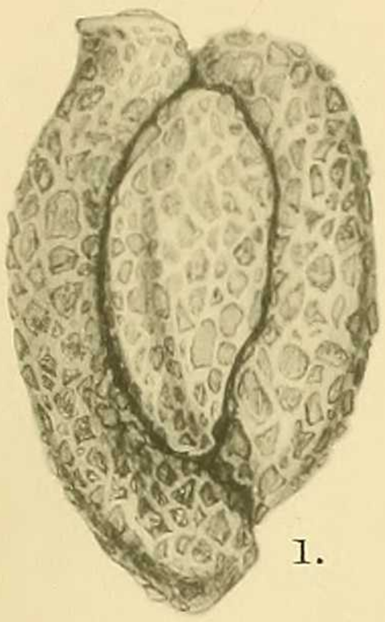
13–17. *Miliolina striata* (d'Orbigny). Figs. 13 & 15. Front views. Fig. 14. Back view. Fig. 16. Edge view. Fig. 17. Oral view. × 45.

18–21. *Miliolina scrobiculata* Brady. Figs. 18–20. Side views. Fig. 21. Oral view. × 62.

22, 23. *Miliolina triquetra* Brady. Fig. 22. Side view. Fig. 23. Oral view. × 45.

24–27. *Massilina secans* (d'Orbigny). Rough variety. Figs. 24, 25. Side views. Fig. 26. Edge view. Fig. 27. Oral view. × 45.

28–31. *Massilina secans*, var. *tenuistriata* Earland. Fig. 28. Front view. Fig. 29. Back view. Fig. 30. Edge view. Fig. 31. Oral view. × 45.



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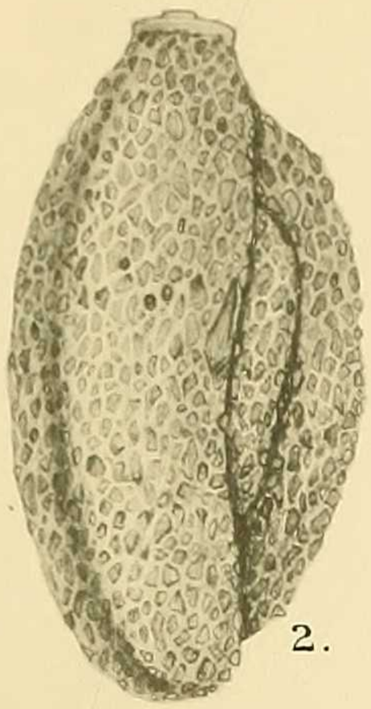

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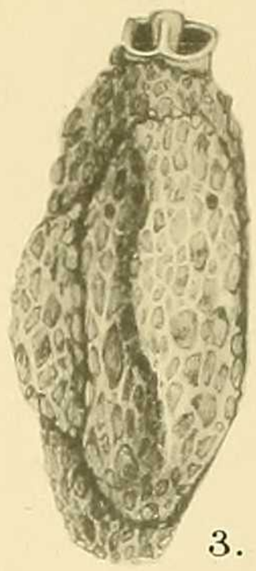

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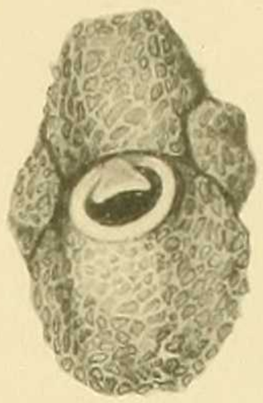

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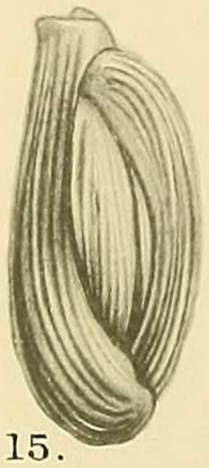

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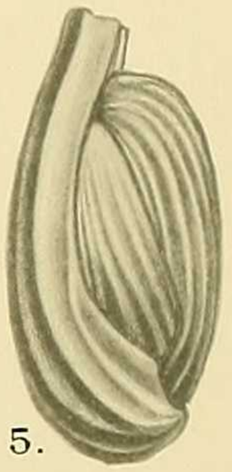

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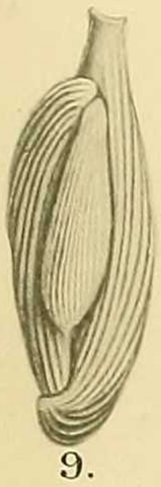

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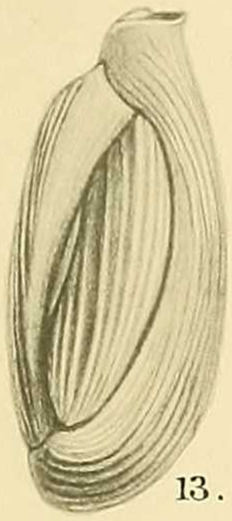

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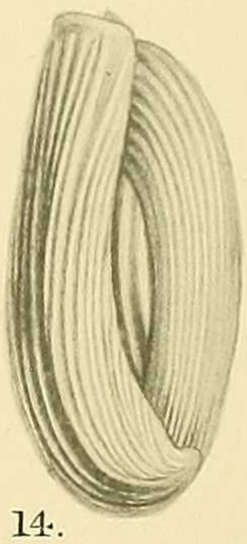

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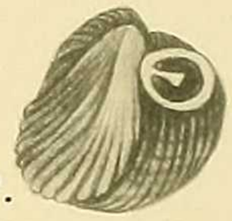

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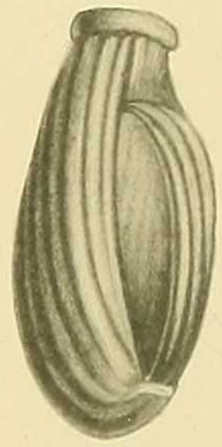

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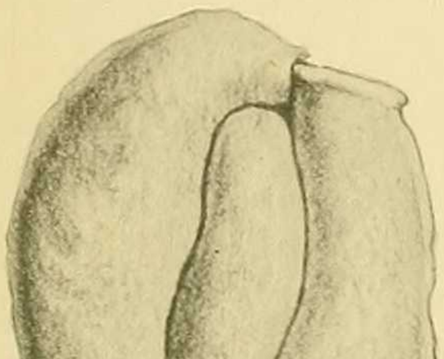

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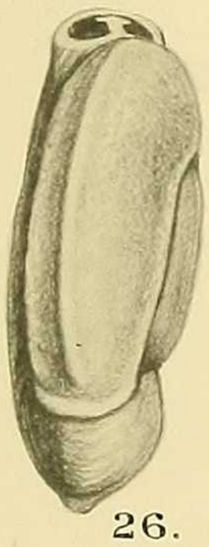

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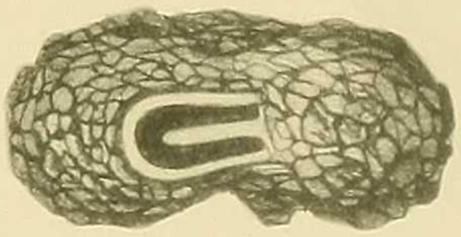

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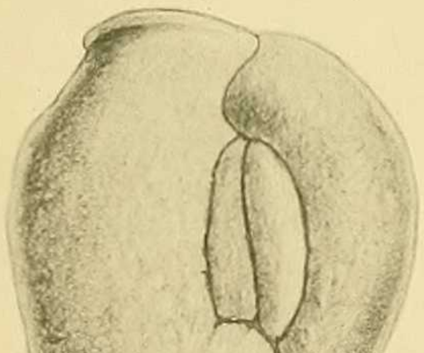

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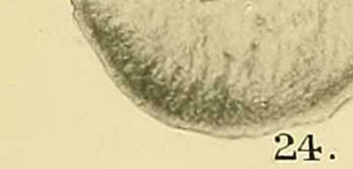

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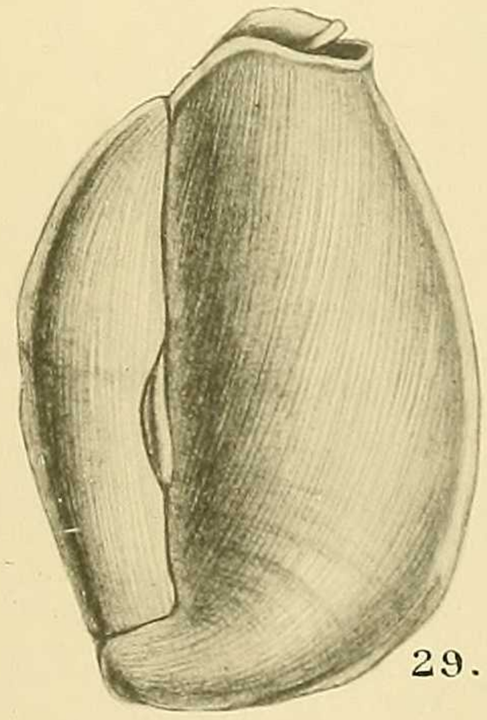

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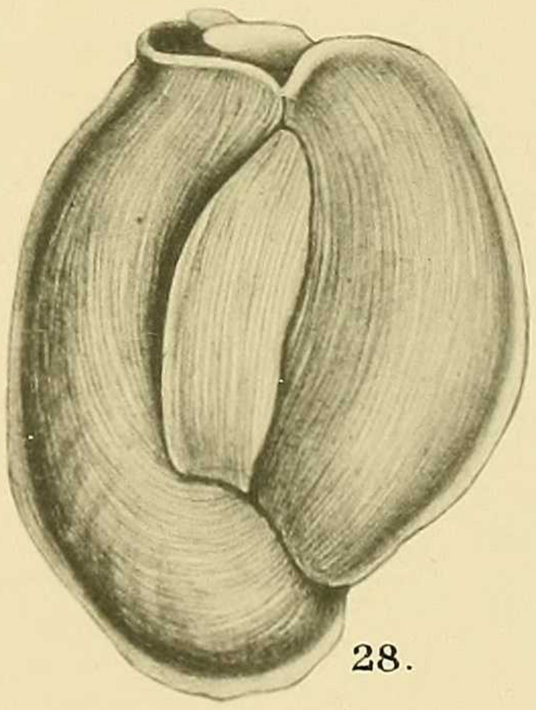

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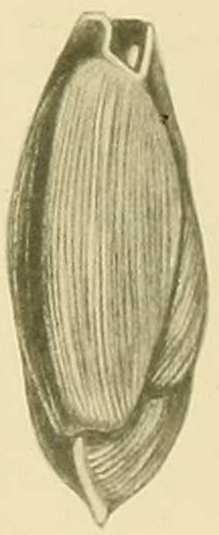

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Huth, coll.

FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE XLV.

PLATE XLV.

Figs. 1–4. *Massilina secans*, var. *reticulata* nov. Figs. 1, 2. Side views. Fig. 3. Side view of abnormal specimen. Fig. 4. Oral view. × 45.

5–12. *Massilina secans*, var. *rugosa* nov. Figs. 5–7. Side views. Fig. 8. Side view of distorted specimen. Fig. 9. Side view of large compressed type. Fig. 10. Edge view. Fig. 11. Oral view. Fig. 12. Section. × 27.

13–14. *Massilina macilenta* (Brady). Fig. 13. Side view. Fig. 14. Oral view. × 45.

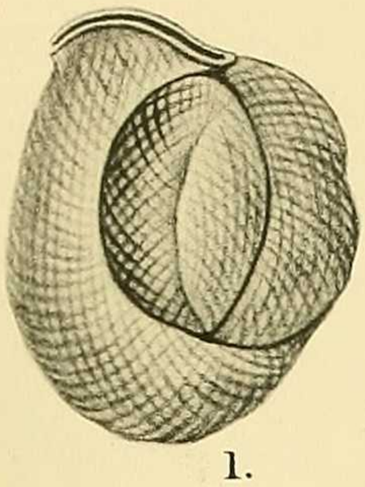
15. *Massilina alveoliniformis* Millett. Young form. × 45.

16–18. *Sigmoilina ovata* Sidebottom. Fig. 16. Side view. Fig. 17. Edge view. Fig. 18. Oral view. × 45.

19–21. *Sigmoilina edwardsi* Schlumberger. Figs. 19, 20. Side views. Fig. 21. Oral view. × 45.

22–25. *Articulina sagra* d'Orbigny. Figs. 22–24. Side views. Fig. 25. Oral view. × 45.

