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TRANSACTIONS OF THE SOCIETY.

X.—*Report on the Recent Foraminifera of the Malay Archipelago
collected by Mr. A. Durrand, F.R.M.S.—Part XVI.*

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(Read June 15th, 1904.)

PLATE X.

Planorbulina d'Orbigny.

Planorbulina mediterraneensis d'Orbigny.

Planorbulina mediterraneensis d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 280, pl. xiv. figs. 4-6; Modèle, No. 79. *P. mediterraneensis* (d'Orb.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 227, pl. xlv. fig. 18. *P. mediterraneensis* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 380, pl. xiv. figs. 24-26. *P. mediterraneensis* (d'Orb.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 91, pl. xv. fig. 786. *P. mediterraneensis* (d'Orb.) Jones, 1895, Palæont. Soc., p. 298, pl. v. fig. 30. *P. mediterraneensis* (d'Orb.) Flint, 1899, Rep. U.S. Nat.

EXPLANATION OF PLATE X.

- Fig. 1, 2.—*Carpenteria proteiformis* Goës. Fig. 1 \times 65; fig. 2 \times 90.
,, 3.—*Pulvinulina oblonga* Williamson sp., var. *carinata* var. n. \times 80.
,, 4. „ *Brongniartii* d'Orbigny sp. \times 40.
,, 5.—*Rotalia Schroeteriana* Parker and Jones, var. *inflata* var. n. \times 60.
,, 6. „ *annectens* Parker and Jones. \times 30.
,, 7. „ „ var. *concinna* var. n. \times 60.

Note.—In all the figures the letter *a* denotes the superior aspect; *b*, the inferior aspect; and *c*, the peripheral aspect.

Oct. 19th, 1904

Mus. for 1897 (1899), p. 328, pl. lxxii. fig. 6. *P. mediterraneensis* (d'Orb.) Silvestri, 1899, Mem. Pontif. Accad. Nuovi Lincei, vol. xv. p. 286, pl. vi. figs. 4-7.

Planorbulina acervalis Brady.

Planorbulina acervalis Brady, 1884, Chall. Rept., p. 657, pl. xcii. fig. 4. *P. acervalis* (Brady) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 227, p. xlvi. fig. 11. *P. acervalis* (Brady) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 328, pl. lxxii. fig. 7.

Planorbulina larvata Parker and Jones.

Planorbulina vulgaris var. *larvata* Parker and Jones, 1860, Ann. and Mag. Nat. Hist., ser. 3, vol. v. p. 294. *P. larvata* Idem, 1865, Phil. Trans., vol. clv. p. 380, pl. xix. fig. 3. *P. larvata* (P. and J.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 381, pl. xiv. fig. 31.

These three forms are not well represented in the Malay Archipelago; they occur at the same Stations, and are most abundant in Area 1.

Truncatulina d'Orbigny.

Truncatulina echinata Brady.

Planorbulina echinata Brady, 1879, Quart. Journ. Micr. Sci., n.s., vol. xix. p. 283. pl. viii. fig. 31. *Truncatulina echinata* Idem, 1884, Chall. Rept., p. 670, pl. xcvi. figs. 9-14. *T. echinata* (Brady) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 403, pl. xvi. figs. 40, 41.

This is an aberrant form which seems as nearly allied to *Planorbulina* as to *Truncatulina*, and may be treated as a connecting link between the two genera.

It is not uncommon in Area 1, and occurs sparingly in Area 2. The examples are normal, both in size and form.

Brady states that it has its home amongst the coral-sands of the Pacific and Indian oceans at depths of from 2 to 155 fathoms. The 'Gazelle' Station is Mauritius, 225 fathoms.

Truncatulina reticulata Czjzek sp.

Rotalina reticulata Czjzek, 1848, Haidinger's Naturw. Abhandl., vol. ii. p. 145, pl. xiii. figs. 7-9. *Truncatulina reticulata* (Czjzek) Brady, 1884, Chall. Rept., p. 669, pl. xcvi. figs. 5-8. *T. reticulata* (Czjzek) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 228, pl. xlv. figs. 23, 24. *T. reticulata* (Czjzek) Terrigi, 1891, Mem. R. Com. Geol. d'Italia, vol. iv. p. 107, pl. iv. fig. 10. *T. reticulata* (Czjzek) Chaster, 1892, First Rept. of the Southport Soc. of

Nat. Sci., 1890-1891 (1892), p. 66, pl. i. fig. 16. *T. (Rotalina) reticulata* (Czjzek) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 402, pl. xvi. figs. 42-44; Idem, 1895, Naturhist. Ver. Passau, Jahresber., xvi. p. 32, pl. v. fig. 7. *T. reticulata* var. *tuberculata*, Silvestri, 1899, Mem. Pontif. Accad. Nuovi Lincei, vol. xv. p. 300, pl. vi. fig. 11; and var. *plano-conveva*, p. 300, pl. vi. fig. 12. *T. reticulata* (Czjzek) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 334, pl. lxxviii. fig. 3.

This form is very rare in the Malay Archipelago, and occurs only in Area 1.

According to Brady it has a somewhat wide geographical range, at depths of from 17 to 450 fathoms; but at one of the 'Gazelle' Stations the depth was 1914 fathoms.

Truncatulina refulgens Montfort sp.

