

F. W. Millett del. ad nat.

West, Newman lith.

FORAMINIFERA OF MALAY ARCHIPELAGO.

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XI.—*Report on the Recent Foraminifera of the Malay Archipelago, collected by Mr. A. Durrand, F.R.M.S. — Part XVII. (Conclusion).*

By FORTESCUE WILLIAM MILLETT, F.R.M.S.

(Read October 19th, 1904.)

PLATE XI.

Calcarina d'Orbigny.

Calcarina Spengleri Linné sp.

“Ammonshorn” Spengler, 1781, Danske Selsk. Skrifter, vol. i. p. 379, pl. ii. fig. 9. *Calcarina Spengleri* (Gmel.) d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 276, No. 4. *C. Spengleri* (Linné) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 423, pl. xix. figs. 4–6. *C. calcitropoides* (Lam.) Idem, 1899, Ibid., vol. xxi. p. 167, pl. xvii. figs. 18, 38, pl. xxii. fig. 36.

This form is not uncommon at Stations 2, and 22. The examples are moderately large, and exhibit the usual variations.

Calcarina hispida Brady.

Calcarina Spengleri (Linné) hispid var. Carpenter, 1860, Phil. Trans., vol. cl. p. 551, pls. xix. figs. 8–11, xx. figs. 6, 8. *C. hispida* Brady, 1876, Proc. R. Irish Acad., ser. 2, vol. ii. p. 590. *C. hispida* (Brady) Lister, 1895, Phil. Trans., vol. clxxxvi. p. 437, pl. viii. figs. 34–37.

EXPLANATION OF PLATE XI.

- Fig. 1.—*Nonionina orbicularis* Brady. × 75.
“ 2.—*Polystomella crispa* Linné sp. Abnormal. × 75.
“ 3.— “ *verriculata* Brady. × 60.
“ 4.—*Miliolina excisa* Brady, Parker, and Jones. × 115.
“ 5, 6.—*Pelosina distoma* sp. n. × 115.
“ 7.—*Thurammina favosa* Flint, var. × 140.

In the Malay Archipelago the distribution of this form is identical with that of *C. Spengleri*. The examples are neither numerous nor large.

Brady in his 'Challenger' Report states that it has been observed at ten Stations, all of them amongst the Islands of the Pacific. The depths range from 3 to 155 fathoms.

Calcarina Defranci d'Orbigny.

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

In the Malay Archipelago, this is the most abundant species of the genus, and it occurs at several Stations in both Areas. The examples have the characters of the one figured by Brady in the 'Challenger' Report.*

According to Brady the best examples in the 'Challenger' collection have been found associated with the type, at one or two Stations in the Eastern Archipelago, notably off the Admiralty Islands, 15 to 25 fathoms. D'Orbigny's locality is the Red Sea.

Sub-Family **Tinoporinæ**.

Tinoporus Montfort.

Tinoporus baculatus Montfort.

Tinoporus baculatus Montfort, 1808, Conch. Syst., vol. i. p. 146, Genre 37. *T. baculatus* (Carp.) Dervieux, 1893, Atti R. Accad. Sci. Torino, vol. xxix. p. 6, pl. figs. 19, 26, 34. *T. baculatus* (Montf.) Sherlock, 1903, Bull. Mus. Comp. Zool. Harvard College, vol. xxxviii. p. 357, fig. 8.

The form is very rare in the Malay Archipelago, and has been noted only at Station 2, in Area 1.

Gypsina Carter.

Gypsina vesicularis Parker and Jones, sp.

Orbitolina vesicularis Parker and Jones, 1860, Ann. and Mag. Nat. Hist., ser. 3, vol. vi. p. 31, No. 5. *Gypsina vesicularis* (P. and J.) Carter, 1877, Ibid. ser. 4, vol. xx. p. 173. *G. vesicularis* (P. and J.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 382, pl. xiv. figs. 20-23. *G. vesicularis* (P. and J.) Jones, 1897, Palæont. Soc., p. 335, fig. 25. *G. vesicularis* (P. and J.) Chapman, 1900, Journ. Linn. Soc. (Zool.), p. 198, pl. xix. fig. 12.

This is rather rare, but occurs at Stations in both Areas.

* Plate cviii. fig. 6.

Gypsina inhærens Schultze, sp.

Acervulina inhærens Schultze, 1854, Organ. Polythal., p. 68, pl. vi. fig. 12. *Gypsina inhærens* (Schultze) Brady, 1884, Chall. Rept., p. 718, pl. cii. figs. 1-6. *G. inhærens* (Schultze) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 229, pl. xli. fig. 19. *G. inhærens* (Schultze) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 91. pl. xv. fig. 787. *G. inhærens* (Schultze) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899) p. 336, pl. lxxix. fig. 6.

This is less rare than the preceding form, and is found in small numbers at several Stations in both Areas. The individuals exhibit the usual irregularities of growth, and size.