26–33. *Articulina conico-articulata* (Batsch). Figs. 26, 27. Dentaline type of Brady. Figs. 28, 29. Straight type of Batsch. Fig. 28. Showing early milioline chambers. Fig. 30. Batsch type approaching d'Orbigny's Modèle no. 22 (*Articulina nitida*) also showing milioline early chambers. Fig. 31. Dentaline type of Karrer. Fig. 32. Diagrammatic section showing milioline initial portion of the Batsch type. Fig. 33. Diagrammatic section showing orbitoline initial portion of the dentaline type. Figs. 26–31, × 45. Figs. 32, 33, × 98.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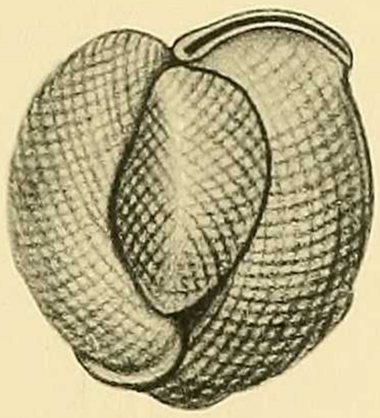
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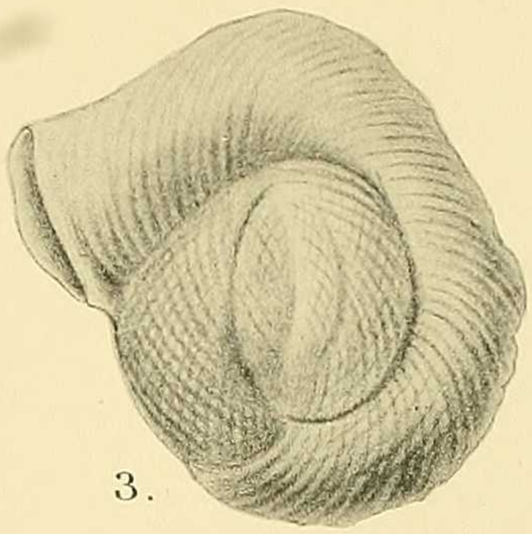
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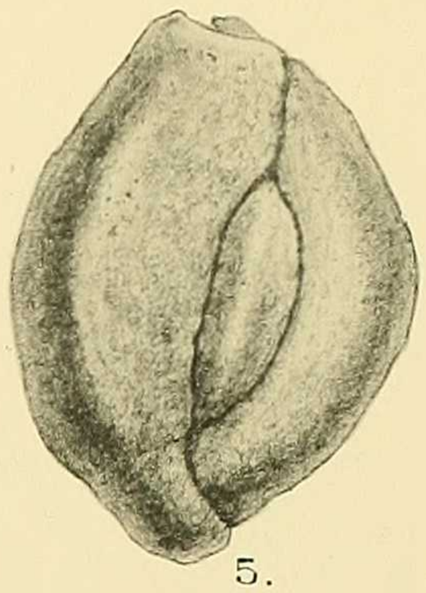
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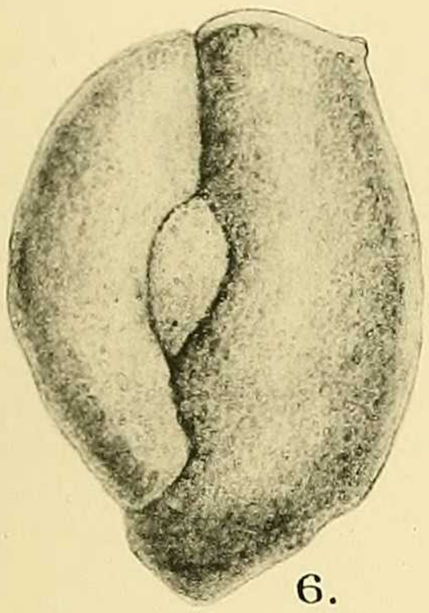
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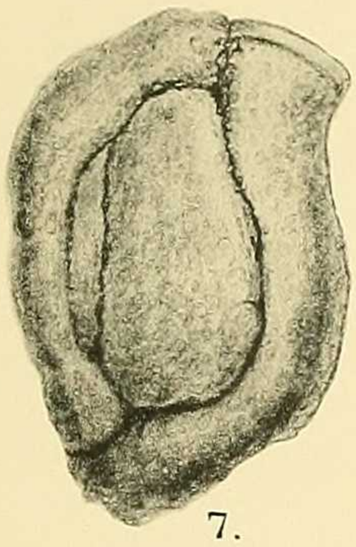
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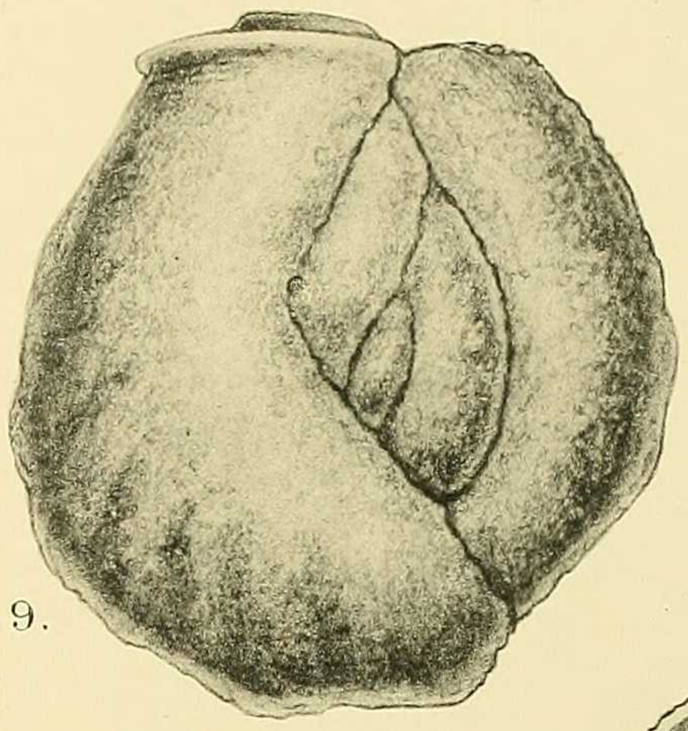
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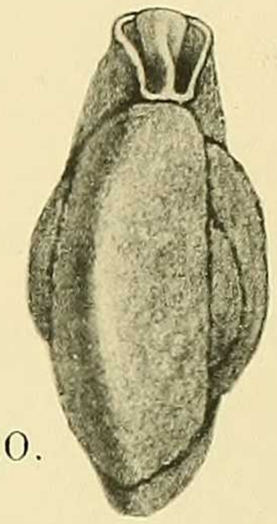
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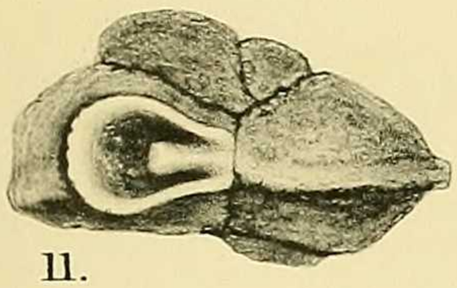
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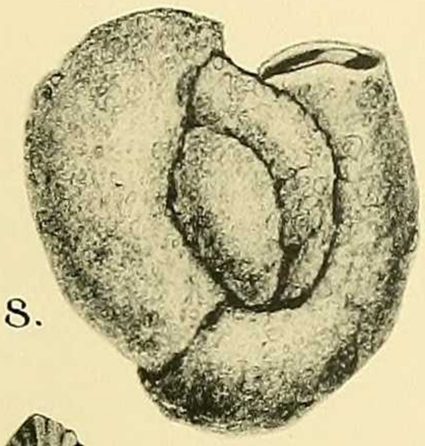
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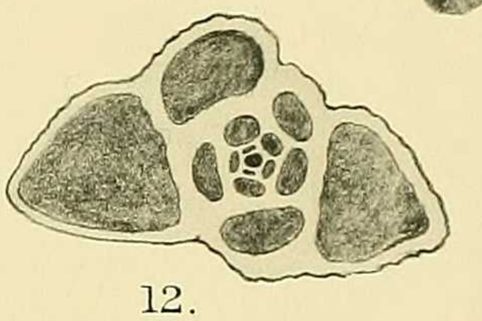
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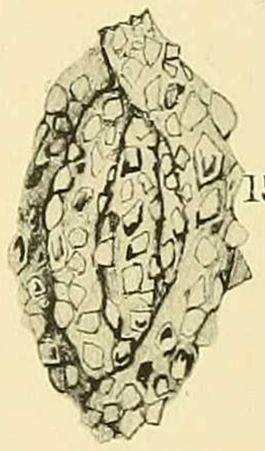
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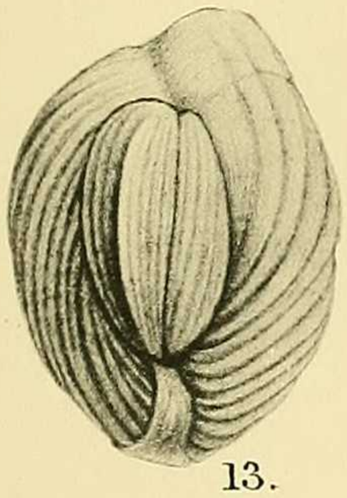
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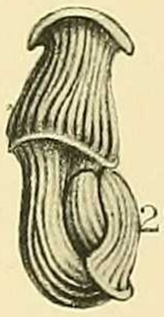
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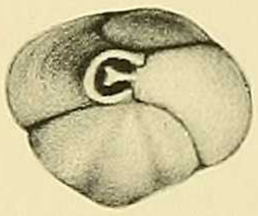
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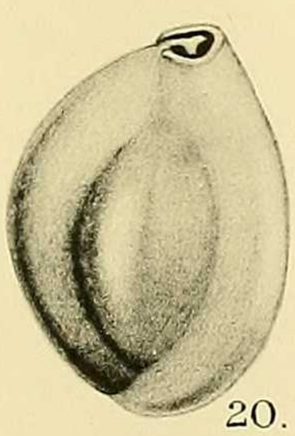
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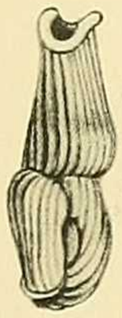
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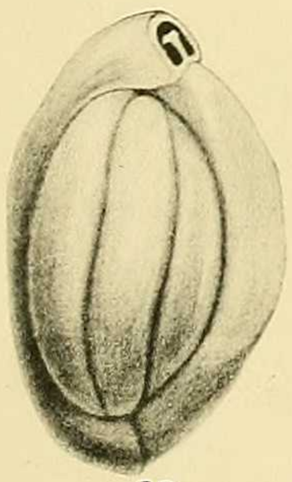
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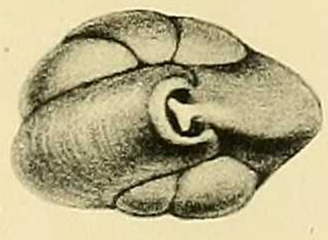
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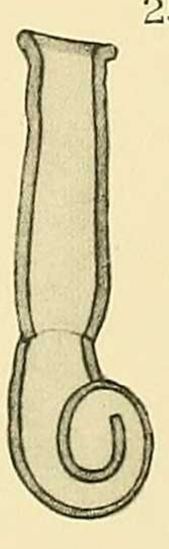
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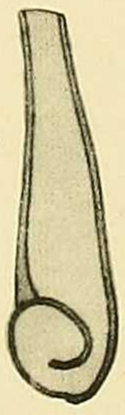
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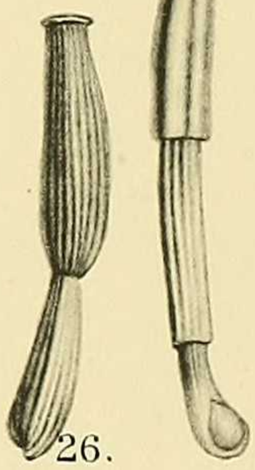
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Huth, coll.

FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE XLVI.

PLATE XLVI.

Figs. 1, 2. *Hauerina fragilissima* (Brady). Fig. 1. Side view. Fig. 2. Oral view. × 45.

3–7. *Planispirina auriculata* Egger. Figs. 3, 4. Broad type, front view. Fig. 5. Ditto, back view. Fig. 6. Narrow type, front view. Fig. 7. Ditto, back view. × 62.

8, 9. *Planispirina communis* Seguenza. Fig. 8. Side view. Fig. 9. Edge view. × 45.

10–14. *Fischerina helix*, sp. n. Fig. 10. Superior view. Fig. 11. Inferior view. Fig. 12. Side view. Fig. 13. Superior view of a specimen mounted in balsam. Fig. 14. Inferior view of the same. (The septal lines on the upper plane in figs. 13 & 14 are exaggerated in the drawing for clearness.) × 98.

15. *Cornuspira charoides*, sp. n. × 98.

16, 17. *Rhaphidoscene conica* Vaughan Jennings. Fig. 16. The test attached to an algal fragment, superior view. Fig. 17. Side view. × 45.

18, 19. *Aschemonella ramuliformis* Brady. Fig. 18. Fragment of a straight tube. Fig. 19. A furcating fragment. × 15.

20, 21. *Haplophragmium compressum* Goës. Fig. 20. Side view. Fig. 21. Edge view. × 62.

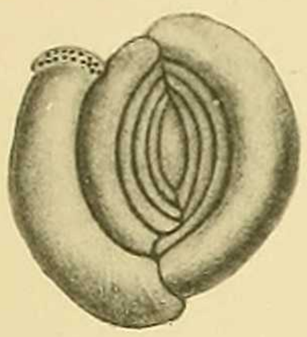
22. *Haddonia torresiensis* Chapman. × 45.

23, 24. *Hippocrepina oviformis*, sp. n. Fig. 23. Side view. Fig. 24. Oral view. × 98.

25. *Hormosina globulifera* Brady. × 45.

26. *Ammodiscus gordialis* (Jones & Parker). Attached specimen. × 62.

27, 28. *Trochammina ochracea* (Williamson). With marginal outgrowths. Fig. 27. Superior view. Fig. 28. Inferior view. × 62.



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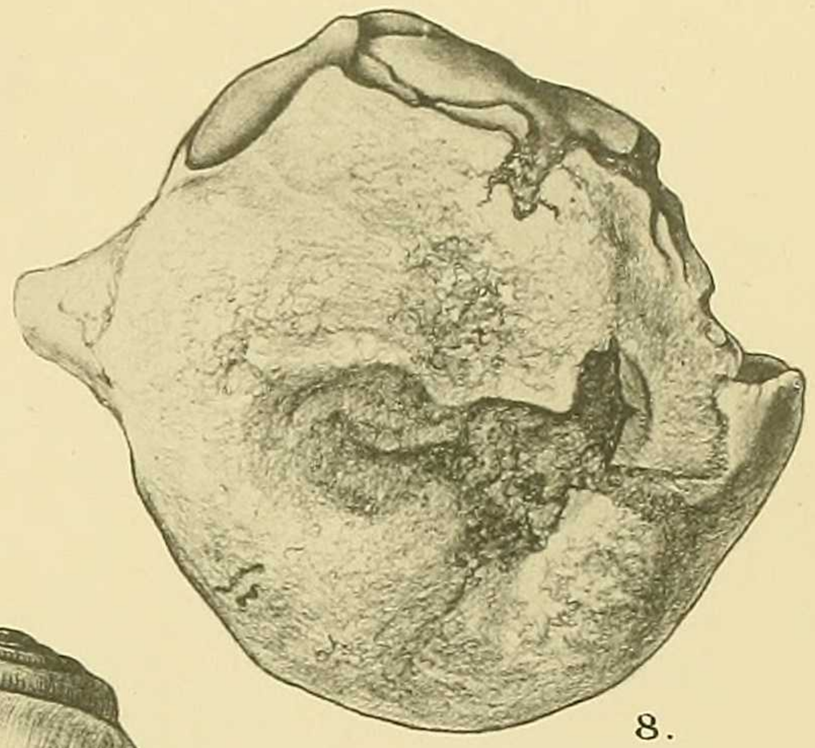

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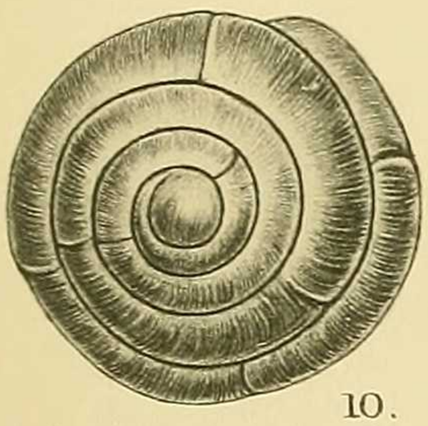

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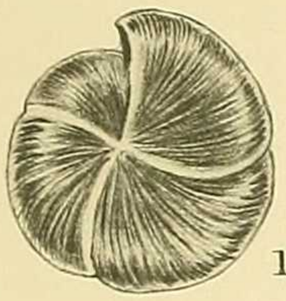

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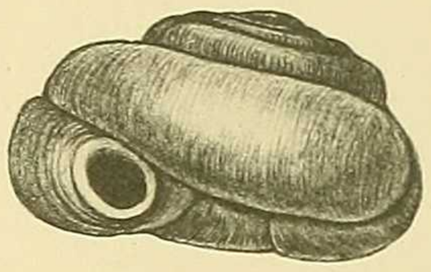