Cibicides refulgens Montfort, 1808, Conch. Syst., vol. i. p. 122, 31^e genre. *Truncatulina refulgens* (Montf.) d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 279, pl. xiii. figs. 9-11; Modèle, No. 77. *T. refulgens* (Montf.) Sherborn and Chapman, 1886, Journ. R. Micr. Soc., ser. 2, vol. vi. p. 756, pl. xiv. fig. 13. *T. refulgens* (Montf.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vii. p. 117, pl. viii. figs. 1-3. *T. refulgens* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 401, pl. xvi. figs. 31-33. *Planorbulina refulgens* (Montf.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 89, pl. xv. figs. 775, 776. *T. refulgens* (Montf.) Jones, 1895, Palæont. Soc., p. 302, pl. v. fig. 31. *T. refulgens* (Montf.) Chapman, 1898, Journ. R. Micr. Soc., p. 1, pl. i. fig. 1. *T. refulgens* (d'Orb.) Egger, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 151, pl. xx. figs. 20, 21.

The examples are few and insignificant, but they occur in both Areas.

Truncatulina lobatula Walker and Jacob sp.

"Nautilus spiralis lobatus, etc.," Walker and Boys, 1784, Test. Min., p. 20, pl. iii. fig. 71. *Truncatulina lobatula* d'Orbigny, 1846, For. Foss. Vienne, p. 168, pl. ix. figs. 18-23. *T. lobatula* (W. and J.) Sherborn and Chapman, 1886, Journ. R. Micr. Soc., ser. 2, vol. vi. p. 756, pl. xvi. fig. 12. *T. lobatula* (Walker) Malagoli, 1887, Atti Soc. Nat. Modena, ser. 3, vol. iii. p. 110, pl. i. fig. 14. *T. lobatula* (W. and J.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 227, pl. xlii. fig. 20, pl. xlv. fig. 26. *T. lobatula* (W. and J.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 116, pl. vii. figs. 5-7. *T. lobatula* (W. and J.) Mariani, 1893, Ann. Istit. Teen. Udine, ser. 2, vol. xi. p. 24, pl. i. figs. 19-21. *T. lobatula* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 396,

pl. xvi. figs. 1-3, 10-12. *T. lobatula* (W. and J.) Fornasini, 1893, Mem. R. Accad. Sci. Ist. Bologna, ser. 5, vol. iii. p. 435, pl. ii. figs. 15, 16. *Planorbulina lobatula* (W. and J.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 88, pl. xv. fig. 774. *T. lobatula* (d'Orb.) Egger, 1895, Naturhist. Ver. Passau, Jahresber., xvi. p. 31, pl. v. fig. 5. *T. lobatula* (W. and J.) Burrows and Holland, 1897, Proc. Geol. Assoc., vol. xv. p. 47, pl. ii. fig. 24. *T. lobatula* (Walker) Chapman, 1898, Journ. R. Micr. Soc., p. 2, pl. i. fig. 2. *T. lobatula* (d'Orb.) Egger, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 151, pl. xxiii. figs. 12-14. *T. lobatula* (W. and J.) Chapman, 1902, Proc. Roy. Soc. Edinburgh, vol. xxiii. p. 392, pl. i. figs. 2, 3.

Truncatulina variabilis d'Orbigny.

Truncatulina variabilis d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 279, No. 8; Idem, 1839, Foram. Canaries, p. 135, pl. ii. fig. 29. *T. variabilis* (d'Orb.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 227, pl. xlv. fig. 17. *T. variabilis* (d'Orb.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 116, pl. vii. fig. 9. *T. variabilis* (d'Orb.) Burrows, Sherborn, and Bailey, 1890, Journ. R. Micr. Soc., p. 562, pl. xi. fig. 22. *T. variabilis* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 404, pl. xvi. figs. 57-59, 63, 64. *T. varians* (Reuss) Hosius, 1893, Verhandl. Naturhist. Ver. Preuss. Rheinl. Westph., Jahrg. 1, p. 127, pl. ii. fig. 14. *T. variabilis* (d'Orb.) Jones, 1896, Palæont. Soc., p. 309, pl. vi. fig. 23. *T. variabilis* (d'Orb.) Fornasini, 1896, Revista Ital. di Paleont., p. 95, pl.

These allied forms are widely distributed in the Malay Archipelago, but are most abundant in Area 1. The examples are small and weak.

Truncatulina Wuellerstorfi Schwager sp.

Anomalina Wuellerstorfi Schwager, 1886, Novara Exped., Geol. Theil, vol. ii. p. 258, pl. vii. fig. 105. *Truncatulina Wuellerstorfi* (Schw.) Brady, 1884, Chall. Rept., p. 662, pl. xciii. figs. 8, 9. *T. Wuellerstorfi* (Schw.) Uhlig, 1886, Jahrb. k. k. geol. Reichs., vol. xxxvi. p. 174, fig. 3. *T. Wuellerstorfi* (Schw.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 397, pl. xvi. figs. 13-15. *Planorbulina Wuellerstorfi* (Schw.) Goës, 1889, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 89, pl. xv. fig. 777. *T. Wuellerstorfi* (Schw.) Egger, 1895, Naturhist. Ver. Passau, Jahresber., xvi. p. 31, pl. v. fig. 6. *T. Wuellerstorfi* (Schw.) Chapman, 1893, Journ. R. Micr. Soc., p. 3, pl. i. fig. 3. *T. Wuellerstorfi* (Schw.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 333, pl. lxxvii. fig. 1.

This form is represented by a few weak examples from Station 27, in Area 2.

Truncatulina Haidingeri d'Orbigny sp.

Rotalina Haidingeri d'Orbigny, 1846, For. Foss. Vienne, p. 154, pl. viii. figs. 7-9. *Truncatulina Haidingeri* (d'Orb.) Reuss, 1867, Sitzungsber. k. Akad. Wiss. Wien, vol. lv. p. 100. *T. Haidingeri* (d'Orb.) Toutkowsky, 1888, Zap. Kievsk. Obsch. Estest., vol. ix. p. 58, pl. viii. fig. 3. *T. Haidingeri* (d'Orb.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 118, pl. viii. figs. 7-9. *T. (Rotalina) Haidingeri* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 401, pl. xvi. figs. 25-27; Idem, 1895, Naturhist. Ver. Passau, Jahresber., xvi. p. 29, pl. v. fig. 1. *Rotalina Haidingeri* (d'Orb.) Idem, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 159, pl. xxv. figs. 36-38; and *R. Brueckneri* (Reuss) p. 159, pl. xxv. figs. 19-21. *T. Haidingeri* (d'Orb.) Liebus, 1902, Jahrb. k. k. geol. Reichs., vol. lii. Heft i. p. 90, fig. 4.