Family NUMMULINIDÆ.

Sub-Family Polystomellinæ.

Nonionina d'Orbigny.*Nonionina depressula* Walker and Jacob, sp.

Nautilus spiralis utrinque subumbilicatus, &c. Walker and Jacob, 1784, Test. Min., p. 19, pl. iii. fig. 68. *Nautilus depressulus* Walker and Jacob, 1798, Adams's Essays, Kanmacher's edition, p. 641, pl. xiv. fig. 33. *Nonionina depressula* (W. and J.) Parker and Jones, 1859, Ann. and Mag. Nat. Hist., ser. 3, vol. iv. pp. 339, 341. *Pulvinulina nonionoides* Andreae, 1884, Abhandl. geol. Special-Karte Elsass-Loth., vol. ii. p. 256, pl. xi. fig. 2. *Nonionina depressula* (W. and J.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 229, pl. xliii. fig. 25. *N. depressula* (W. and J.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4. vol. vi. p. 119, pl. x. fig. 4; Idem, 1891, Mem. R. Com. Geol. Italia, vol. iv. p. 109, pl. iv. fig. 16. *N. depressula* (W. and J.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 427, pl. xix., figs. 38, 39. *N. depressula* (W. and J.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 103, pl. xvii. figs. 825, 826. *N. depressula* (W. and J.) Morton, 1897, Proc. Portland Soc. Nat. Hist., vol. ii. p. 121, pl. i. fig. 20. *N. depressula* (W. and J.) Jones, 1897, Palæont. Soc., p. 347. *N. depressula* (W. and J.) Wright, 1900, Geol. Mag., dec. 4, vol. vii. p. 100, pl. v. fig. 23. *N. depressula* (*N. complanata* d'Orb.) Fornasini, 1904, Mem. R. Accad. Sci. Ist. Bologna, ser. 6, vol. i. p. 12, pl. iii. fig. 6.

This species is abundant in Area 2, and occurs sparingly at a few Stations in Area 1. The forms vary in the direction of *N. asterizans*.

Nonionina orbicularis Brady, plate XI. fig. 1.

Nonionina orbicularis Brady, 1881, Denkschr. k. Akad. Wiss. Wien., vol. xliii. p. 105, pl. ii. fig. 5. *N. depressula* var. *orbicularis* (Brady) Madsen, 1895, Medd. Dansk Geol. Forening, No. 2, p. 217, pl. fig. 7.

This essentially northern form is very rare, and represented only at Station 22, in Area 2. The examples are quite characteristic, even to the granulation of the sutures shown in Brady's figures.

Nonionina stelligera d'Orbigny.

Nonionina stelligera d'Orbigny, 1839, Foram. Canaries, p. 128, pl. iii. figs. 1, 2. *N. stelligera* (d'Orb.) Fornasini, 1889, Minute forme Rizopod. Retic., pl., fig. 32. *N. stelligera* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 425, pl. xix. fig. 44. *N. stelligera* (d'Orb.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 104, pl. xvii. figs. 827, 828. *N. stelligera* (d'Orb.) Morton, 1897, Proc. Portland Soc. Nat. Hist., vol. ii. p. 121, pl. i. fig. 18. *N. stelligera* (d'Orb.) (*N. elegans* d'Orb.) Fornasini, 1899, Mem. R. Accad. Sci. Ist. Bologna, ser. 5, vol. vii. p. 654, fig. 5.

This occurs at Stations in both Areas, but is very rare.

Nonionina umbilicatula Montagu sp.

Nautilus umbilicatus Montagu, 1803, Test. Brit., p. 191; Suppl., p. 78, pl. xviii. fig. 1. *Nonionina asterizans* (F. and M.) var. *umbilicatula* Parker and Jones, 1859, Ann. and Mag. Nat. Hist., ser. 3, vol. iv. p. 347. *N. umbilicatula* (Montagu) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 230, pl. xliii. fig. 19. *N. umbilicatula* (Montagu) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 426, pl. xix. figs. 36, 37. *N. umbilicatula* (Montagu) Silvestri, 1893, Atti e Rendic. Acad. Sci. Lett. e Arti dei Zelanti di Acireale, vol. v. p. 20, pl. iii. figs. 26, 27. *N. umbilicatula* (Montagu) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 103, pl. xvii. fig. 823. *N. Soldanii* (d'Orb.) Egger, 1895, Naturhist. Ver. Passau, Jahresber. xvi. p. 40, pl. iii. fig. 18. *N. umbilicatula* (Montagu) Jones, 1897, Palæont. Soc., p. 345, fig. 29. *N. umbilicatula* (Montagu) var. *depressula* Silvestri, 1899, Mem. Pontif. Accad. Nuovi Lincei, vol. xv. p. 331, pl. vi. fig. 15. *N. Soldanii* (d'Orb.) Egger, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 174, pl. xxii. figs. 7, 8. *N. umbilicatula* (Montagu) Chapman, 1900, Proc. California Acad. of Sci., ser. 3, Geol., vol. i. p. 256, pl. xxx. fig. 15.