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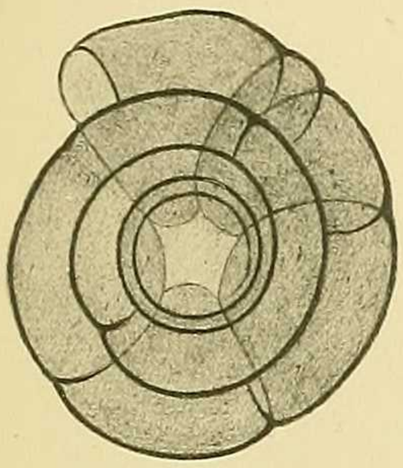

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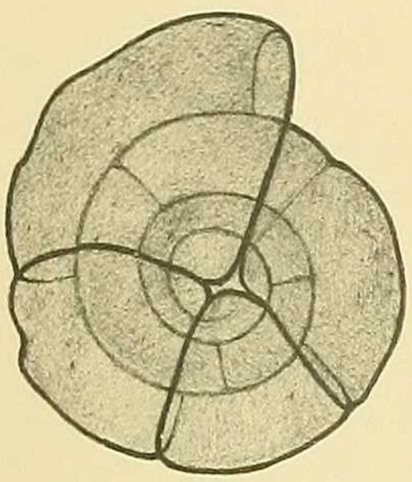

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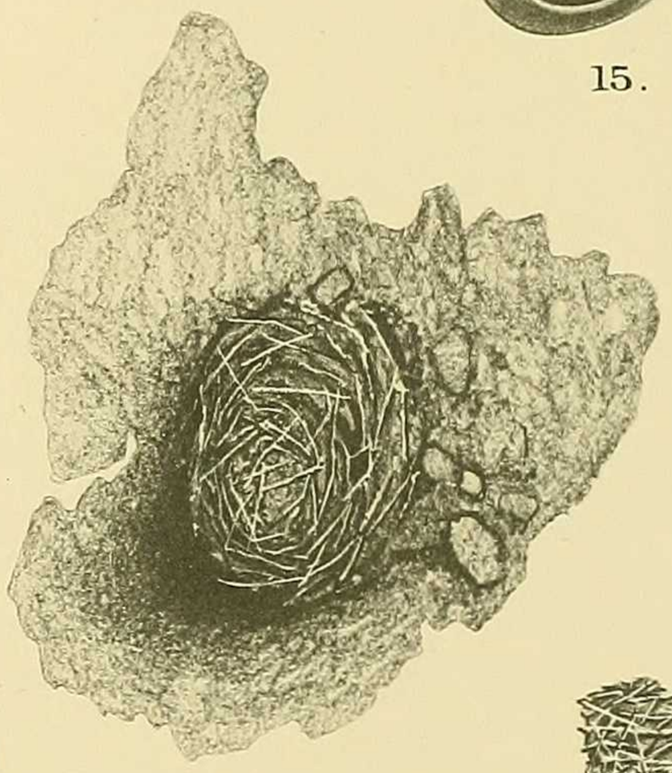

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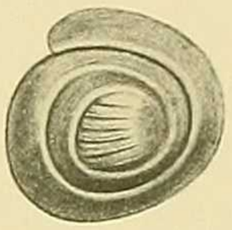

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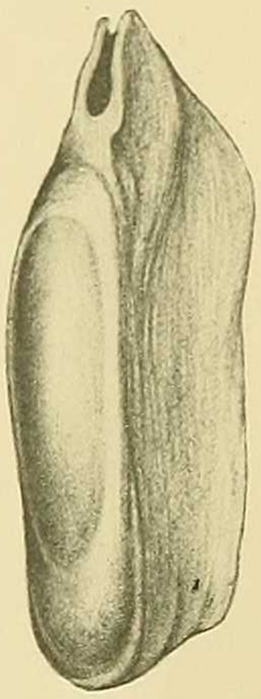

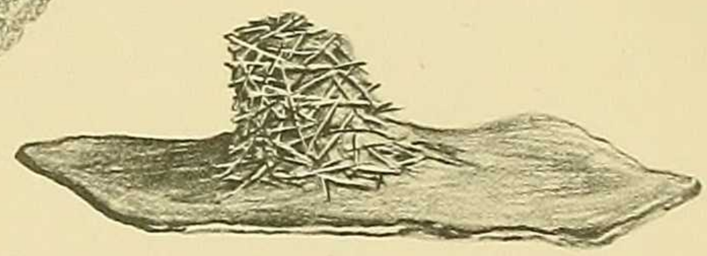

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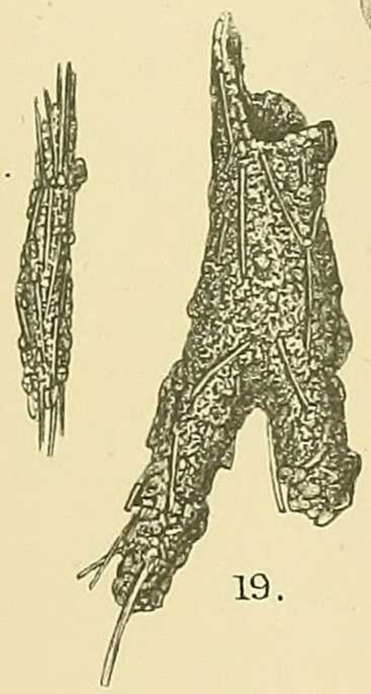

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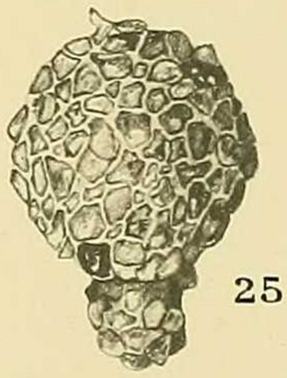

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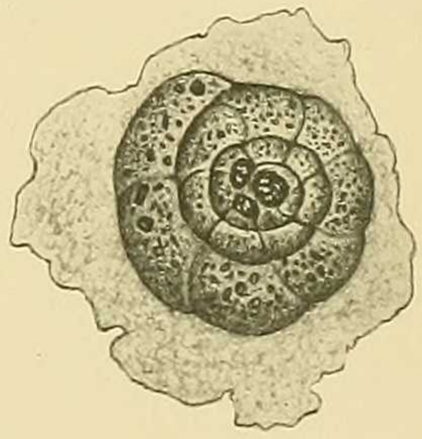

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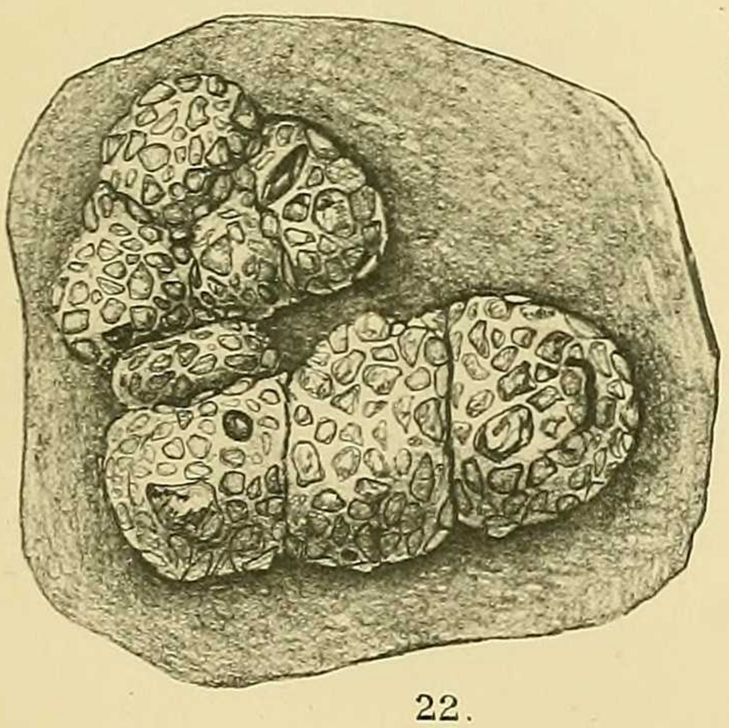

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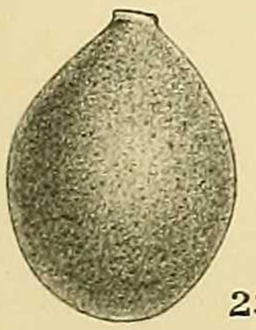

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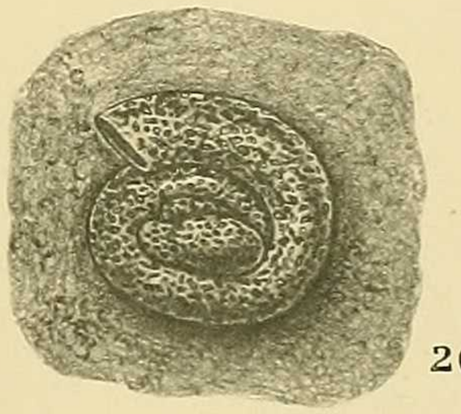

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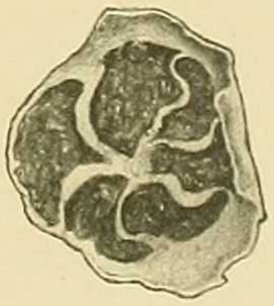

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FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

Huth, coll.

PLATE XLVII.

PLATE XLVII.

Figs. 1–4. *Textularia inconspicua* Brady. Spinulose variety. Figs. 1, 2. Side views. Fig. 3. Edge view. Fig. 4. Apical view. × 130.

5, 6. *Textularia crispata* Brady. Fig. 5. Side view. Fig. 6. Edge view. × 45.

7–9. *Textularia rugosa* (Reuss). Gaudryine variety. Fig. 7. Edge view. Fig. 8. Side view, showing aperture and textularian arrangement of later chambers. Fig. 9. Apical view, showing triserial arrangement of early chambers. × 45.

10–16. *Textularia candeiana* d'Orbigny. Fig. 10. Large form, side view. Fig. 11. Edge, or oral view. Fig. 12. Abbreviated form. Figs. 13, 14. Small form, side views. Fig. 15. Edge or oral view. Fig. 16. Apical view. × 30.

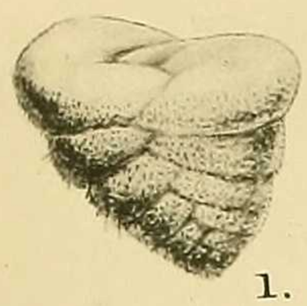
17–20. *Textularia foliacea*, sp. n. Figs. 17–19. Side views. Fig. 20. Edge view. × 45.

21–23. *Textularia hauerii* d'Orbigny. Figs. 21, 22. Side views. Fig. 23. Edge or oral view. × 45.

24–27. *Textularia conica*, var. *corrugata* nov. Fig. 24. Side view. Fig. 25. Edge or oral view. Fig. 26. Apical view. Fig. 27. Basal view. × 45.

28. *Textularia trochus* d'Orbigny. Abnormal specimen showing lateral twist of long axis at mid-growth. × 45.

29–31. *Chrysalidina dimorpha* Brady. Fig. 29. Side view. Fig. 30. Edge view. Fig. 31. Oral view. × 50.



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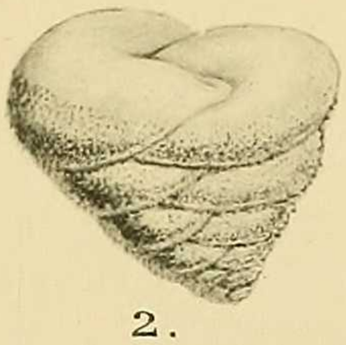

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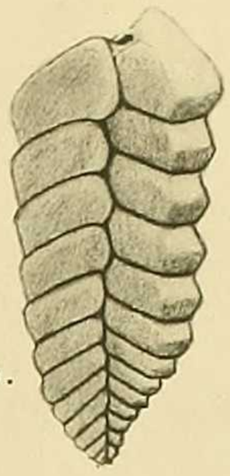

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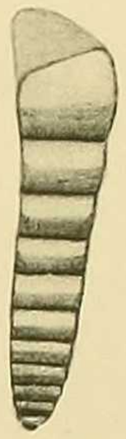

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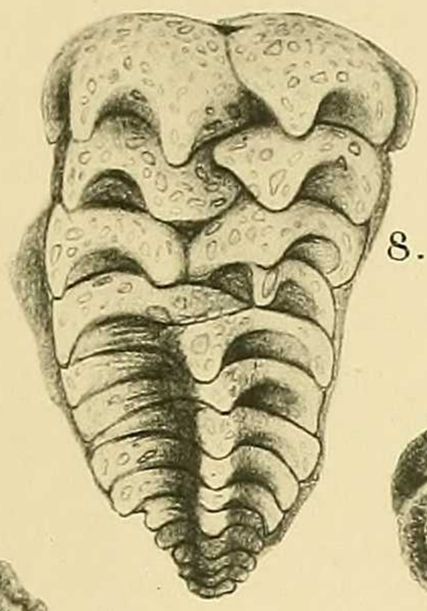

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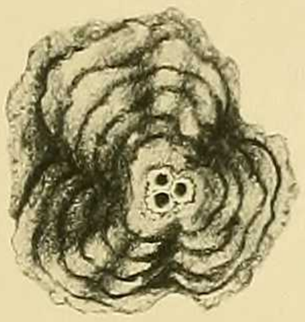

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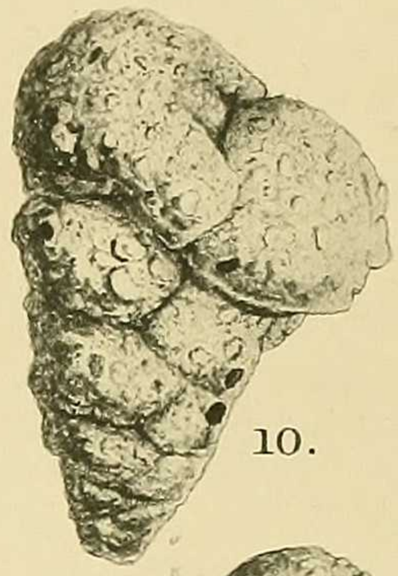

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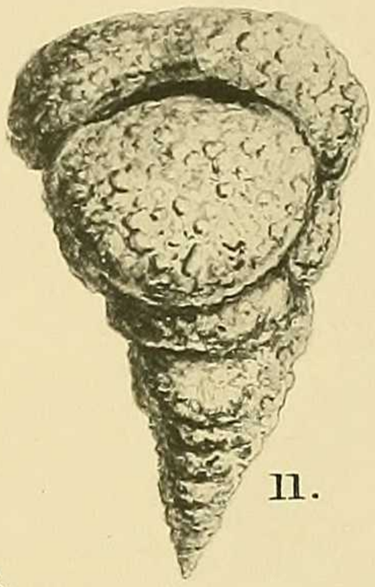

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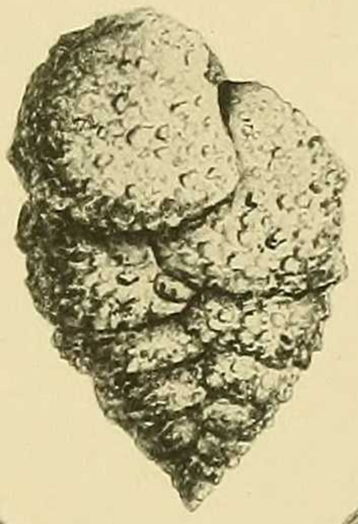