■ This also is a rare form in the Malay Archipelago, but it is found at Stations in both Areas. The examples, although small, are typical.

Truncatulina Ungeriana d'Orbigny sp.

Rotalina Ungeriana d'Orbigny, 1846, For. Foss. Vienne, p. 157, pl. viii. figs. 16-18. *T. Ungeriana* (d'Orb.) Reuss, 1865, Denkschr. k. Akad. Wiss. Wien, vol. xxv. p. 161. *Planorbulina Ungeriana* (d'Orb.) Sherborn and Chapman, 1886, Journ. R. Micr. Soc., ser. 2, vol. vi. p. 757, pl. xvi. fig. 16. *T. Ungeriana* (d'Orb.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 117, pl. viii. fig. 4; and *Truncatulina* sp., p. 118, pl. viii. fig. 6. *T. involuta* (Reuss) Franzénau, 1899, Math. termész. értesítő, vol. vii. p. 263, pl. iv. fig. 4. *T. Ungeriana* (d'Orb.) Terrigi, 1891, Mem. R. Com. geol. d'Italia, vol. iv. p. 106, pl. iv. fig. 9. *T. Ungeriana* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. (not described) pl. xvi. figs. 19-21. *T. Ungeriana* (d'Orb.) Silvestri, 1893, Mem. Pontif. Accad. Nuovi Lincei, vol. ix. p. 213, pl. vi. fig. 3. *Planorbulina Ungeriana* (d'Orb.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 90, pl. xv. fig. 780. *T. Ungeriana* (d'Orb.) Jones, 1896, Paleont. Soc., p. 312 (1886), pl. ii. figs. 11, 12. *T. Ungeriana* (d'Orb.) Burrows and Holland, 1897, Proc. Geol. Assoc., vol. xv. p. 47, pl. ii. fig. 23. *T. Ungeriana* (d'Orb.) Egger, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 150, pl. xix. figs. 4-6. *T. Ungeriana* (d'Orb.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 333, pl. lxxvii. fig. 2.

This form is not quite so rare in the Malay Archipelago as *T. Haidingeri*, and occurs at a greater number of Stations in both Areas.

Truncatulina Akneriana d'Orbigny sp.

Rotalina Akneriana d'Orbigny, 1846, For. Foss. Vienne, p. 156, pl. viii. figs. 13-15. *T. Akneriana* (d'Orb.) Reuss, 1865, Denkschr. k. Akad. Wiss. Wien, vol. xxv. p. 160. *T. Akneriana* (d'Orb.) Toutkowsky, 1887, Zap. Kievsk. Obsch. Estest., p. 46, pl. vi. figs. 1, 2. *T. Ackneriana* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 400, pl. xvi. figs. 60-62. *T. (Rotalina) Ackneriana* (d'Orb.) Egger, 1895, Naturhist. Ver. Passau, Jahresber., xvi. p. 30, pl. v. fig. 2. *T. Akneriana* (d'Orb.) Flint, 1899, Rep. U.S. Nat. Mus. 1897 (1899), p. 333, pl. lxxvii. fig. 5.

Is represented by a few characteristic examples from Stations in Area 2.

Truncatulina præcineta Karrer sp.

Rotalia præcineta Karrer, 1868, Sitzungsber. k. Akad. Wiss. Wien, vol. lviii. p. 189, pl. v. fig. 7. *T. præcineta* (Karr.) Brady, 1884, Chall. Rept., p. 667, pl. xciv. figs. 1-3. *T. præcineta* (Karr.) Terrigi, 1891, Mem. R. Com. geol. d'Italia, vol. iv. p. 107, pl. iv. fig. 11. *T. præcineta* (Karr.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 403, pl. xvi. figs. 51-53. *T. præcineta* (Karr.) Fornasini, 1895, Mem. R. Accad. Sci. Ist. Bologna, ser. 5, vol. v. p. 12, pl. iv. fig. 36. *T. præcineta* (Karr.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 334, pl. lxxviii. fig. 1. *T. præcineta* var. *ornata* Silvestri, 1899, Mem. Pontif. Accad. Nuovi Lincei, vol. xv. p. 299, pl. v. fig. 10.

This form also is very rare in the Malay Archipelago, and has been noted only at Station 2 in Area 1, and at Station 22 in Area 2.

According to Brady it most affects the coral reefs of the tropics, at depths of from 15 to 225 fathoms.

Anomalina d'Orbigny.*Anomalina ammonoides* Reuss sp.