A few characteristic examples occur at Stations in both Areas.

Nonionina pompilioides Fichtel and Moll sp.

Nautilus pompilioides Fichtel and Moll, 1798, Test. Micr., p. 31, pl. ii. figs. a-c. *Nonionina pompilioides* (F. and M.) Parker, Jones, and Brady, 1865, Ann. and Mag. Nat. Hist., ser. 3, vol. xvi. p. 18, pl. iii. fig. 98. *N. pompilioides* (F. and M.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 426, pl. xix. figs. 32, 33. *N. Soldanii* (d'Orb.) Idem, 1895, Naturhist. Ver. Passau, Jahresber. xvi. p. 40, pl. iii. fig. 16. *N. pompilioides* (F. and M.) Chapman, 1900, Proc. California Acad. of Sci., ser. 3, Geol., vol. i. p. 256, pl. xxx. fig. 16.

As might be anticipated, this deep-water form is not well represented in the anchor-mud of the Malay Archipelago. It has been observed only at Station 11, in Area 1, and is there very rare.

Brady states that it is almost exclusively a deep-water Foraminifer, and mentions several localities where it has occurred at depths of from 1000 to 2750 fathoms. Amongst numerous 'Gazelle' Stations one has a depth of as little as 75 fathoms.

Nonionina scapha Fichtel and Moll sp.

Nautilus scapha Fichtel and Moll, 1798, Test. Micr., p. 105 pl. xix. figs. d-f. *Polystomella crispa* (Linné) var. *Nonionina scapha* (F. and M.), Parker and Jones, 1865, Phil. Trans., vol. clv. p. 404, pl. xvi. figs. 37, 38, pl. xviii. figs. 55, 56. *N. scapha* (F. and M.) Brady, Parker, and Jones, 1888; Trans. Zool. Soc., vol. xii. p. 230, pl. xliii. fig. 20. *N. scapha* (F. and M.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 120, pl. x. fig. 7; Idem, 1891, Mem. R. Com. Geol. d'Italia, vol. iv. p. 110, pl. iv. fig. 18. *N. scapha* (F. and M.) Woodward and Thomas, 1893, Geol. and Nat. Hist. Survey of Minnesota, vol. iii. p. 48, pl. E, figs. 35, 36. *N. scapha* (F. and M.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 424, pl. xix. figs. 43, 44. *N. scapha* (F. and M.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 104, pl. xvii. fig. 830. *N. scapha* (F. and M.) Egger, 1895, Naturhist. Ver. Passau, Jahresber. xvi. p. 40, pl. iii. fig. 17. *N. scapha* (F. and M.) Morton, 1897, Proc. Portland Soc. Nat. Hist., vol. ii. p. 121, pl. i. fig. 23. *N. scapha* (F. and M.) Jones, 1897, Palæont. Soc., p. 342, fig. 27. *N. scapha* (F. and M.) Egger, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 175, pl. xxv. fig. 56. *N. scapha* (F. and M.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899) p. 337, pl. lxxx. fig. 1. *N. scapha* (F. and M.) (*N. elongata* d'Orb.) Fornasini, 1904, Mem. R. Accad. Sci. Ist. Bologna, ser. 6, vol. i. p. 12, pl. iii. fig. 4. *N. scapha* (F. and M.) (*N. Grateloupi* d'Orb.), Idem, Ibid., p. 12, pl. xiii. fig. 5.

Nonionina Boueana d'Orbigny.

Nonionina Boueana d'Orbigny, 1846, For. Foss. Vienne, p. 108, pl. v. figs. 11, 12. *N. Boueana* (d'Orb.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 119, pl. x. fig. 5; Idem, 1891, Mem. R. Geol. Italia, vol. iv. p. 110, pl. iv. fig. 17. *N. Boueana* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 426, pl. xix. figs. 34, 35. *N. Boueana* (d'Orb.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 104, pl. xvii. fig. 829. *N. Boueana* (d'Orb.) Egger, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 175, pl. xxii. figs. 11, 12. *N. Boueana* (d'Orb.) var. *senensis* Silvestri, 1899, Mem. Pontif. Accad. Nuovi Lincei, vol. xv. p. 335, pl. xi. fig. 16. *N. Boueana* (d'Orb.) Fornasini, 1900, Mem. R. Accad. Sci. Ist. Bologna, ser. 5, vol. viii. p. 400, fig. 49. *N. Boueana* (d'Orb.) (*Polystomella umbilicata* d'Orb.) Idem, 1904; Ibid., ser. 6, vol. i. p. 13, pl. iii. fig. 11.

These two forms are found associated in great abundance throughout the Region. Whilst there are numerous typical examples of both forms, there is also a great mass of individuals in which the characters are mixed up in such bewildering confusion that it would be vain to attempt to assign them to either one or other of the types.