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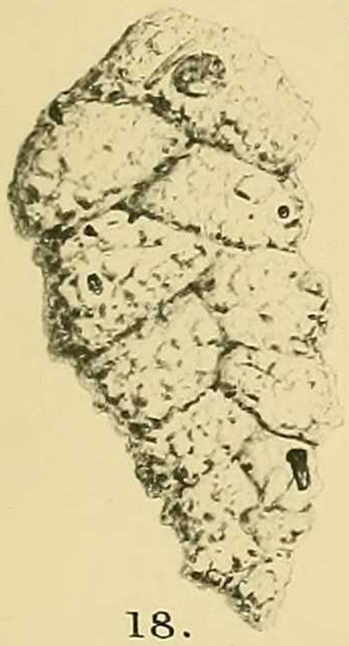

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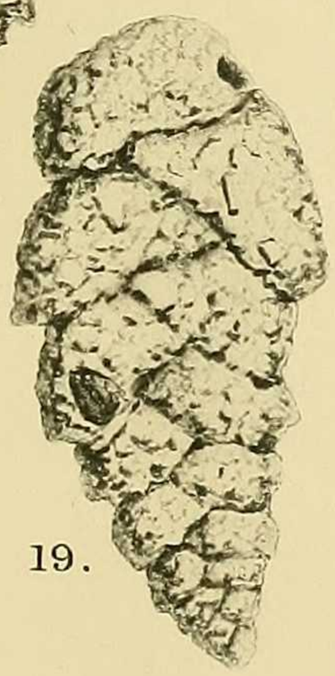

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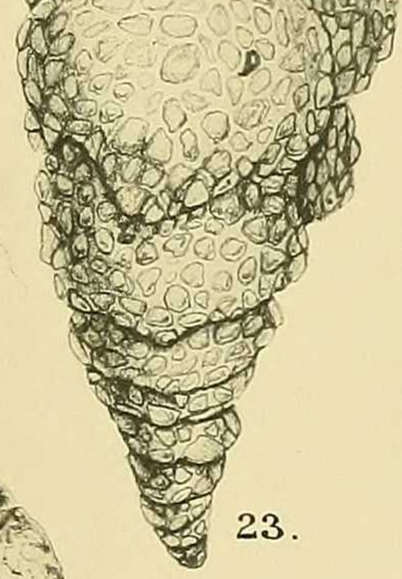

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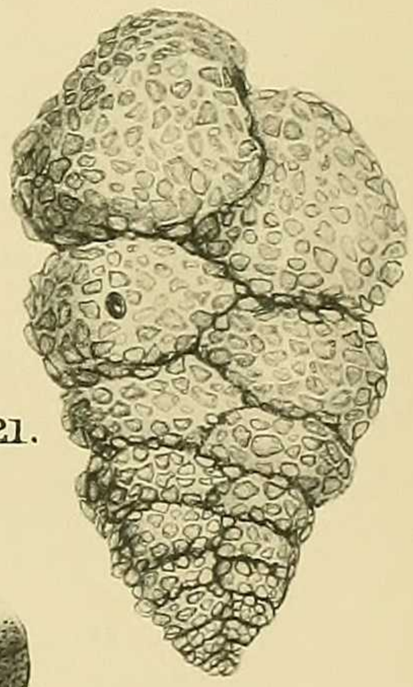

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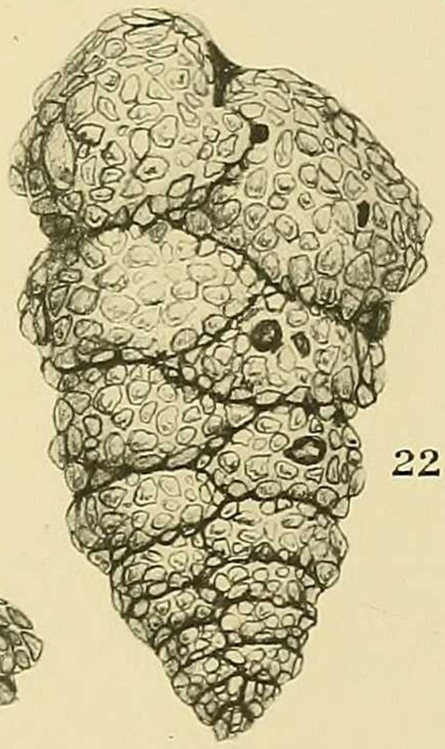

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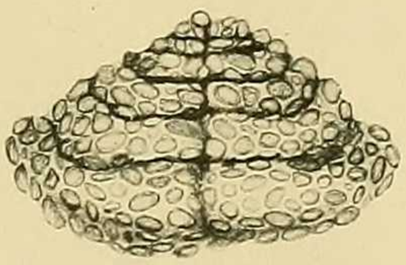

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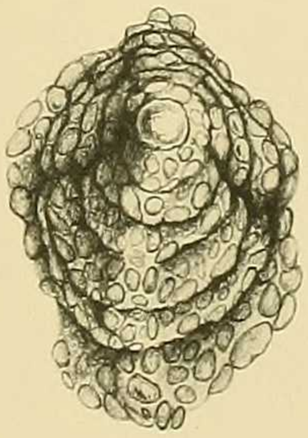

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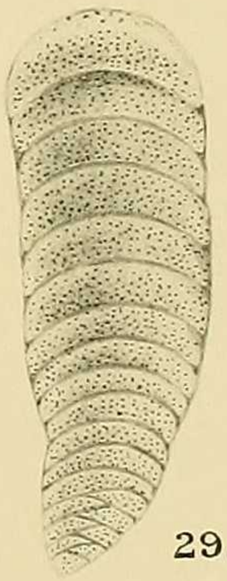

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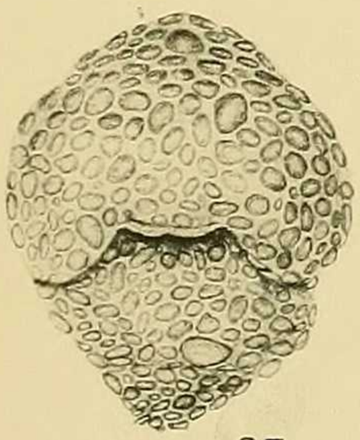

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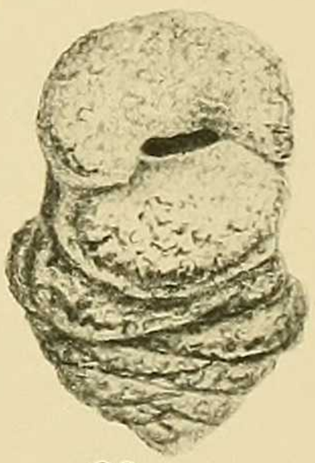

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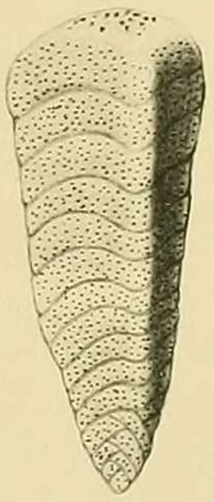

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FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE XLVIII.

PLATE XLVIII.

Figs. 1–6. *Pavonina flabelliformis* d'Orbigny. Figs. 1–5. Side views in various stages of growth. × 50. Fig. 6. Side view of a specimen in balsam showing early textularian arrangement of chambers followed by the pavonine series. × 70.

7–14. *Gaudryina scabra* Brady. Figs. 7–10. Side views. Fig. 11. Edge or oral view. Figs. 12, 13. Side views. Fig. 14. Edge or oral view. Figs. 12–14. Specimens in balsam showing the gaudryine early chambers. × 110.

15–17. *Clavulina communis* d'Orbigny. Fig. 15. Side view. Fig. 16. Oblique view. Fig. 17. Oral view. × 55.

18, 19. *Clavulina cylindrica* Hantken. Fig. 18. Side view. Fig. 19. Oral view. × 35.

20–22. *Clavulina angularis*, var. *difformis* Brady. Fig. 20. Edge view. Fig. 21. Side view. Fig. 22. Oral view. × 35.

23–30. *Bulimina elegantissima*, var. *compressa* Millett. Fig. 23. Side view, front; showing aperture. Figs. 24, 25. Side views, back. Fig. 25. Showing inflation of the final chamber. Figs. 26, 27. Side views, front; showing aperture resorbed. Figs. 28, 29. Side views of specimens, with final inflated chamber broken away, and internal septa resorbed. Fig. 30. Side view of specimen with large inflated terminal chamber. × 145.

31–35. *Bulimina squammigera* d'Orbigny. Figs. 31, 32. Side views. Figs. 33, 34. Oblique views. Fig. 35. Edge view, showing aperture. × 145.

36, 37. *Bifarina mackinnonii* Millett. Fig. 36. Side view. Fig. 37. Edge view. × 50.


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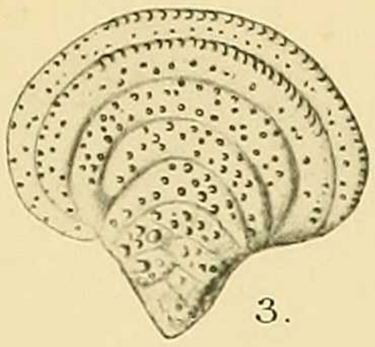
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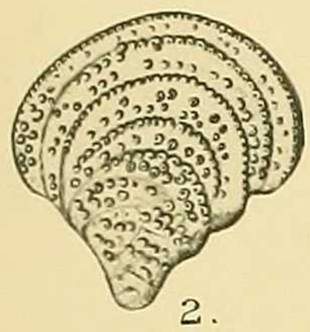
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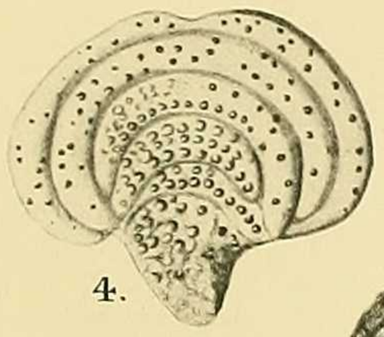
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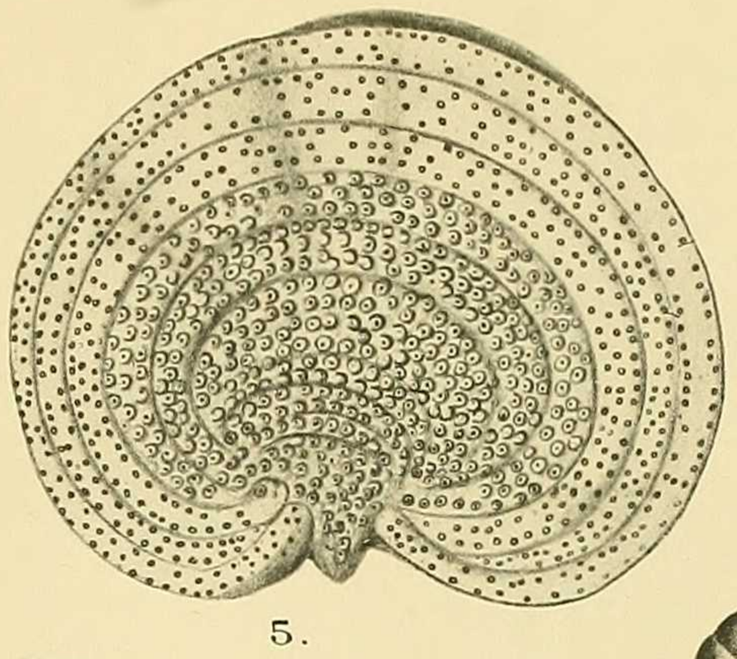
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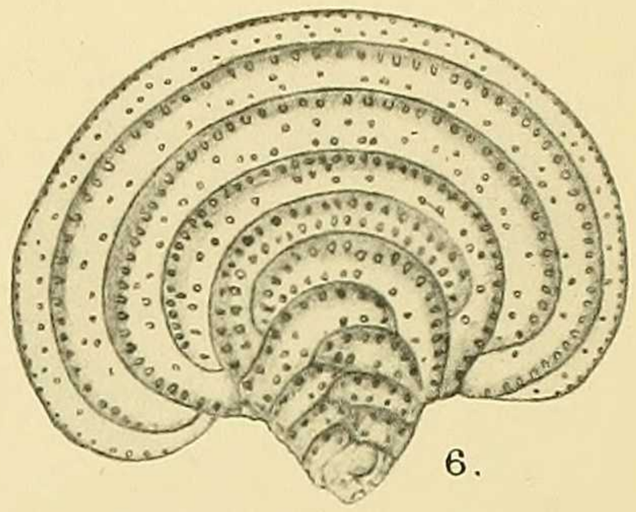
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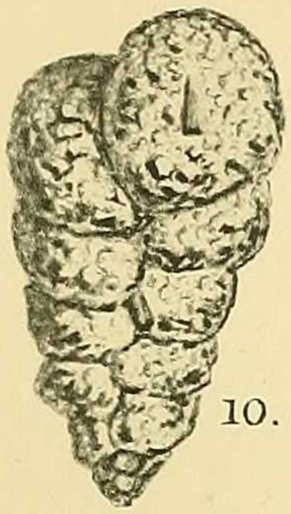
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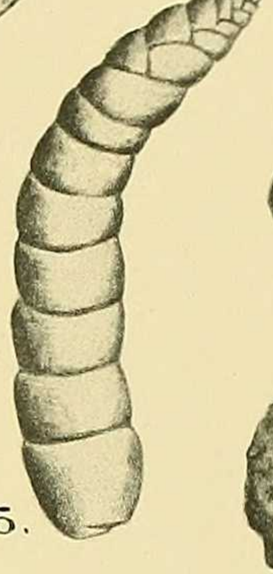
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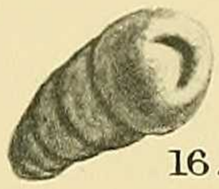
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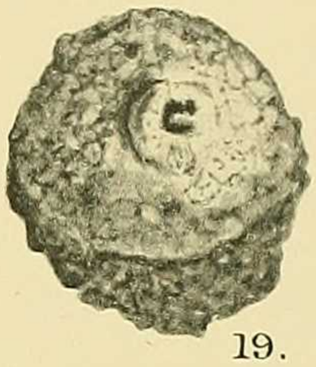
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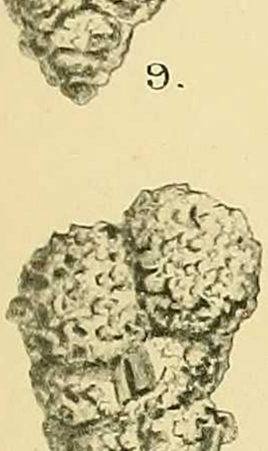
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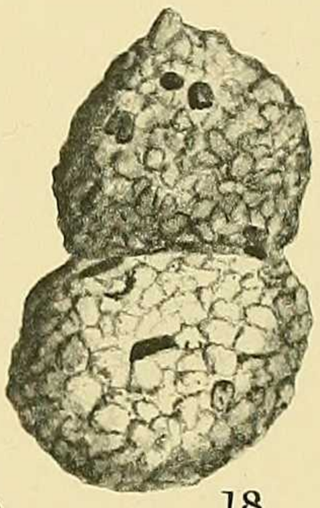
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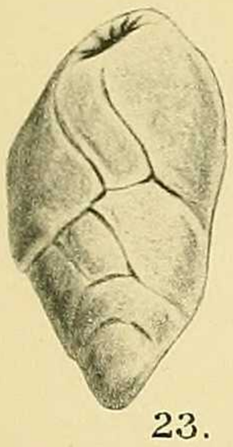
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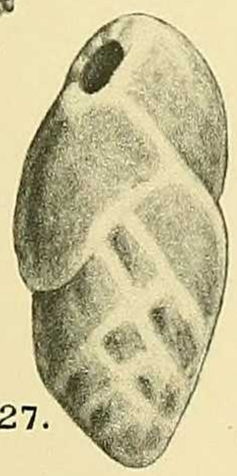
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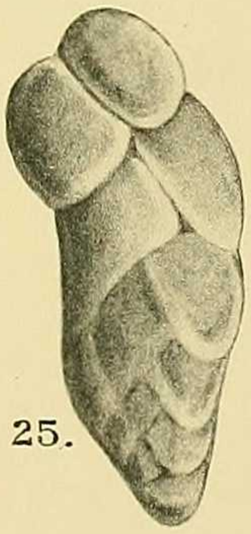
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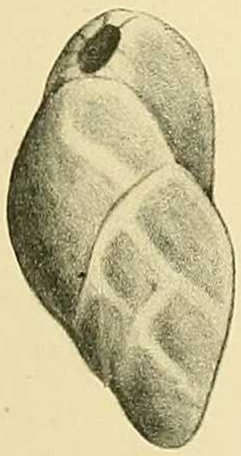
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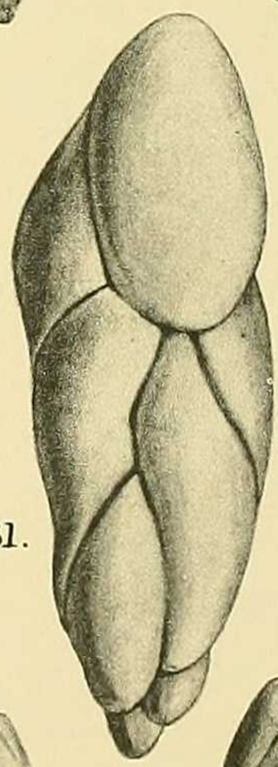
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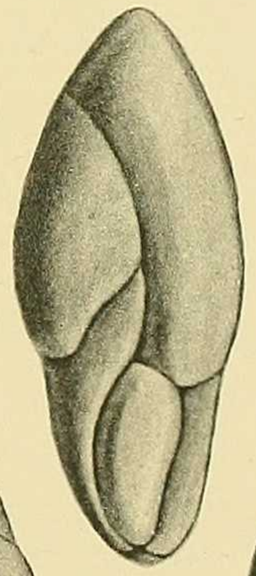
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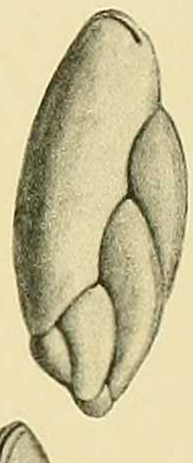
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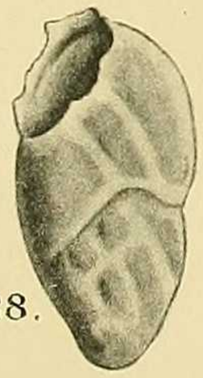
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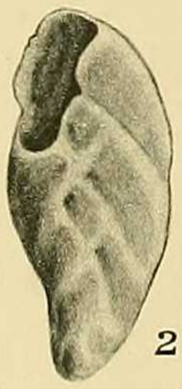
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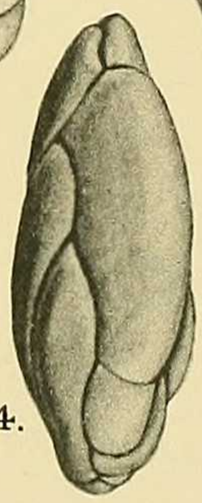
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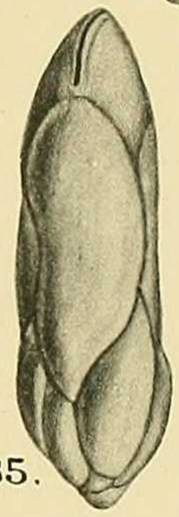
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FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