Rosalina ammonoides Reuss, Geogn. Skizze Böhmen, p. 214; and 1845, Verstein. böhm. Kreide, p. 36, pl. viii. fig. 53, pl. xiii. fig. 66. *A. ammonoides* (Reuss) Brady, 1884, Chall. Rept., p. 672, pl. xciv. figs. 2, 3. *Planorbulina ammonoides* (Reuss) Sherborn and Chapman, 1886, Journ. R. Micr. Soc., ser. 2, vol. vi. p. 756, pl. xvi. fig. 14. *Planorbulina ammonoides* (Reuss) Burrows, Sherborn, and Bailey, 1890, Journ. R. Micr. Soc., p. 562, pl. xi. fig. 23. *A. (Rosalina) ammonoides* (Reuss) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 378, pl. xiii. fig. 35, pl. xiv. figs. 36, 37. *A. ammonoides* (Reuss) Woodward and Thomas, 1893 (1895), Geol. and Nat. Hist. Survey of Minnesota, vol. iii. p. 44, pl. D,

figs. 28, 29. *A. ammonoides* (Reuss) Perner, 1897, Česká. Akad. Císaře Františka Josefa (Palæont. Bohemicæ No. 4), p. 53, fig. 13. *A. ammonoides* (Reuss) Fornasini, 1898, Mem. R. Accad. Sci. Ist. Bologna, ser. 5, vol. vii. p. 205, pl. fig. 24. *A. ammonoides* (Reuss) Chapman, 1898, Journ. R. Micr. Soc., p. 4, pl. i fig. 5. *A. ammonoides* (Reuss) Egger, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 152, pl. xviii. figs. 10–12. *A. ammonoides* (Reuss) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 335, pl. lxxviii. fig. 4. *A. ammonoides* (Reuss) Bagg, 1899, Bull. U.S. Geol. Survey, No. 88, p. 67, pl. vi. fig. 5.

Anomalina grosserugosa Gümbel sp.

Truncatulina grosserugosa Gümbel, 1868, Abhandl. k. bayer. Akad. Wiss., vol. x. p. 660, pl. ii. fig. 104. *A. grosserugosa* (Gümb.) Brady, 1884, Chall. Rept., p. 673, pl. xcvi. figs. 4, 5. *A. grosserugosa* (Gümb.) Sherborn and Chapman, 1889, Journ. R. Micr. Soc., p. 487, pl. xi. fig. 34. *Truncatulina grosserugosa* (Gümb.) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 117, pl. viii. fig. 5. *A. grosserugosa* (Gümb.) Burrows, Sherborn, and Bailey, 1890, Journ. R. Micr. Soc., p. 563, pl. xi. fig. 25. *A. grosserugosa* (Gümb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 378, pl. xiv. figs. 4–6. *A. grosserugosa* (Gümb.) var. Jones, 1897, Palæont. Soc., p. 315, pl. vii. fig. 30. *A. grosserugosa* (Gümb.) Burrows and Holland, 1897, Proc. Geol. Assoc., vol. xv. p. 48, pl. ii. fig. 26. *A. grosserugosa* (Gümb.) Bagg, 1898, Bull. U.S. Geol. Survey, No. 88, p. 67, pl. vi. fig. 4. *A. grosserugosa* (Gümb.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 335, pl. lxxviii. fig. 5. *A. grosserugosa* (Gümb.) Chapman, 1900, Proc. California Acad. of Sci., ser. 3, Geol., vol. i. p. 253, pl. xxx. fig. 9. *A. grosserugosa* (Gümb.) Schubert, 1901, Zeitschr. deutsch. geol. Gesell., Jahrg. 1901, p. 21, figs. 5, 6.

Anomalina ariminensis d'Orbigny sp.

Planulina ariminensis d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 280, pl. xiv. figs. 1–3; Modèle, No. 26. *A. ariminensis* (d'Orb.) Brady, 1884, Chall. Rept., p. 674, pl. xciii. figs. 10, 11. *A. ariminensis* (d'Orb.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 228, pl. xiv. figs. 20–22. *A. ariminensis* (d'Orb.) Terrigi, 1891, Mem. R. Com. Geol. Italia, vol. iv. p. 107, pl. iv. fig. 12. *Planorbulina ariminensis* (d'Orb.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 91, pl. xv. figs. 784, 785. *A. ariminensis* (d'Orb.) Fornasini, 1895, Mem. R. Accad. Sci. Ist. Bologna, ser. 5, vol. v. p. 13, pl. iv. fig. 37. *A. ariminensis* (d'Orb.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 335, pl. lxxix. fig. 1.

Of these three forms, *ammonoides* and *grosserugosa* are widely distributed in the Malay Archipelago and occur at most of the

Stations; whilst *ariminensis* is rare, although it is found in both Areas. All the examples are small and thin-shelled.

A. grosserugosa is essentially a deep-water form. Brady gives depths of from 345 to 2160 fathoms; Egger records it from one 'Gazelle' Station, at a depth of 371 fathoms; whilst the 'Albatross' Stations range from 420 to 1019 fathoms.

Carpenteria Gray.

Carpenteria monticularis Carter.

Carpenteria monticularis Carter, 1877, Ann. and Mag. Nat. Hist., ser. 4, vol. xix. p. 211, pl. xiii. figs. 9-12. *C. monticularis* (Carter) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 439, pl. xxi. fig. 12. *C. monticularis* (Carter) Chapman, 1900, Journ. Linn. Soc. (Zool.), p. 14, pl. ii. fig. 5, pl. iv. figs. 5, 6.

This form is very rare in the Malay Archipelago, and has been found only at Station 4 in Area 1.

Carpenteria proteiformis Goës, plate X. figs. 1, 2.

Carpenteria balaniformis var. *proteiformis* Goës, 1882, K. Svenska Vet.-Akad. Handl., vol. xix. p. 94, pl. vi. figs. 208-214, pl. vii. figs. 215-219. *C. lithothamnica* Uhlig, 1886, Jahrb. k. k. geol. Reichs., vol. xxxvi. p. 189, pl. v. figs. 1, 2; and *C. cf. proteiformis* (Goës) p. 188, pl. v. fig. 3. *Karrerria fallax*, Rzehak, 1895, Ann. k. k. Naturh. Hofmuseums, vol. x. part 2, p. 226, pl. vii. figs. 7, 8. *C. proteiformis* Goës, 1896, Bull. Mus. Comp. Zool. Harvard College, vol. xxix. p. 74, pl. vi. figs. 8-17. *C. proteiformis* (Goës) Chapman, 1900, Journ. Linn. Soc. (Zool.), vol. xxviii. p. 195, pl. xix. fig. 11.