Nonionina turgida Williamson sp.

Rotalina turgida Williamson, 1858, Rec. Foram. Gt. Britain, p. 50, pl. iv. figs. 95-97. *Nonionina asterizans* var. *turgida* (Will.) Parker and Jones, 1862, In Carpenter's Introd. Foram., App., p. 311. *N. turgida* (Will.) Terquem, 1886, Bull. Soc. Zool. France, vol. xi. p. 331, pl. xi. figs. 7, 8. *N. turgida* (Will.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 425, pl. xix., figs. 45, 46. *N. turgida* (Will.) Schubert, 1900, "Lotos," vol. xx. p. 97, pl. i. fig. 10; and *turgida* var. *inflata*, p. 97, pl. ii. fig. 6.

In the Malay Archipelago this is as widely distributed as the two preceding forms, but is not quite as abundant. Its affinities are with *N. Boueana*.

Polystomella Lamarck.*Polystomella striatopunctata* Fichtel and Moll sp.

Nautilus striatopunctatus Fichtel and Moll, 1798, Test. Micr., p. 61, pl. ix. figs. a-c. *Polystomella striatopunctata* (F. and M.) Parker and Jones, 1860, Ann. and Mag. Nat. Hist., ser. 3, vol. v. p. 103, No. 6. *P. striatopunctata* (F. and M.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 230, pl. xliii. fig. 17. *P. striatopunctata* (F. and M.) Terrigi, 1889, Mem. R. Accad.

Lincei, ser. 4, vol. vi. p. 120, pl. x. fig. 2. *P. striatopunctata* (F. and M.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 433, pl. xix. figs. 49, 50. *P. striatopunctata* (F. and M.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 101, pl. xvii. figs. 815 (partim), 822. *P. striatopunctata* (F. and M.) Morton, 1897, Proc. Portland Soc. Nat. Hist., vol. ii. p. 122, pl. i. fig. 19. *P. striatopunctata* (F. and M.) Wright, 1900, Geol. Mag., dec. 4, vol. vii. p. 100, pl. v. fig. 24. *P. striatopunctata* (F. and M.) (*P. oceanensis* d'Orb.) Fornasini, 1904, Mem. R. Accad. Sci. Ist. Bologna, ser. 6, vol. i. p. 13, pl. iii. fig. 10. *P. striatopunctata* (F. and M.) (*P. burdigalensis* d'Orb.) Idem, Ibid., p. 13, pl. iii. fig. 12.

Polystomella crispa Linné sp., plate XI., fig. 2.

"Cornu Hammonis minus vulgare, Orbiculatum," &c., Plancus, 1739, Conch. Min., p. 10, pl. i. fig. 2. *Nautilus crispus* Linné, 1767, Syst. Nat., ed. 12, p. 1162, No. 275. *Polystomella crispa* (Linn.) Lamarck., 1822, Anim. sans Vert., vol. vii. p. 625, No. 1. *P. flexuosa* (d'Orb.) Walther, 1888, Mitth. Zool. Stat. Neapel, vol. viii. p. 382, pl. xx. fig. 5. *P. crispa* (Linn.) Verworn, 1888, Zeitschr. Wiss. Zool., vol. xlvi. p. 462, pl. xxxii. figs. 7-9, and figs. *g, h, i*. *P. crispa* (Linn.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 120, pl. x. fig. 6. *P. crispa* (Linn.) Silvestri, 1893, Mem. Pontif. Accad. Nuovi Lincei, vol. ix. p. 216, pl. iv. fig. 3. Idem, Atti e Rendic. Accad. Sci. Lett. e Arti dei Zelanti Acireale, vol. v. p. 21, pl. iii. figs. 28, 29. *P. crispa* (Linn.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 432, pl. xx. figs. 20, 21. *P. crispa* (Linn.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 102, pl. xvii. figs. 820, 821. *P. crispa* (Linn.) Lister, 1895, Phil. Trans., vol. clxxxvi. p. 414, pl. vi. figs. 1-3, 5-12, pl. vii. figs. 13-27, pl. viii. figs. 28-32. *P. crispa* (Linn.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899) p. 338, p. lxxx. fig. 3. *P. crispa* (Linn.) Rhumbler, 1902, Zeitschr. für allgem. Phys., vol. ii. part 2, p. 233, fig. 64. *P. crispa* (Linn.) Lister, 1903, The Foraminifera, in Lankester's Zoology, p. 62, figs. 7-12. *P. crispa* (Linné) = *angularis* (d'Orb.) Fornasini, 1904, Mem. R. Accad. Sci. Ist. Bologna, ser. 6, vol. i. p. 12, pl. iii. fig. 7.

Wherever there is an abundance of examples, the characters of these two forms become so involved that it is impossible to draw anything like a distinct line of separation between them. The rounded margin and small circular depressions of *striatopunctata*, and the acute or carinate periphery, together with the retral processes reaching from septal band to septal band, characteristic of *crispa*, are mixed together in inextricable confusion.