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PLATE XLIX.

PLATE XLIX.

Figs. 1–12. *Virgulina schreibersiana* Czjzek. Figs. 1, 2, 11, 12. Edge views showing the aperture. Figs. 3–5. Side views, dorsal. Figs. 6–10. Side views, front; showing the aperture. Figs. 1–4, & 6, × 150. Figs. 5, & 7–12, × 100.

13–17. *Virgulina schreibersiana*, var. *carinata* nov. Fig. 13. Side view, back. Figs. 14, 15. Side view, front. Figs. 16, 17. Edge views. × 100.

18–35. *Bolivina simpsoni*, sp. n. Figs. 18–30. Side views in various stages of growth and development. Fig. 31. Side view of an abnormal bifarine specimen. Fig. 32. Edge view. Figs. 33, 34. Side views, in balsam. Fig. 35. Edge view, ditto. × 80.

Huth, coll.

FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE L.

PLATE L.

Figs. 1–4. *Bolivina limbata* Brady. Costate variety. Figs. 1, 2. Side views. Fig. 3. Ditto, tortuose specimen. Fig. 4. Edge view. × 45.

5–11. *Mimosina rimosa*, sp. n. Figs. 5, 6. Side views. Fig. 7. Ditto, with front half of last chamber removed. Fig. 8. Edge view. Fig. 9. End view, basal. Fig. 10. Side view, in balsam, showing the aperture and granular protoplasmic contents. Fig. 11. Edge view, in balsam. × 180.

12–18. *Mimosina echinata*, sp. n. Figs. 12–14. Side views. Fig. 15. Apical view. Figs. 16–18. Edge or oral views. × 150.

19. *Mimosina hystrix* Millett. Side view. × 200.

20. *Cassidulina bradyi*, var. *elongata* Sidebottom. Balsam-mounted specimen. × 350.

21, 22. *Cassidulina* (*Orthoplecta*) *clavata* Brady. Fig. 21. Oral view. Fig. 22. Dorsal view. × 200.

23. *Lagena clavata* (d'Orbigny). Abnormal specimen. × 130.

24–30. *Lagena marginato-perforata* Seguenza. Figs. 24–27. Complanate type. Figs. 24, 25. Side views. Fig. 26. Oral view. Fig. 27. Edge view. Figs. 28–30. Biconvex type. Fig. 28. Side view. Fig. 29. Oral view. Fig. 30. Edge view. Figs. 24–27, × 130. Figs. 28–30, × 100.

31–36. *Lagena orbignyana*, var. *walleriana* Wright. Figs. 31–34. Side views, showing different types of marking. Fig. 35. Edge view. Fig. 36. Oral view. × 130.

37. *Nodosaria spinulosa* (Montagu). × 85.

38–40. *Lagena orbignyana*, var. *kerimbatica* nov. Fig. 38. Side view. Fig. 39. Edge view. Fig. 40. Oral view. × 130.


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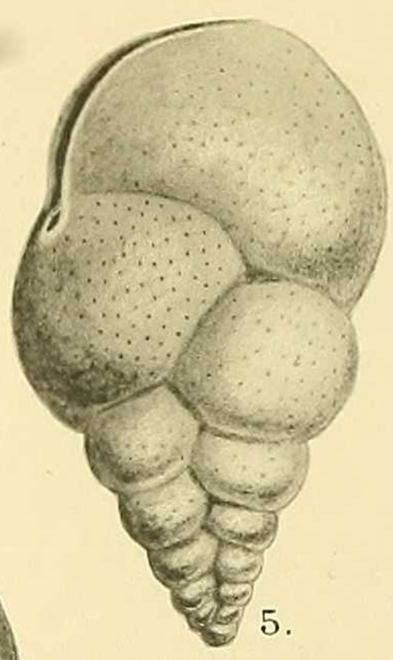
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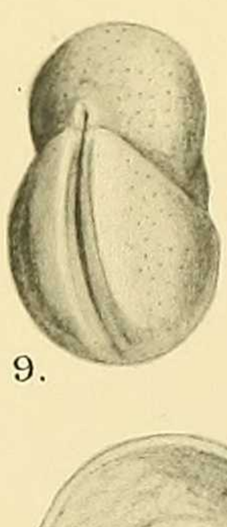
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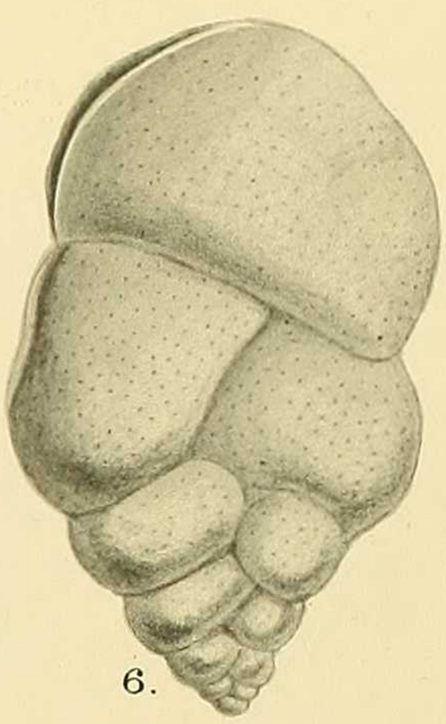
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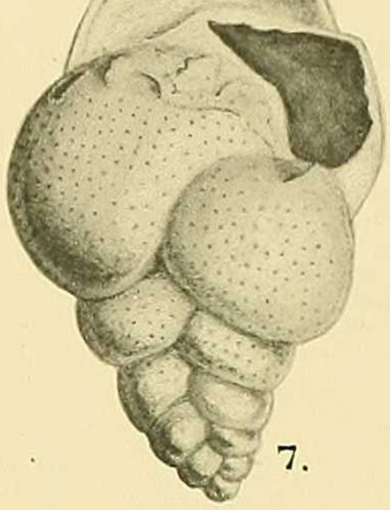
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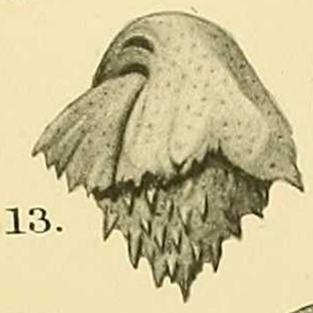
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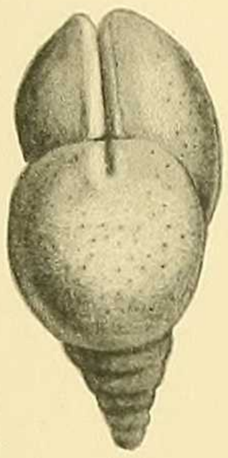
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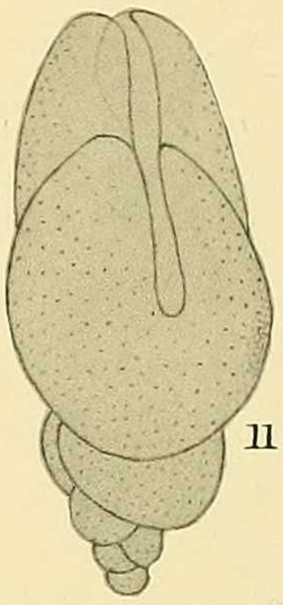
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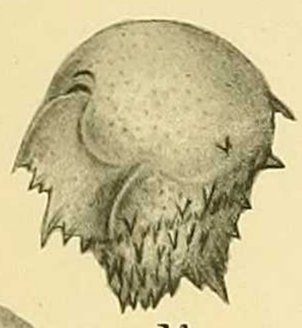
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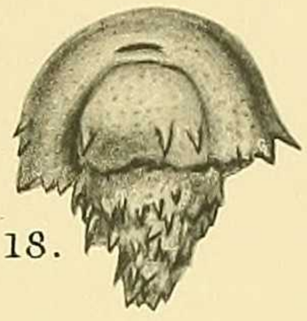
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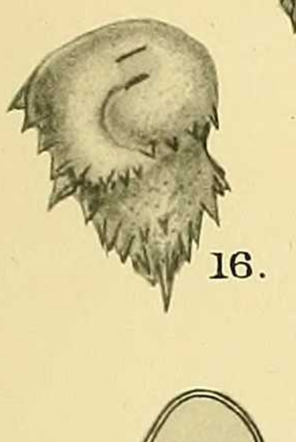
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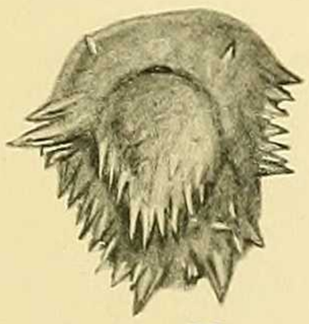
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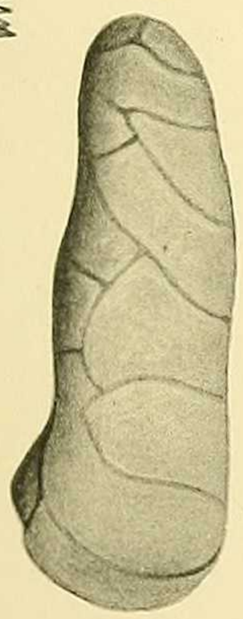
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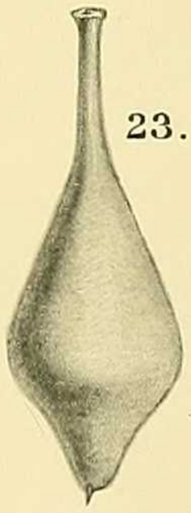
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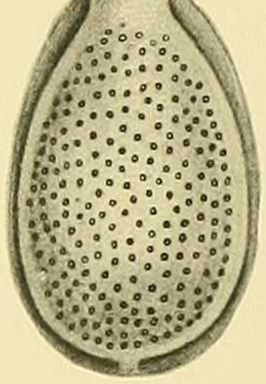
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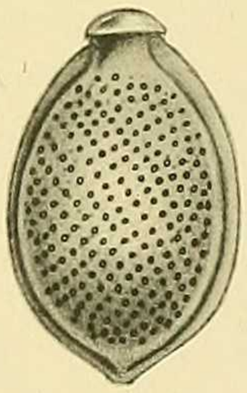
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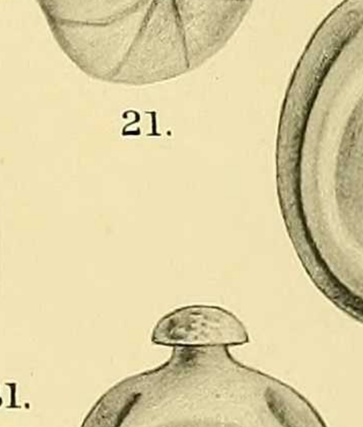
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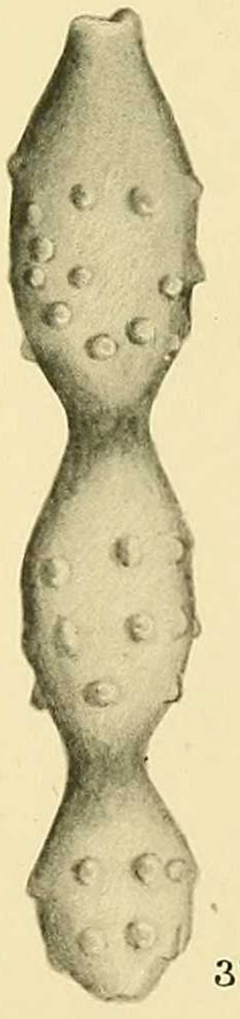
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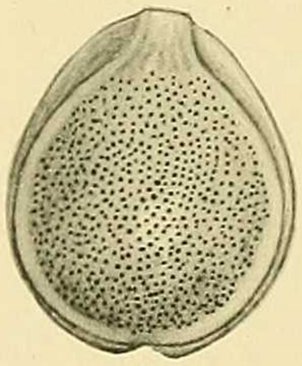
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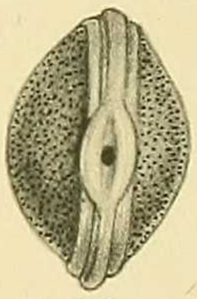
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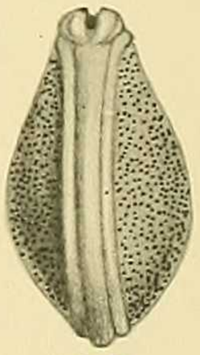
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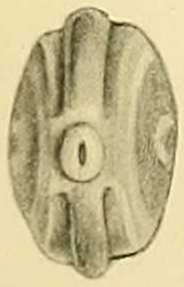
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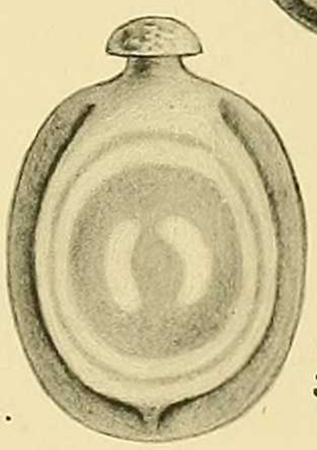
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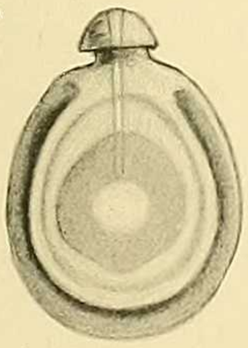
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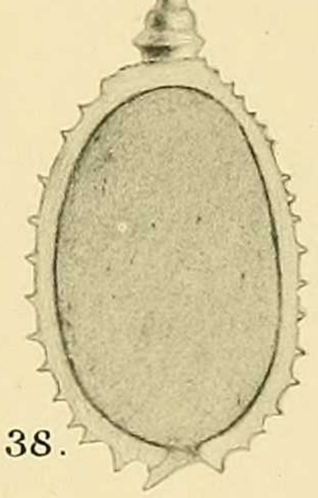
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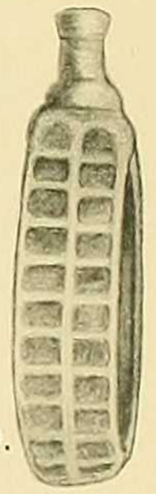
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FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE LI.