This form is much more abundant than the preceding, and occurs at several Stations in both Areas. Usually the examples are irregular in growth and coarsely perforated as shown by fig. 1, but there is a solitary specimen from Station 25, which bears a remarkable resemblance to the example of *Karrerria fallax*, figured by Rzehak; this is represented by fig. 2 in our Plate.

Pulvinulina Parker and Jones.

Pulvinulina repanda Fichtel and Moll sp.

Nautilus repandus Fichtel and Moll, 1798, Test. Micr., p. 35, pl. iii. figs. a-d. *Pulvinulina repanda* (F. and M.) Parker and Jones, 1862, in Carpenter's Introd. Foram., p. 311. *P. repanda* (F. and M.) Sherborn and Chapman, 1886, Journ. R. Micr. Soc., p. 757, pl. xvi.

fig. 18. *P. repanda* (F. and M.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 405, pl. xviii. figs. 28-30, 34, 35. *P. repanda* (F. and M.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 95, pl. xvi. fig. 801. *P. repanda* (F. and M.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 328, pl. lxxii. fig. 8. *P. repanda* (F. and M.) Jones and Chapman, 1900, in a Monograph of Christmas Island, p. 228, pl. xx. fig. 1.

This species is not common in the Malay Archipelago, but it is widely distributed and the examples are large and well-grown.

Pulvinulina concentrica Parker and Jones.

Pulvinulina concentrica (P. and J., Ms.) Brady, 1864, Trans. Linn. Soc., vol. xxiv. p. 470, pl. xlvi. fig. 14. *P. concentrica* (P. and J.) Uhlig, 1886, Jahrb. k. k. geol. Reichs., vol. xxxvi. p. 190, pl. iii. figs. 3, 4. *P. concentrica* (P. and J.) Grzybowski, 1894, Rozprawy Wydz. Mat.-Przyr. Akad. Umiej-Krakowie, vol. xxix. p. 202, pl. iv. fig. 9.

This form is very rare, being represented by a solitary specimen from Station 13.

Pulvinulina lateralis Terquem sp.

Rosalina lateralis Terquem, 1878, Mém. Soc. Géol. France, sér. 3, vol. i. p. 25, pl. vii. fig. 11. *Pulvinulina lateralis* (Terq.) Brady, 1884, Chall. Rept., p. 689, pl. civ. figs. 2, 3. *P. lateralis* (Terq.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 413, pl. xviii. figs. 48-50.

This form, which in the living condition appears to be nothing more than a wild-growing variety of *P. repanda*, is tolerably plentiful at Station 22, and is represented at a few other Stations mostly in Area 2.

Like *P. repanda* it is a shallow-water variety. Our knowledge of its distribution in the existing seas, is confined to the localities mentioned by Brady, and the solitary Station recorded by Egger.

Pulvinulina oblonga Williamson sp.

Nautilus auricula var. β , Fichtel and Moll, 1798, Test. Mier., p. 110, pl. xx. figs. *d, c, f*. *Rotalina oblonga* Williamson, 1858, Rec. Foram. Gt. Britain, p. 51, pl. iv. figs. 98-100. *Pulvinulina repanda* var. *auricula* (F. and M.) Parker and Jones, 1862, Introd. Foram., App., p. 311. *P. oblonga* (Will.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 229, pl. xlvi. fig. 5. *P. oblonga* (Will.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 415, pl. xvii. figs. 23-25. *P. oblonga* (Will.) Grzybowski,

1894, Rozprawy Wydz. Mat.-Przyr. Akad. Umiej-Krakowie, vol. xxix. p. 203, pl. iv. fig. 8.

This form is well represented, and occurs abundantly at most of the Stations in both Areas. The examples are large and usually have a clear patch on the septal face, similar to that found in recent specimens of *P. Hauerii*.

Pulvinulina oblonga Williamson sp. var. *carinata* var. n.,
plate X. fig. 3.

This is a well-marked variety, and differs from the type in having an acute ridge down the centre of the septal face; this peculiarity causes the transverse section of the chambers to be of a triangular form.

It occurs at a few Stations, but in small numbers.

Pulvinulina Brongniartii d'Orbigny sp., plate X. fig. 4.

Rotalia Brongniartii d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 273, No. 27. *Rotalina Brongniarti* Idem, 1846, For. Foss. Vienne, p. 158, pl. viii. figs. 22-24. *Pulvinulina auricula* (F. and M.) Parker, Jones, and Brady, 1871, Ann. and Mag. Nat. Hist., ser. 4, vol. viii. p. 173, pl. xii. fig. 143.

This variety of the *P. auricula* group is so abundant in the Malay Archipelago, and its characters so persistent, that it may be worth while to record it under the name given to it by d'Orbigny.

The chambers are ventricose, and the sutures limbate, and formed of clear shelly matter.

It is common at several Stations in both Areas.

Pulvinulina Hauerii d'Orbigny sp.

Rotalina Hauerii d'Orbigny, 1846, For. Foss. Vienne, p. 151, pl. vii. figs. 22-24. *Pulvinulina Hauerii* (d'Orb.) Brady, 1884, Chall. Rept., p. 690, pl. cvi. figs. 6, 7. *P. petrolei* Andreae, 1884, Abhandl. geol. Special-Karte Elsass-Loth., vol. ii. p. 217, pl. viii. fig. 15. *P. (Rotalina) Haueri* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 414, pl. xvii. figs. 29-31. *P. Hauerii* (d'Orb.) Woodward and Thomas, 1893, Geol. and Nat. Hist. Survey of Minnesota, vol. iii. p. 44, pl. E, fig. 34. *P. Hauerii* (d'Orb.) Chapman, 1898, Journ. R. Micr. Soc., p. 5, pl. i. fig. 7. *P. Hauerii* (d'Orb.) Egger, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 154, pl. xviii. figs. 4-6.