Both forms are abundant in the Malay Archipelago, and exhibit great variety of character, some examples being covered with short

spines, whilst others add to the nautiloid a linear series of chambers, as in the example of *P. crispa* here figured.

Although many of the specimens of *P. crispa* are much compressed, none of them have the other characters of *P. macella*.

Polystomella subnodosa Münster sp.

Robulina subnodosa Münster (fide Römer), 1838, Neues Jahrb. für Min., p. 391, pl. iii. fig. 61. *Polystomella subnodosa* (Münst.) Reuss, 1856, Sitzungsber. K. Akad. Wiss. Wien, vol. xviii. p. 240, pl. iv. fig. 51. *P. subnodosa* (Münst.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 102, pl. xvii. figs. 817-819. *P. subnodosa* (Münst.) Fornasini, 1897, Rendic. Accad. Sci. Ist. Bologna, n. s., vol. ii. pl. i. fig. 12.

Although the form is compounded of characters taken from both *P. crispa* and *P. striatopunctata*, it is subject to but little variation, and the examples can usually be identified without difficulty.

In the Malay Archipelago it is found at several Stations in both Areas, and is abundant at Stations 13, 18, and 21.

Polystomella vericulata Brady, plate XI. fig. 3.

Polystomella verriculata Brady, 1881, Quart. Journ. Micr. Sci., n. s., vol. xxi. p. 66; and 1884, Chall. Rept., p. 738, pl. cx. fig. 12.

This form occurs at most of the Stations in the Malay Archipelago. The reticulations of the surface are much more delicate than those of the example figured by Brady. Specimens of a similar character occur in some sea-sand from Sagami Bay, Japan, for which I am indebted to the kindness of Prof. Yokoyama of Tokio.

Brady gives two 'Challenger' Stations, both off the west coast of Australia.

Polystomella craticulata Fichtel and Moll sp.

Nautilus craticulatus Fichtel and Moll, 1798, Test. Micr., p. 51, pl. v. figs. *h, i, k*. *Polystomella craticulata* (F. and M.) d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 284, No. 3? *P. iberica* Schrodt, 1890, Zeitschr. deutsch. geol. Gesell., vol. xlii. p. 417, pl. xxii. fig. 9. *P. craticulata* (F. and M.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 433, pl. xx. figs. 24, 25.

A few fine examples occur at several Stations in both Areas.

Under the name of *P. iberica*, Schrodt describes a similar form from the Spanish Pliocene. If identical, this would be the first record of its occurrence in the fossil condition.

Sub-Family **Nummulitinæ.***Amphistegina* d'Orbigny.*Amphistegina Lessonii* d'Orbigny.

Amphistegina Lessonii d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 304, No. 3, pl. xvii. figs. 1-4; Modèle No. 98. *A. vulgaris*, Id. Ibid., p. 305, No. 8; Modèle No. 40. *A. vulgaris* (d'Orb.) Amicis, 1886, Atti Soc. Tosc. Sci. Nat., (Mem.) vol. vii. p. 242, pl. xi. fig. 2. *A. Lessonii* (d'Orb.) Bütschli, 1886, Morph. Jahrb., vol. xi. p. 86, pl. vi. figs. 7, 8. *A. Lessonii* (d'Orb.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 230, pl. xliii. fig. 15. *A. Lessonii* (d'Orb.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 121, pl. ix. figs. 6-8. *A. Lessonii* (d'Orb.) Dreyer, 1891, Jenaische Zeitsch. für Naturwiss., vol. xxvi. pl. xxviii. fig. 267. *A. Lessonii* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 431, pl. xx. figs. 18, 19. *A. Lessonii* (d'Orb.) Zittel, 1896, Bull. Soc. Géol. France, sér. 3, vol. xxiv. p. 969, fig. 1¹⁻⁷. *A. Lessonii* (d'Orb.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 338, pl. lxxxii. fig. 4. *A. Lessonii* (d'Orb.) Chapman, 1901, Proc. R. Soc. Edinburgh, vol. xxiii. p. 394, pl. iii. fig. 2. *A. vulgaris* (d'Orb.) Newton and Holland, 1902, Journ. Coll. Sci. Imp. Univ. Tōkyō, vol. xvii. p. 16, pl. ii. fig. 1. *A. Lessonii* (d'Orb.) Fornasini, 1903, Rendic. R. Accad. Sci. Ist. Bologna, n. s., vol. vii. pl. ii. fig. 1. *A. Lessonii* (d'Orb.) Sherlock, 1903, Bull. Mus. Comp. Zool. Harvard College, vol. xxxviii. p. 356, fig. 5.

This form is not abundant, but it occurs at several Stations, and is most frequent in Area 1.

Amphistegina Cumingii Carpenter.