PLATE LI.

Figs. 1–3. *Polymorphina complexa* Sidebottom. Figs. 1, 2. Side view. Fig. 3. Edge (oral) view. × 85.

4, 5. *Sagrina virgula* Brady. × 85.

6–8. *Sagrina striata* (Schwager). Figs. 6, 7. Side views. Fig. 8. Edge view. × 60.

9. *Sagrina tessellata* Brady. × 110.

10–13. *Globigerina cretacea* d'Orbigny. Figs. 10, 11. Superior views. Fig. 12. Inferior view. Fig. 13. Edge view. × 83.

14–18. *Sphæroidina corticata*, sp. n. Fig. 14. Oral view. Fig. 15. Side view. Fig. 16. Detail of young form, showing the hexagonal surface ornament. Figs. 17, 18. Specimens in balsam, side and edge views. × 80.

19–21. *Spirillina vivipara* Ehrenberg. Thick variety. Fig. 19. Superior view. Fig. 20. Inferior view. Fig. 21. Edge view. × 130.

22, 23. *Spirillina vivipara* Ehrenberg. Denticulate variety. Fig. 22. Superior view. Fig. 23. Inferior view. × 130.

24, 25. *Spirillina ornata* Sidebottom. Fig. 24. Superior view. Fig. 25. Inferior view. × 130.

26–31. *Spirillina semidecorata*, sp. n. Fig. 26. Superior view of a specimen of the depressed evolute type. Fig. 27. Ditto, inferior view. Fig. 28. Superior view of the high crenelated type, the earlier whorl obscured with secondary shell-matter. Fig. 29. Ditto, edge view. Fig. 30. Superior view of the involute type, the early whorls entirely concealed by the later. Fig. 31. Ditto, inferior view. × 130.

32–35. *Cymbalopora milletti*, sp. n. Figs. 32, 33. Side views. Fig. 34. Apical view. Fig. 35. Basal view. × 62.

36–39. *Discorbina globularis* (d'Orbigny). Toothed variety. Fig. 36. Superior view. Figs. 37, 38. Inferior views, showing the toothed processes projecting into the umbilicus. Fig. 39. Edge view. × 55.

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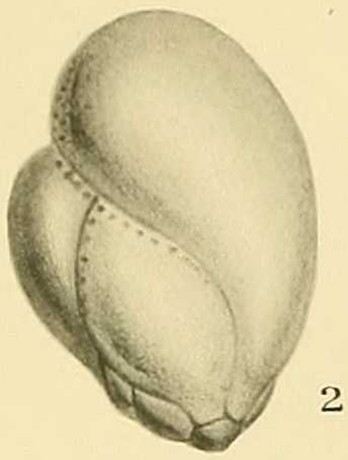

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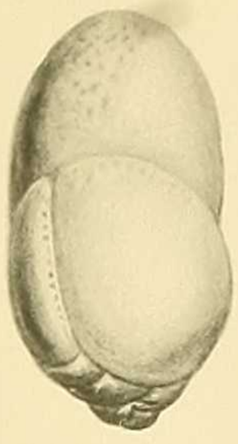

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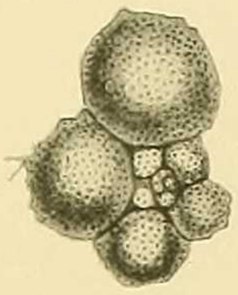

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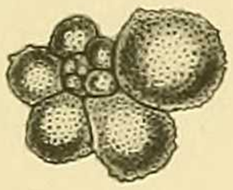

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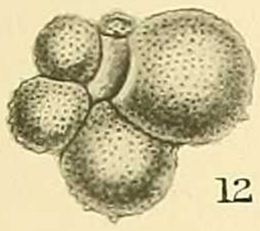

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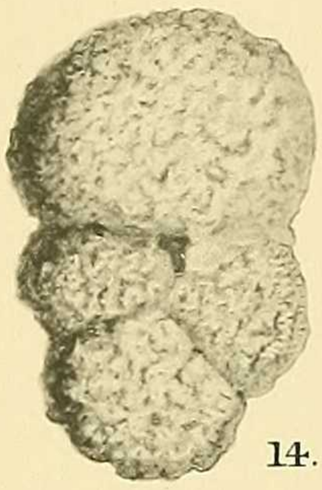

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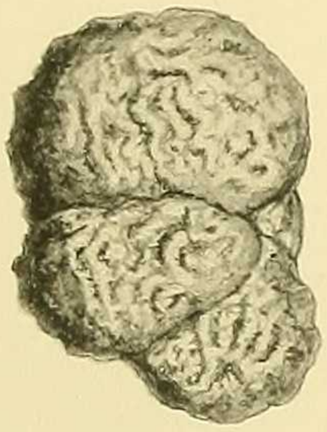

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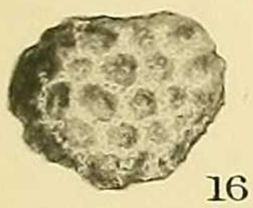

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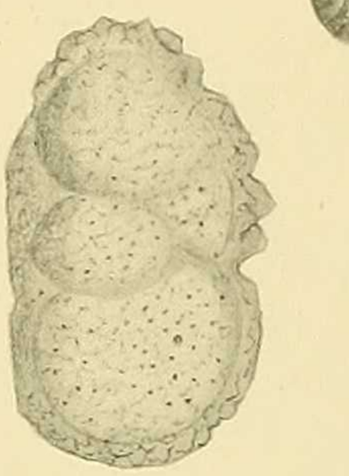

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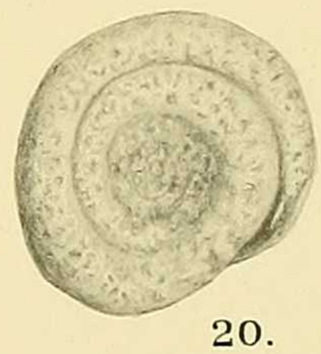

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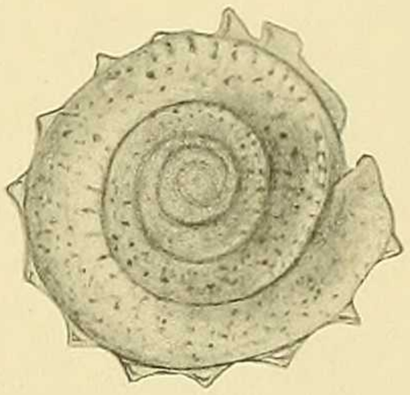

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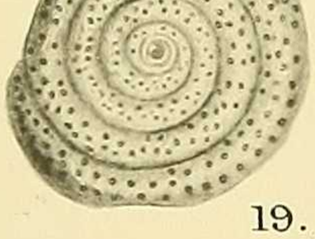

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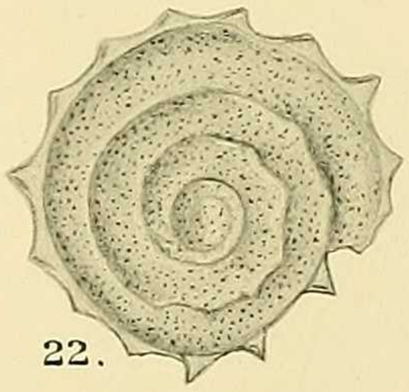

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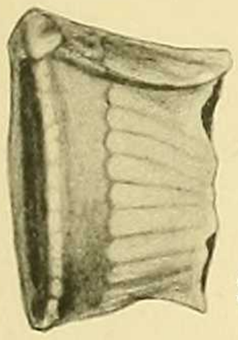

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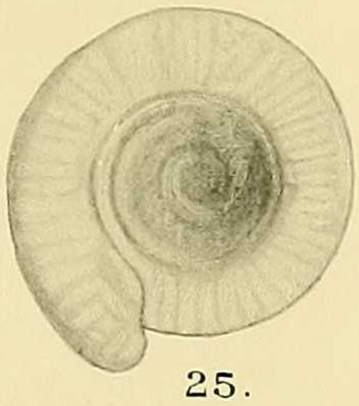

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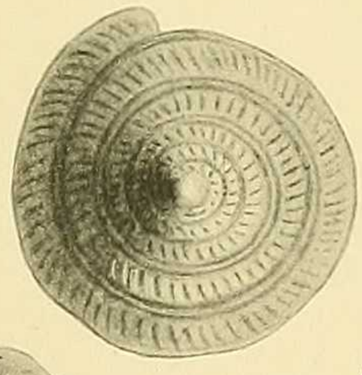

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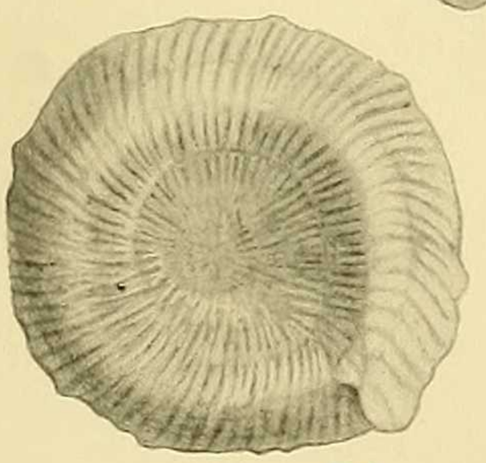

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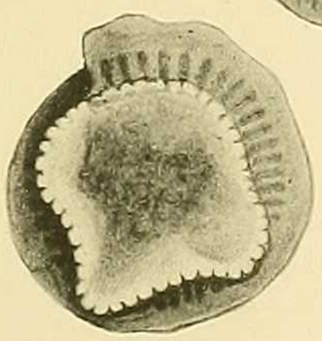

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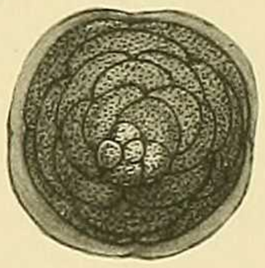

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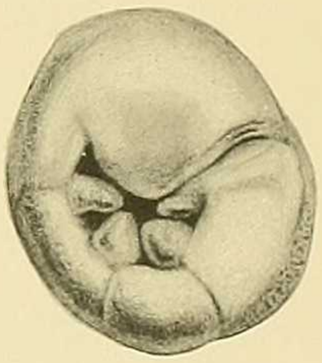

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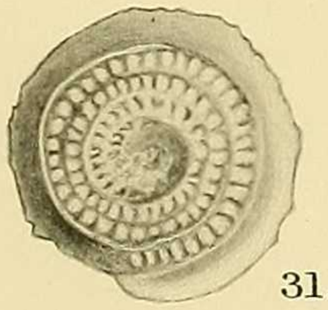

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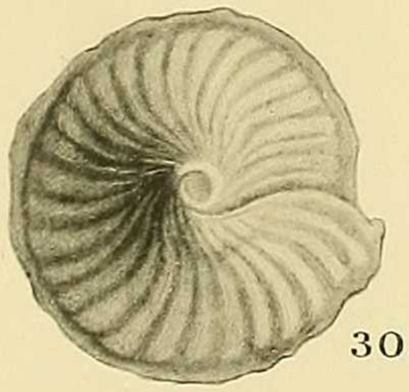

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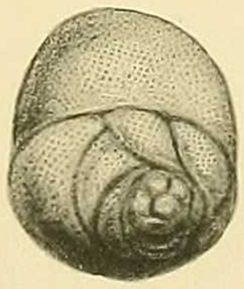

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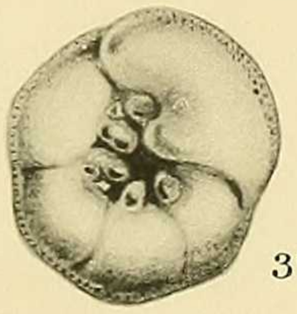

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FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE LII.