Abundant at two or three Stations, and occurs at several others in both Areas. All the examples possess the characters shown in Brady's drawing, pl. civ. fig. 6.

Pulvinulina Menardii d'Orbigny sp.

Rotalia Menardii d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 273, No. 26; Modèle, No. 10. *Pulvinulina repanda* var. *Menardii* (d'Orb.) Parker and Jones, 1865, Phil. Trans., vol. clv. p. 394, pl. xvi. figs. 35-37. *P. Menardii* (d'Orb.) Malagoli, 1887, Boll. Soc. Geol. Italia, vol. vi. p. 523, pl. xiii. fig. 10. *P. Menardii* (d'Orb.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 228, pl. xlvi. fig. 3. *P. Menardii* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 411, pl. xvii. figs. 7-9, 10-12. *P. Menardii* (d'Orb.) Woodward and Thomas, 1893, Geol. and Nat. Hist. Survey of Minnesota, vol. iii. p. 45, pl. E, fig. 33. *Discorbina pusilla* (Uhlig) Grzybowski, 1894, Rozprawy Wydz. Mat.-Przyr. Akad. Umiej-Krakowie, vol. xxix. p. 197, pl. iii. fig. 7. *P. Menardii* (d'Orb.) Burrows and Holland, 1897, Proc. Geol. Assoc., vol. xv. p. 48, pl. ii. fig. 22. *P. Menardii* (d'Orb.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 329, pl. lxxiii. fig. 3. *P. Menardii* (d'Orb.) Rhumbler, 1900, in Dr. Karl Brandt's Nordisches Plankton, Heft 14, p. 14, figs. 6-8; Idem, 1902, Zeitschr. für allgem. Phys., vol. ii. part 2, p. 234, fig. 67. *P. Menardii* (d'Orb.) Fornasini, 1902, Mem. R. Accad. Sci. Ist. Bologna, ser. 5a, vol. x. p. 58, fig. 55.

Pulvinulina Menardii d'Orbigny var. *fimbriata* Brady.

Pulvinulina Menardii var. *fimbriata* Brady, 1884, Chall. Rept., p. 691, pl. ciii. fig. 3. *P. fimbriata* (Brady) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 412, pl. xvii. fig. 19. *P. Menardii* var. *fimbriata* (Brady) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 329, pl. lxxiii. fig. 4. *P. Menardii* var. *fimbriata* (Brady) Rhumbler, 1900, in Dr. Karl Brandt's Nordisches Plankton, Heft 14, p. 16, fig. 9.

The normal form, although stunted in growth, is plentiful and widely distributed throughout the region.

Wherever the type is abundant, examples occur which have the margin more or less fimbriated.

Pulvinulina tumida Brady.

Pulvinulina Menardii var. *tumida* Brady, 1877, Geol. Mag., ser. 2, vol. iv. p. 535. *P. tumida* Idem, 1884, Chall. Rept., p. 692, pl. ciii. figs. 4-6. *P. tumida* (Brady) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 414, pl. xvii. figs. 4-6, 35-37, 44. *P. tumida* (Brady) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 329, pl. lxxiii. fig. 5.

This thick variety is but poorly represented, and has been noted at two Stations only, and there only in small quantities.

Pulvinulina canariensis d'Orbigny sp.

Rotalina canariensis d'Orbigny, 1839, Foram. Canaries, p. 130, pl. i. figs. 34-36. *Pulvinulina repanda* var. *Menardii* subvar. *canariensis* (d'Orb.) Parker and Jones, 1865, Phil. Trans., vol. clv. p. 395, pl. xvi. figs. 47-49. *P. canariensis* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 413, pl. xvii. figs. 20-22. *P. canariensis* (d'Orb.) Rhumbler, 1900, in Dr. Karl Brandt's Nordisches Plankton, Heft 14, p. 16, fig. 10.

Pulvinulina patagonica d'Orbigny sp.

Rotalina patagonica d'Orbigny, 1843, Foram. Amér. Mérid., p. 36, pl. ii. figs. 6-8. *Pulvinulina scitula* Brady, 1882, Proc. Roy. Soc. Edinburgh, vol. xi. p. 716. *P. scitula* (Brady) Balkwill and Millett, 1884, Journ. Micr., vol. iii. p. 85, pl. iv. fig. 12. *P. patagonica* (d'Orb.) Brady, 1884, Chall. Rept., p. 693. pl. ciii. fig. 7. *P. patagonica* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 413, pl. xvii. figs. 16-18. *P. patagonica* (d'Orb.) Rhumbler, 1900, in Dr. Karl Brandt's Nordisches Plankton, Heft 14, p. 13, fig. 5.

These closely allied forms are scarce in the Malay Archipelago, and restricted to a few Stations. Of the two *canariensis* is the less rare.

Pulvinulina crassa d'Orbigny sp.

Rotalina crassa d'Orbigny, 1840, Mém. Soc. Géol. France, vol. iv. p. 32, pl. iii. figs. 7, 8. *Pulvinulina crassa* (d'Orb.) S. R. J. Owen, 1867, Journ. Linn. Soc. (Zool.), vol. ix. p. 148, pl. v. figs. 18, 19. *P. crassa* (d'Orb.) Terrigi, 1891, Mem. R. Com. Geol. Italia, vol. iv. p. 108, pl. iv. fig. 13. *P. crassa* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 416, pl. xviii. figs. 7-12. *P. crassa* (d'Orb.) Flint, 1897, Rep. U.S. Nat. Mus. for 1897 (1899), p. 329, pl. lxxiv. fig. 1. *P. crassa* (d'Orb.) Rhumbler, 1900, in Dr. Karl Brandt's Nordisches Plankton, Heft 14, p. 17, figs. 12, 14, 15.