Amphistegina Cumingii Carpenter, 1859, Phil. Trans., vol. cxlix. p. 32, pl. v. figs. 13-17, pl. vi. figs. 5, 6. *A. Cumingii* Murray and Renard, 1891, Chall. Rept. 'On Deep Sea Deposits,' pls. xiii., xiv.

Is represented by a few examples from one or two Stations in both Areas.

Whether this species should be assigned to *Amphistegina* or to *Nummulina* is still undecided. The Malay specimens exhibit a greater affinity with *Operculina* than with *Nummulina*.

Operculina d'Orbigny.*Operculina complanata* DeFrance sp.

Lenticulites complanata DeFrance, 1822, Dict. Sci. Nat., vol. xxv. p. 453. *Operculina complanata* (Basterot) d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 281, No. 1, pl. iv. figs. 7-10; Modèle, No. 80. *O. complanata* (Defr.) Woodward and Thomas, 1885, 13th Ann.

Rept. Geol. and Nat. Hist. Survey of Minnesota for 1884, p. 175, pl. iv. fig. 35. *Operculina* sp. Blackenhorn, 1890, Zeitschr. deutsch. geol. Gesell., p. 339, pl. xvii. figs. 2, 3. *O. complanata* (Defr.) Woodward and Thomas, 1893, Geol. and Nat. Hist. Survey of Minnesota, vol. iii. p. 45, pl. E. fig. 37. *O. complanata* (Defr.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 435, pl. xx. figs. 40-42. *O. complanata* (Defr.) Jones, 1897, Palæont. Soc., p. 362, pl. ii. figs. 49, 50. *O. complanata* (Defr.) Newton and Holland, 1902, Journ. Coll. Sci. Imp. Univ. Tōkyō, p. 13. pl. i. figs. 3, 5, pl. iii. fig. 3. *O. complanata* (Defr.) Lister, 1903, The Foraminifera, in Lankester's Zoology, p. 126, fig. 55.

Operculina complanata var. *granulosa* Leymerie.

Operculina granulosa Leymerie, 1846, Mém. Soc. Géol. France, sér. 2, vol. i. p. 359, pl. xiii. fig. 12. *O. complanata* var. *granulosa* (Leym.) Woodward and Thomas, 1885, 13th Ann. Rept. Geol. and Nat. Hist. Survey of Minnesota for 1884, p. 176, pl. iv. fig. 36. *O. granulosa* (Leym.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii., p. 435, pl. xx. figs. 36, 37, 43. *O. complanata* var. *granulosa* (Leym.) Idem, 1899, Ibid. vol. xxi. p. 175, pl. xix. figs. 33, 34. *O. complanata* var. *granulosa* (Leym.) Newton and Holland, 1902, Journ. Coll. Sci. Imp. Univ. Tōkyō, vol. xvii. p. 14, pl. ii. fig. 4, pl. iii. fig. 5.

Both these forms occur in the two Areas, and mostly at the same Stations. With few exceptions the examples are small and ill-developed.

Heterostegina d'Orbigny.

Heterostegina depressa d'Orbigny.

Heterostegina depressa d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 305, No. 2, pl. xvii. figs. 5-7; Modèle, No. 99. *H. depressa* (d'Orb.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 122, pl. x. fig. 1. *H. curva* (Moebius) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 434, pl. xx. figs. 26-31; and *H. depressa* (d'Orb.) p. 433, pl. xx. figs. 34, 35. *H. depressa* (d'Orb.) Jones and Chapman, 1900, In A Monograph of Christmas Island, p. 229, pl. xx. fig. 1. *H. depressa* (d'Orb.) Chapman, 1900, Journ. Linn. Soc. (Zool.), vol. xxviii. p. 18, pl. iii. figs. 6, 7; Idem, 1900, Geol. Mag., n. s., dec. 4, vol. vii. pl. xiii. fig. 7; Idem, 1902, Ibid., vol. ix. p. 10, pl. iv. fig. 1. *H. depressa* (d'Orb.) Lister, 1903, The Foraminifera, in Lankester's Zoology, p. 128, fig. 56. *H. suborbicularis* (d'Orb.) (cf. *H. depressa* d'Orb.) Fornasini, 1903, Boll. Soc. Geol. Italiana, vol. xxii. p. 396, pl. xiv. figs. 5, 6.

This form is represented in the Malay Archipelago by a few small examples occurring at Stations in Area 1.

APPENDIX.

Miliolina excisa Brady, Parker, and Jones, plate XI. fig. 4.

Miliolina excisa Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 215, pl. xl. fig. 33.

A solitary example of this form has been found in the material from Station 7. The *M. cristata* described and figured in Part II. of this Report differs in having only one dentate ridge.

Brady, Parker, and Jones's specimens were from the Abrohlos Bank; depth 31 fathoms.

A somewhat similar form from Delos has been described and figured by my friend Mr. H. Sidebottom, under the name of *M. seminulum* var. *cornuta*.*

Miliolina crassatina Brady.