PLATE LII.

Figs. 1–6. *Discorbina valvulata*, var. *granulosa* nov. Figs. 1–3. Young individuals. Fig. 1. Superior view. Fig. 2. Inferior view. Fig. 3. Edge (oral) view. Figs. 4–6. Adult individuals. Fig. 4. Superior view. Fig. 5. Inferior view. Fig. 6. Edge (dorsal) view. × 45.

7–14. *Discorbina reniformis*, sp. n. Fig. 7. Oblique view. Fig. 8. Superior view. Fig. 9. Edge view of a very thick specimen with obscured convolutions. Fig. 10. Side view. Figs. 11–14. Balsam mounts. Fig. 11. Inferior view. Fig. 12. Superior view. Fig. 13. Edge view of a thick-walled specimen with obscured convolutions. Fig. 14. Side view of specimen showing dense outer shell-wall. × 100.

15–18. *Discorbina vesicularis* (Lamarck). Fig. 15. Superior view. Fig. 16. Inferior view. Fig. 17. Edge or oral view. Fig. 18. Dorsal (edge) view. × 45.

19–23. *Discorbina polystomelloides* Parker & Jones. Fig. 19. Superior view. Fig. 20. Inferior view. Fig. 21. Edge view, showing the double system of aperture. Figs. 22, 23. Diagrammatic optical sections. Fig. 22 from the superior and 23 from the inferior side. (The principal series of chambers is shown in outline, and the secondary series in shading.) × 45.

24–26. *Discorbina pustulata* Heron-Allen & Earland. Figs. 24, 25. Superior views. Fig. 26. Inferior view. × 120.

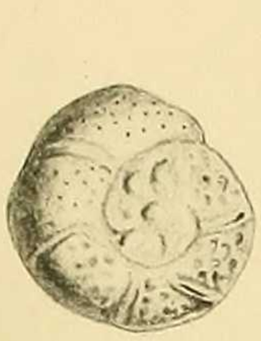
27–31. *Discorbina globosa* (Sidebottom). Fig. 27. Side view. Figs. 28, 29. Apical view. Figs. 30, 31. Basal view. × 98.

32. *Discorbina patelliformis* Brady. Paired or "budded" shells, viewed as a transparent object in balsam. × 130.

33–36. *Truncatulina rostrata* Brady. Fig. 33. Young specimen, oblique view. Figs. 34, 35. Adult specimens, side view. Fig. 36. Edge or oral view. × 33.

37–40. *Truncatulina tubulifera*, sp. n. Fig. 37. Superior view, specimen mounted in balsam. Fig. 38. Superior view, opaque. Fig. 39. Inferior view. Fig. 40. Edge view. × 80.

41–47. *Truncatulina glabra*, sp. n. Figs. 41–43. Young specimens showing the involute character of the test. Fig. 43. Oral view. Figs. 44–47. Adult forms. Fig. 47. Oral view. × 83.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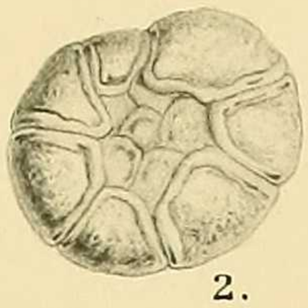
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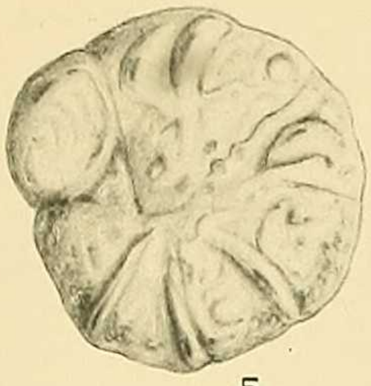
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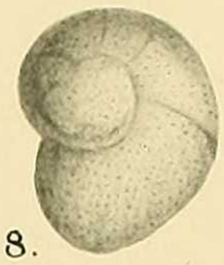
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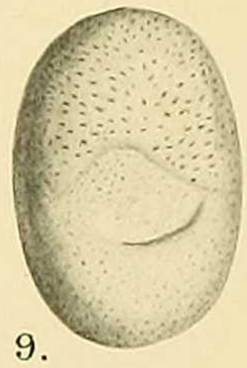
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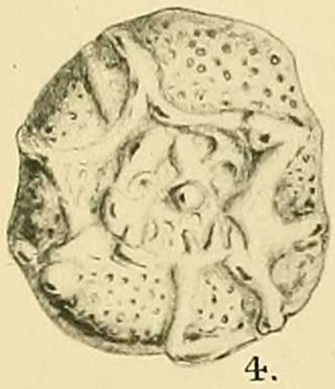
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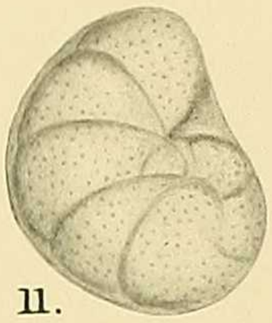
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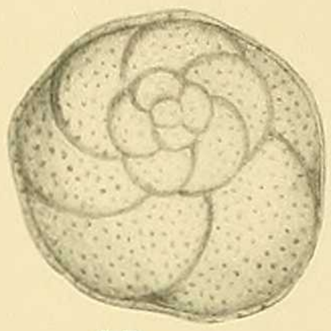
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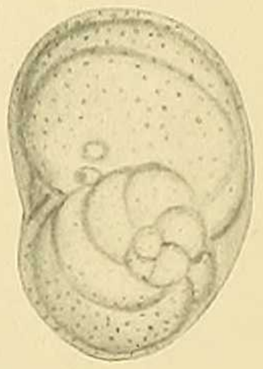
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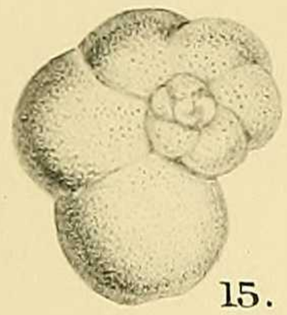
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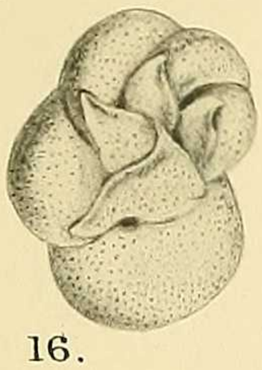
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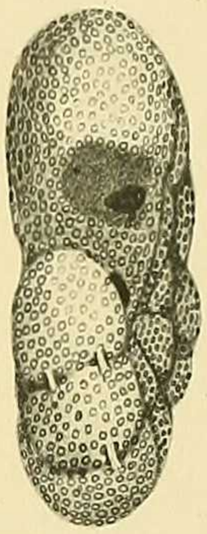
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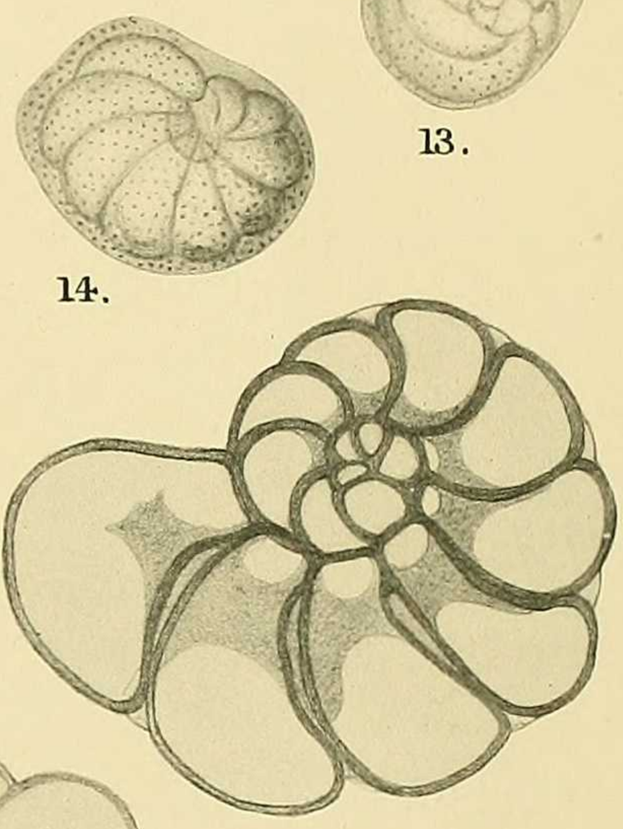
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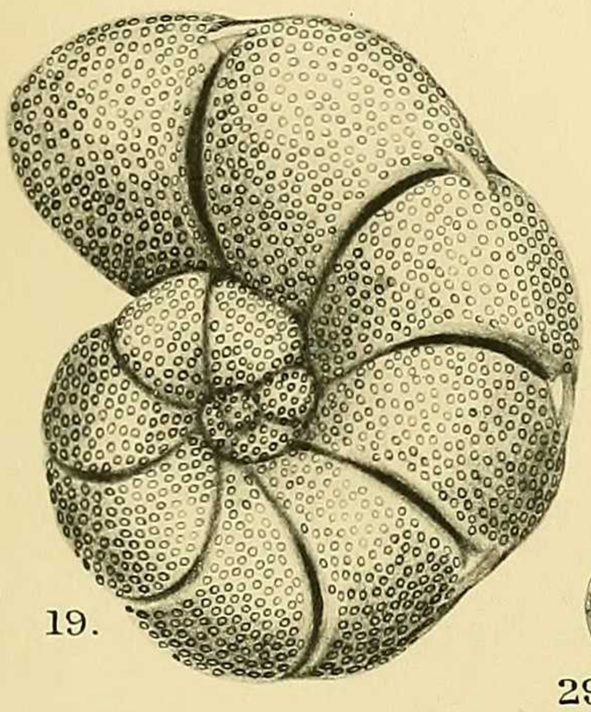
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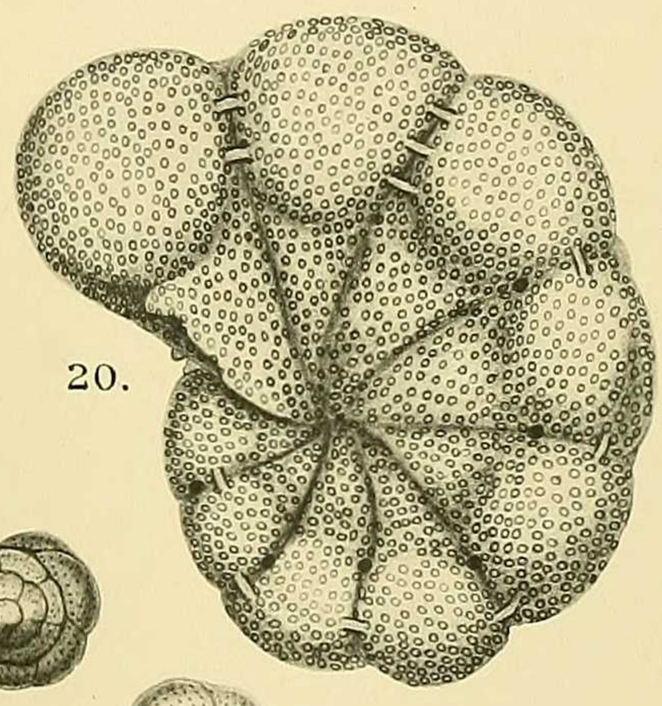
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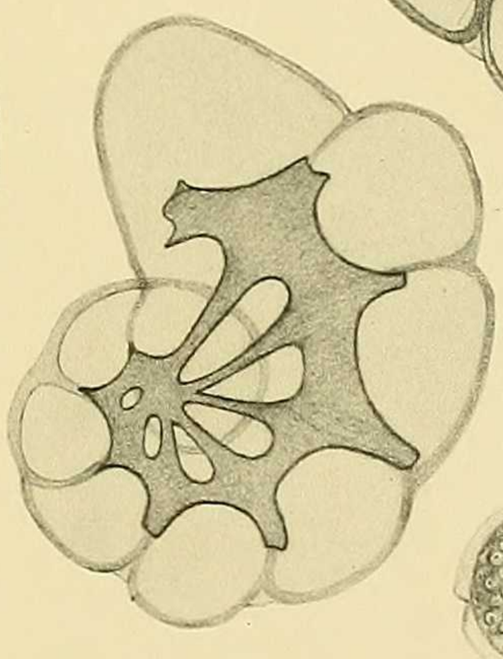
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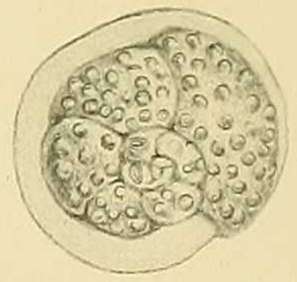
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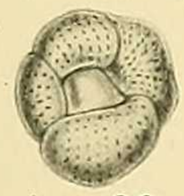
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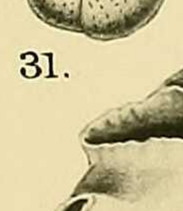
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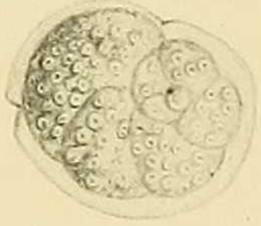
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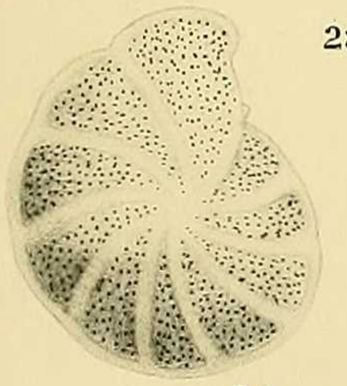
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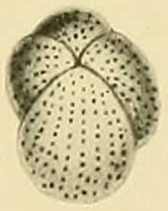
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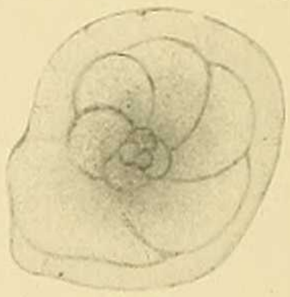
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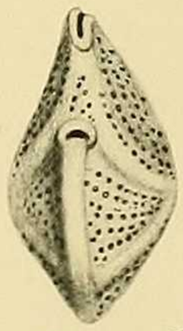
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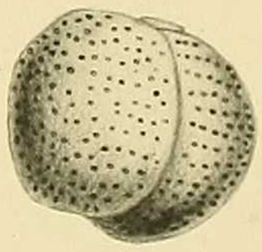
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FORAMINIFERA FROM THE KERIMBA ARCHIPELAGO.

PLATE LIII.

PLATE LIII.