This also is a rare form in the Malay Archipelago. The examples, although small, are characteristic.

Pulvinulina Micheliniana d'Orbigny sp.

Rotalina truncatulinoides d'Orbigny, 1839, Foram. Canaries, p. 132, pl. ii. figs. 25-27. *Rotalina Micheliniana* Idem, 1840, Mém. Soc. Géol. France, vol. iv. p. 31, pl. iii. figs. 1-3. *Pulvinulina repanda* var. *Menardii* subvar. *Micheliniana* (d'Orb.) Parker and Jones, 1865, Phil. Trans., vol. clv. p. 396, pl. xvi. figs. 41-43; pl. xiv. fig. 16. *P. Micheliniana* (d'Orb.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 229, pl. xlvi. fig. 10.

Rotalina Michelinii (d'Orb.) Fritel, 1888, Foss. Caract. terr. sed. second., pl. xx. figs. 33-35. *Rotalia Michelinii* (d'Orb.) Beissel (Holzapfel), 1891, Abhandl. k. Preuss. geol. Landesanst, N.F., Heft 3, p. 73, pl. xiv. figs. 7-10. *P. Micheliniana* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 416, pl. xviii. figs. 1-6. *Rotalina Micheliniana* (d'Orb.) Idem, 1899, Ibid., vol. xxi. p. 155, pl. xx. figs. 1-3. *P. truncatulinoides* (d'Orb.) Rhumbler, 1900, in Dr. Karl Brandt's Nordisches Plankton, Heft 14, p. 17, fig. 16.

In according precedence to the trivial name *truncatulinoides*, Dr. Rhumbler is no doubt technically right, that is, as far as the dates on the title pages are concerned; but the name *Micheliniana* is so well established, that even a slight excuse for its retention may be willingly accepted. The uncertainty of d'Orbigny's dates is shown by the fact that the memoirs on the foraminifera of the Canary Isles, and of South America both bear on the title the date 1839. On the very first page of the latter work allusion is made to a memoir published in 1840, and this is asserted to have been issued in the year previous to 1839, whilst to complete the incongruity the original wrapper of my copy bears the date 1843. Brady, in his 'Challenger' Report, notices some of these discrepancies and accords preference to the name *Micheliniana*.

The form is rare in the Malay Archipelago, and has been found only at Station 2.

Pulvinulina Schreibersii d'Orbigny sp.

Rotalina Schreibersii d'Orbigny, 1846, For. Foss. Vienne, p. 154, pl. viii. figs. 4-6. *Pulvinulina Schreibersii* (d'Orb.) Parker and Jones, 1865, Phil. Trans., vol. clv. p. 393. *P. Schreibersii* (d'Orb.) Brady, Parker, and Jones, Trans. Zool. Soc., vol. xii. p. 228, pl. xlvi. fig. 4. *P. Schreibersii* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 409, pl. xviii. figs. 31-33, 67-69.

This form also is rare in the Malay Archipelago, and has been observed only in Area 2.

Pulvinulina elegans d'Orbigny sp.

Rotalia (Turbinulina) elegans d'Orbigny, 1826, Ann. Sci. Nat., vol. xii. p. 276, No. 54. *Pulvinulina elegans* (d'Orb.) Jones and Parker, 1864, Geologist, vol. vii. p. 88. *P. elegans* (d'Orb.) Brady, Parker, and Jones, 1888, Trans. Zool. Soc., vol. xii. p. 228, pl. xlvi. fig. 2. *P. elegans* (d'Orb.) Sherborn and Chapman, 1889, Journ. R. Micr. Soc., p. 489, pl. xi. figs. 30-32. *Rotalia cf. Bouei* (d'Orb.) Beissel (Holzapfel), 1891, p. 72, pl. xiv. figs. 25-29. *P. elegans* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 410, pl. xviii. figs. 37-39. *P. elegans* (d'Orb.)

Fornasini, 1893, Mem. R. Accad. Sci. Ist. Bologna, ser. 5, vol. iii. p. 435, pl. ii. fig. 18. *P. elegans* (d'Orb.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 97, pl. xvi. fig. 808. *P. elegans* (d'Orb.) Jones, 1895, Palæont. Soc., p. 324, pl. vii. fig. 32. *P. elegans* (d'Orb.) Chapman, 1898, Journ. R. Micr. Soc., p. 6, pl. i. fig. 8. *P. elegans* (d'Orb.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 331, pl. lxxv. fig. 1.

Pulvinulina Partschiana d'Orbigny sp.

Rotalina Partschiana d'Orbigny, 1846, For. Foss. Vienne, p. 153, pl. vii. figs. 28-30; pl. viii. figs. 1-3. *Pulvinulina repanda* var. *elegans* (d'Orb.) Parker and Jones, 1865, Phil. Trans., vol. clv. p. 397, pl. xvi. figs. 44-46. *P. Partschiana* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 410, pl. xvii. fig. 43, pl. xviii. figs. 25-27. *P. (Rotalina) Partschiana* (d'Orb.) Idem, 1895, Naturhist. Ver. Passau, Jahresber., xvi. p. 33, pl. v. fig. 9. *P. Partschiana* (d'Orb.) Grzybowski, 1897, Rozprawy Wydz. Mat.-Przyr. Akad. Umiej-Krakowie, vol. xxxiii. p. 299, pl. xii. fig. 25. *P. Partschiana* (d'Orb.) Egger, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 154, pl. xx. figs. 10-12. *P. Partschiana* (d'Orb.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 331, pl. lxxv. fig. 3.

Although these allied forms occur at several Stations in both Areas; the examples are very small and weak, and nowhere numerous.

Pulvinulina Berthelotiana d'Orbigny sp.