Miliolina incrassata Brady, 1881, Quart. Journ. Micr. Sci., n. s., vol. xxi. p. 46. *M. crassatina* Idem, 1884, Chall. Rept., p. 180, pl. viii. fig. 5.

A very few examples of this ambiguous form occur at two Stations in Area 1, and at one Station in Area 2. The minute crescentic aperture is in some examples concealed by the coarse grains of sand composing the test.

Brady writes, "*Miliolina crassatina* is exceedingly rare. It has only been met with in a single dredging, off East Monceur Island, Bass Strait, 38 fathoms."

Sigmoilina tenuis Czjzek.

Quinqueloculina tenuis Czjzek, 1848, Haidinger's Naturw. Abhandl., vol. ii. p. 149, pl. xiii. figs. 31-34. *Miliolina tenuis* (Cz.) Balkwill and Wright, 1885, Trans. R. Irish. Acad., vol. xxviii. (Sci.) p. 324, pl. xii. figs. 3-5. *Spiroloculina panda* (Schwager) var. *Rengerriana* Deecke, 1886, Mém. Soc. émul. Montbeliard, sér. 3, vol. xvi. p. 16, pl. i. fig. 28. *Sigmoilina tenuis* (Cz.) Schlumberger, 1887, Bull. Soc. Zool. France, vol. xii. p. 117. *Miliolina* sp. Burrows, Sherborn, and Bailey, 1890, Journ. R. Micr. Soc., p. 551, pl. viii. figs. 2, 3; and *Spiroloculina tenuis* (Cz.) p. 551, pl. viii. fig. 4. *Spiroloculina tenuis* (Cz.) Terrigi, 1891, Mem. R. Com. Geol. d'Italia, vol. iv. p. 65, pl. i. figs. 2, 3. *Spiroloculina tenuis* (Cz.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii.

* Mem. and Proc. Manchester Lit. and Phil. Soc., xlvi. 1904, p. 11, pl. iii. figs. 11, 12.

p. 222, pl. i. figs. 46, 47. *Sigmoilina tenuis* (Cz.) Jones, 1895, Palæont. Soc., p. 125, pl. vii. fig. 2.

This form is represented by a fine but solitary example from Station 13, in Area 1.

Pelosina distoma sp. n., Plate XI. figs. 5, 6.

Test pyriform or fusiform, with a rounded aperture at each extremity, that at the superior end being the larger. From the inferior orifice the chitinous lining protrudes in the form of a short tube. Length 0.35 mm.

In his definition of the genus *Pelosina* Brady specifies "aperture single." This limitation would exclude the species under consideration, but it is so evidently a true *Pelosina* that the emendation of Brady's definition would be less objectionable than the creation of a new genus.

The test of *P. distoma* is unusually dense, and often has a polished surface, which gives it a superficial resemblance to *Glandulina*. Sometimes there is a constriction in the test, as shown by fig. 6. The chitinous membrane is in some specimens visible at the superior orifice, but never forms there a projecting tube as in *P. rotundata*.

In its distribution it appears to be very local, being somewhat abundant at Station 6, and is represented sparingly at Station 22, but these are the only localities where it has been found.

Thurammia favosa Flint, Plate XI. fig. 7.

Thurammia favosa Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899) p. 278, pl. xxi. fig. 2. *Thyrammina favosa* (Flint) Rhumbler, 1903, Schaudinn's Archiv für Protistenkunde, vol. iii. p. 236, fig. 65.

This is a doubtful Foraminifer, and I had hesitated in accepting it, but since it has been admitted by Flint and Rhumbler, I feel compelled to include it in the present Report. Like the also doubtful *Reophax pleurostomelloides* before described, there is a certain amount of flexibility about the test reminiscent of the vegetable kingdom, to which possibly both may belong.

In the Malay Archipelago it occurs at several Stations, but is most abundant in Area 1.

The 'Gazelle' Stations are in the Gulf of Mexico; 26 and 420 fathoms.

In conclusion, it should be explained that a few doubtful forms which may or may not be Foraminifera, have purposely been

included in this Report. By thus calling attention to them, their true position in Nature is more likely to be determined, than it would have been, had they been absolutely ignored.

CORRIGENDA AND ADDENDA.

Journ. R. Micr. Soc.

1898.

Page 610, line 1 from top, *for* sp. n. *read* sp.

1899.

„ 249, line 7 from foot	„ Bertholin	„ Berthelin
„ 357 „ 10 „	„ × 90	„ × 40
„ 362 „ 12 „	„ 1895	„ 1894
„ 557 „ 3 „	„ <i>Candeina</i>	„ <i>Candeiana</i>
„ 560 „ 13 from top	„ <i>Sagraina</i>	„ <i>Textularia</i>
	<i>affinis</i>	<i>concava</i>
„ 562 „ 20 „	„ <i>Candeina</i>	„ <i>Candeiana</i>
„ 564 „ 7 „	„ Fornasini	„ Malagoli

1900.