Fig. 1. *Truncatulina echinata* Brady. Double specimen. × 80.

2–5. *Anomalina polymorpha* Costa. Figs. 2–4. Side views. Fig. 5. Edge (oral) view. × 70.

6–11. *Pulvinulina lateralis* (Terquem). Fig. 6. Superior, and Fig. 7, inferior views, of young specimen. Figs. 8–11. Adult shells. Fig. 8. Superior view. Figs. 9, 10. Inferior views. Fig. 11. Edge view. × 45.

12–14. *Pulvinulina partschiana* (d'Orbigny). Fig. 12. Superior view. Fig. 13. Inferior view. Fig. 14. Edge view. × 62.

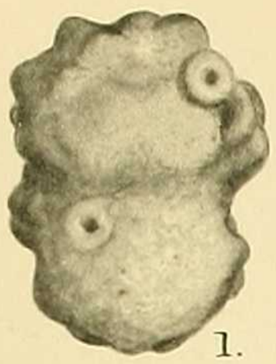
15–22. *Rotalia venusta* Brady. Figs. 15–17. Spinous type. Figs. 15, 16. Superior views. Fig. 17. Inferior view. Figs. 18–22. Non-spinous type. Figs. 18 & 21. Superior views. Figs. 19 & 22. Inferior views. Fig. 20. Edge view. × 45.

23–26. *Rotalia erinacea*, sp. n. Figs. 23, 24. Superior views. Fig. 25. Inferior view. Fig. 26. Edge (dorsal) view. × 130.

27–34. *Rotalia murrayi*, sp. n. Figs. 27–30. Superior views in different stages. Fig. 31. Inferior view. Fig. 32. Edge or oral view. Fig. 33. Spinous type; superior view. Fig. 34. Ditto; inferior view. × 83.

35–37. *Gypsina rubra* (d'Orbigny). × 25.

38–42. *Polystomella milletti*, sp. n. Figs. 38–40. Side views. Fig. 41. Oral view. Fig. 42. Dorsal view. × 70.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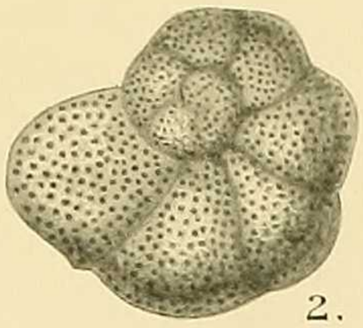
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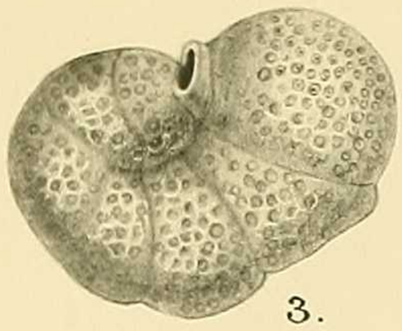
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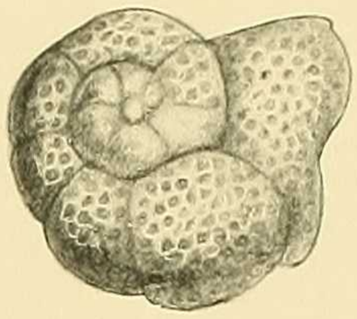
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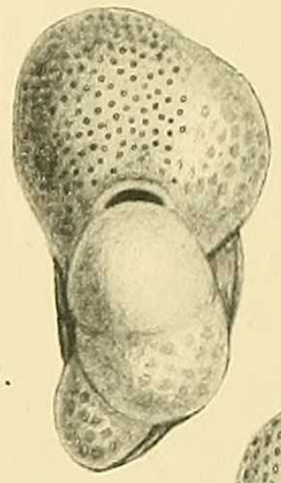
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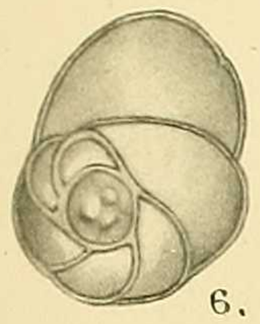
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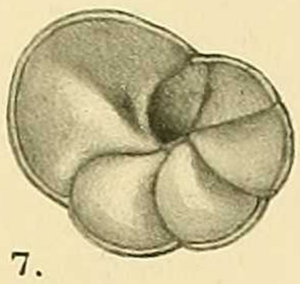
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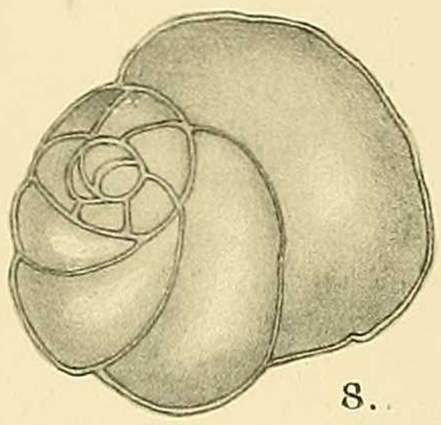
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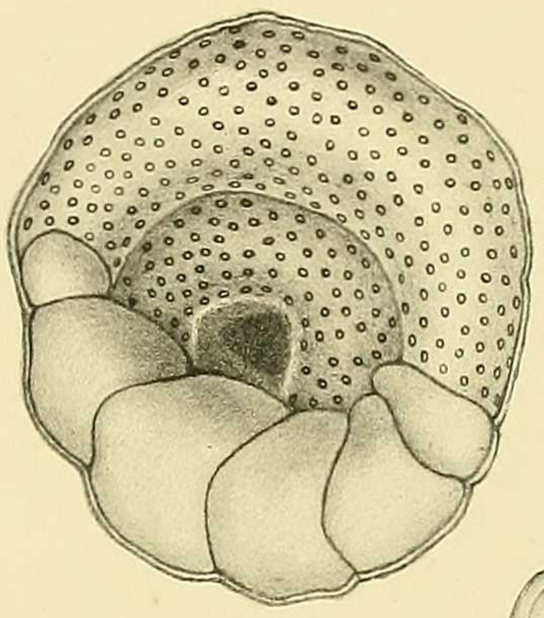
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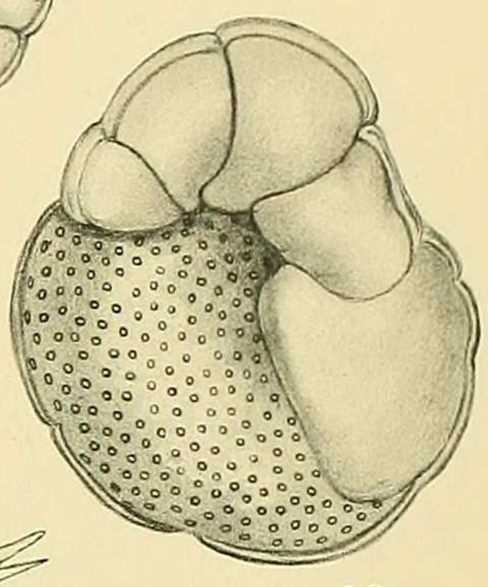
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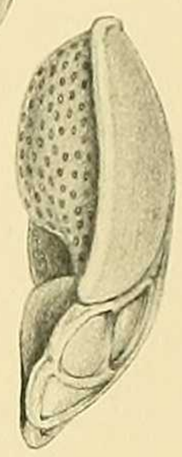
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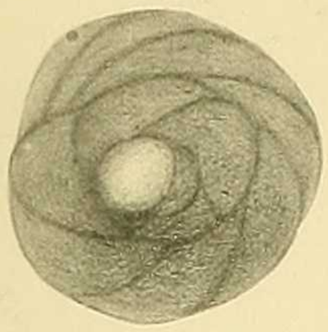
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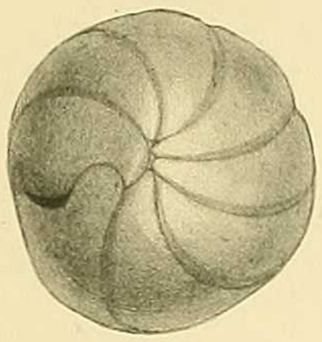
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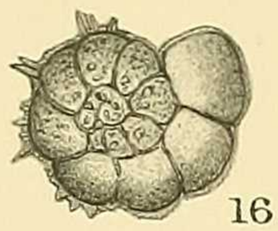
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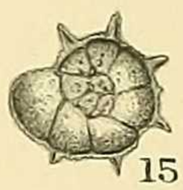
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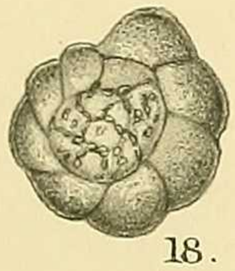
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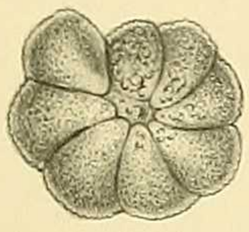
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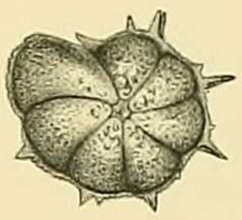
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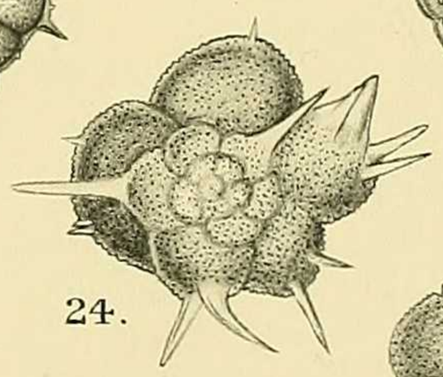
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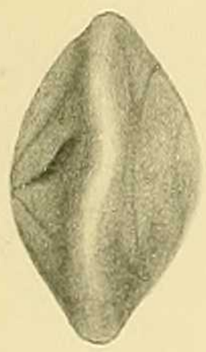
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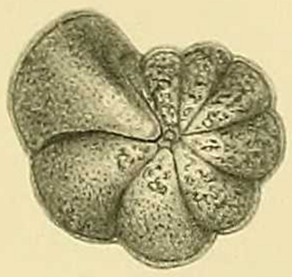
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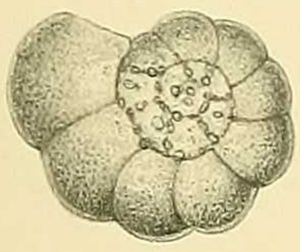
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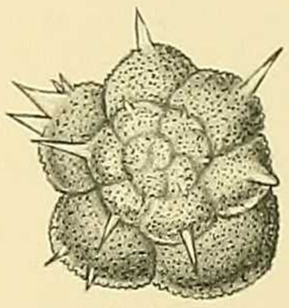
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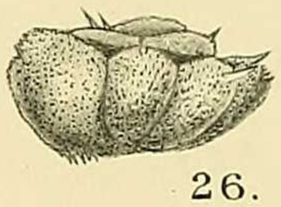
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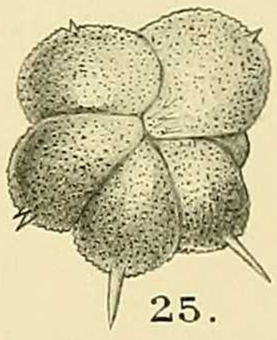
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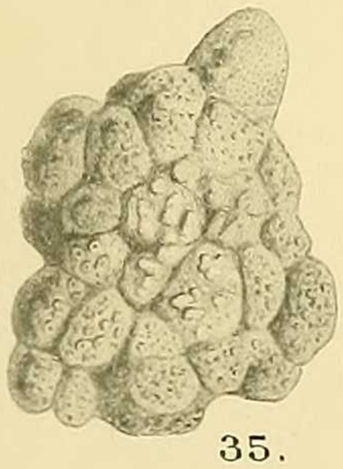
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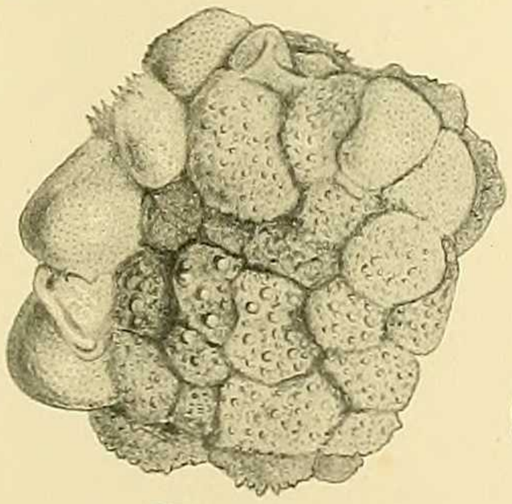
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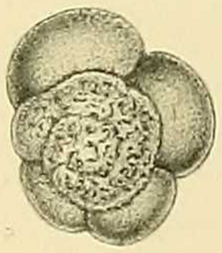
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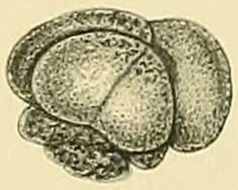
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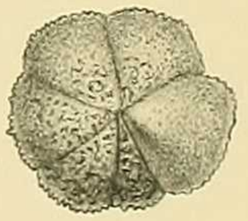
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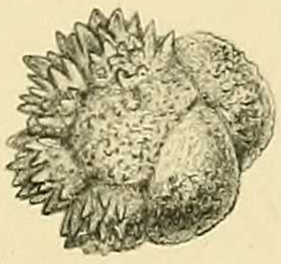
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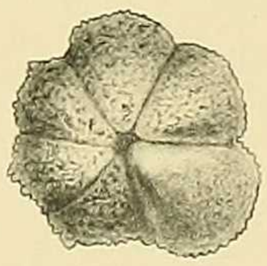
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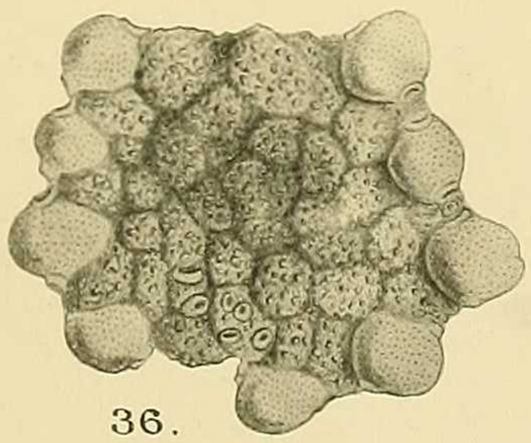
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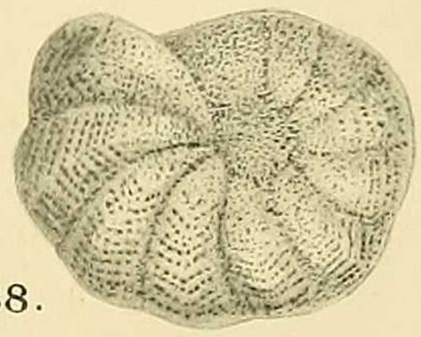
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ALPHABETICAL LIST

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[New names in clarendon type. Systematic references in italics.]

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