„ 6 „ 3 from foot	„ Reuss	„ Egger sp.
„ 540 „ 9 „	„ 6	„ 10
„ 545 „ 9 from top	„ 42	„ 62
„ 145 „ 11 „	„ 35	„ 65

1901.

„ 4 „ 24 „	„ 17	„ 9
„ 493 „ 18 „	„ vii.	„ viii.
„ 496 „ 15 „	<i>after</i> sp.	<i>add</i> var.

1902.

523 „ 13 „	<i>for</i> Haeussler	<i>read</i> Haeusler
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Journal of the Royal Microscopical Society

CONTAINING ITS TRANSACTIONS AND PROCEEDINGS

AND

A SUMMARY OF CURRENT RESEARCHES RELATING TO
ZOOLOGY AND BOTANY

(principally Invertebrata and Cryptogamia)

MICROSCOPY, &c.

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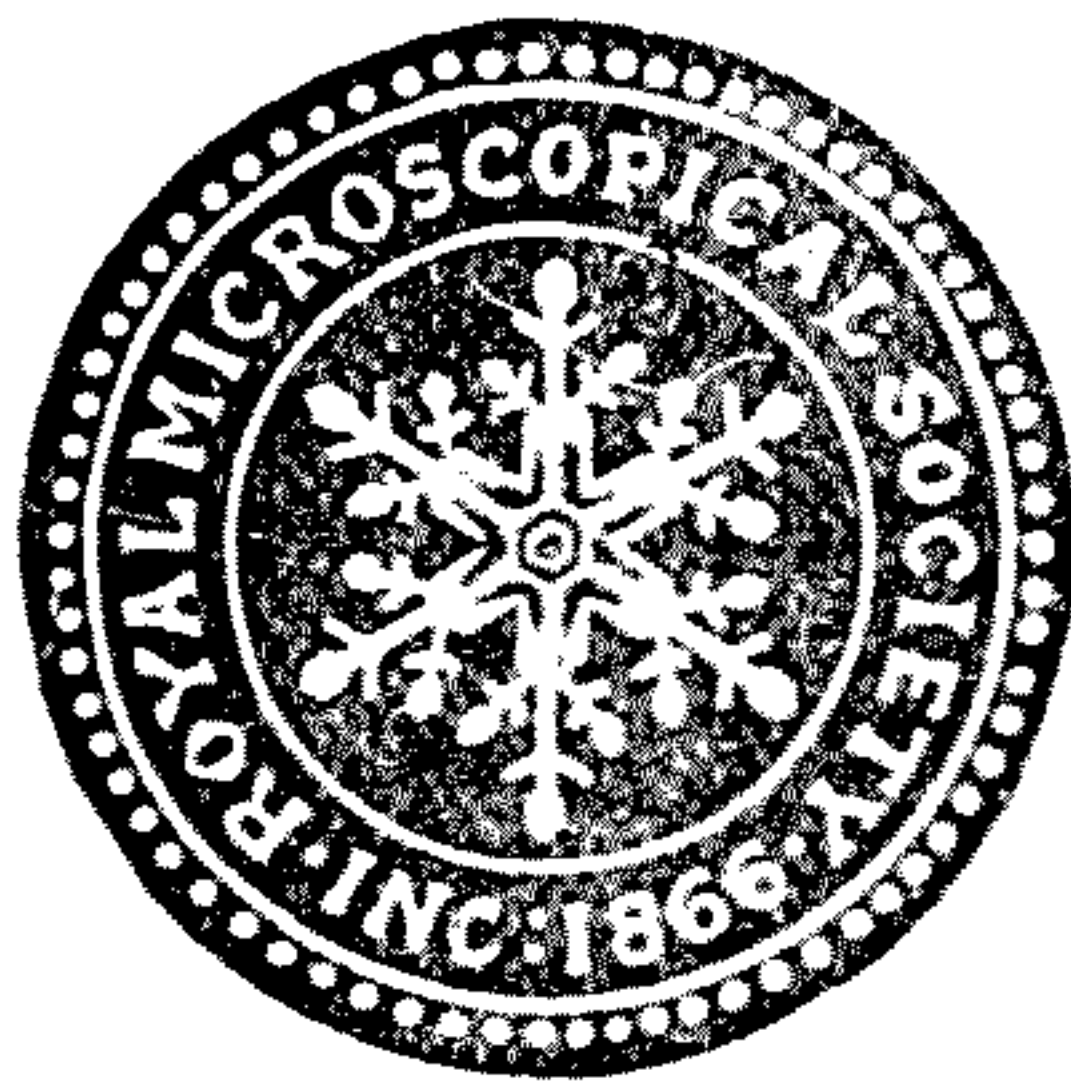
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Minimis partibus, per totum Naturæ campum, certitudo omnis innititur
quas qui fugit pariter Naturam fugit.—*Linnaeus.*

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