Rotalina Berthelotiana d'Orbigny, 1839, Foram. Canaries, p. 130, pl. i. figs. 31-33. *Pulvinulina Berthelotiana* (d'Orb.) Parker and Jones, 1865, Phil. Trans., vol. clv. p. 393. *P. Berthelotiana* (d'Orb.) De Amicis, 1893, Boll. Soc. Geol. Italia, vol. xii. p. 455, pl. iii. fig. 12.

Is represented by a solitary, but fine specimen from Station 2 in Area 1.

Little is known of its distribution in the living condition; d'Orbigny found it in the sand of Teneriffe, and Brady records two 'Challenger' Stations, both near the coast of Papua, at depths from 16 to 25 fathoms.

Rotalia Lamarck.

Rotalia Beccarii Linné sp.

Cornu Ammonis Plancus, 1739, Conch. Min., p. 8, pl. i. fig. 1. *Nautilus Beccarii* Linné, 1758, Syst. Nat., p. 710, No. 237. *Rotalia*

(*Turbinulina*) *Beccarii* (Turt.) d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 275, No. 42. *R. Beccarii* (Linné) Wright, 1886, Proc. Belfast Nat. Field Club, 1884-1885, App. ix. p. 332, pl. xxvii. fig. 15. *R. Beccarii* (Linné) Malagoli, 1887, Boll. Soc. Geol. Italia, vol. vi. p. 523, pl. xiii. fig. 11. *R. Beccarii* var. *ammoniformis* Idem, Ibid., p. 523, pl. xiii. fig. 12; Idem, 1888, Atti Soc. Nat. Modena, ser. 3, vol. vii. p. 113, pl. iii. fig. 10. *R. Beccarii* (Linné) Terrigi, 1889, Mem. R. Accad. Lincei, ser. 4, vol. vi. p. 119, pl. viii. fig. 5. *Rotalina Beccarii* (Linné) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 420, pl. xix. figs. 25-27. *Rotalina Beccarii* (Linné) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 99, pl. xvi. fig. 811. *R. Beccarii* (Linné) Rhumbler, 1894, Zeitschr. für Wiss. Zool., vol. lvii. p. 574, pl. xxii. fig. 41. *R. Beccarii* (Linné) Lister, 1895, Phil. Trans., vol. clxxxvi. p. 436, pl. viii. figs. 38-40. *R. Beccarii* (Linné) Fornasini, 1898, Mem. R. Accad. Sci. Ist. Bologna, p. 259, figs. *R. Beccarii* (Linné) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 331, pl. lxxv. fig. 2. *R. Beccarii* (Linné) Wright, 1900, Geol. Mag., dec. 4, vol. vii. p. 100, pl. v. fig. 22. *R. Beccarii* (Linné) Fornasini, 1902, Mem. R. Accad. Sci. Ist. Bologna, ser. 5^a, vol. x. p. 59, figs. 56-58. *R. Beccarii* (Linné) Chapman, 1902, The Foraminifera, p. 37, fig. 23. *R. Beccarii* (Linné) Lister, 1903, The Foraminifera, in Lankester's Zoology, p. 120, fig. 50.

This well-known form is very abundant and occurs at nearly all of the Stations. The examples are small, but are marked with great variety, not only in the number and degree of inflation of the chambers, but also in the thickness and translucency of the shell-substance.

Rotalia Broeckhiana Karrer.

Rotalia Broeckhiana Karrer, 1878, in Drasche's Geol. Luzon, p. 98, pl. v. fig. 26. *Rotalina Broeckhiana* (Karr.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 421, pl. xix. figs. 19-21.

This even at its best is a very unsatisfactory form, and the Malay Archipelago examples, which are always found in company with *R. Beccarii*, are small and poor.

Brady records it from off Ki Islands, 580 fathoms. The solitary 'Gazelle' Station is West Australia, 196 fathoms.

Rotalia Soldanii d'Orbigny.

Rotalia (Gyroidina) Soldanii d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 278, No. 5; Modèle, No. 36. *R. Soldanii* (d'Orb.) Terrigi, 1891, Mem. R. Com. Geol. Italia, vol. iv. p. 109, pl. iv. fig. 15. *Rotalina Soldanii* (d'Orb.) Egger, 1893, Abhandl. k. bayer.

Akad. Wiss., Cl. II. vol. xviii. p. 420, pl. xix. figs. 16-18, 51. *Rotalina Soldanii* (d'Orb.) Goës, 1894, K. Svenska Vet.-Akad. Handl., vol. xxv. p. 99, pl. xvi. fig. 812. *Rotalina Soldanii* (d'Orb.) Egger, 1895, Naturhist. Ver. Passau, Jahresber., xvi. p. 34, pl. v. fig. 10. *R. Soldanii* (d'Orb.) Grzybowski, 1897, Rozprawy Wydz. Mat.-Przyr. Akad. Umiej-Krakowie, vol. xxxiii. p. 300, pl. xii. fig. 23. *R. Soldanii* (d'Orb.) Silvestri, 1899, Mem. Pontif. Accad. Nuovi Lincei, vol. vi. p. 328, pl. vi. fig. 14. *R. Soldanii* (d'Orb.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 332, pl. lxxv. fig. 4. *Rotalina Soldanii* (d'Orb.) Egger, 1899, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xxi. p. 156, pl. xx. figs. 26-28.

This form is found at two Stations in considerable numbers, but the examples are small and weak. They vary in the direction of *R. orbicularis*, but no typical specimens of this latter form have been observed.

Rotalia Schroeteriana Parker and Jones.

Ammonshorn Schroeter, 1784, Neue Litt. u. Beyträge, vol. i. p. 307, pl. i. fig. 1. *Faujasina* sp., Williamson, 1853, Trans. Micr. Soc. London, ser. 2, vol. i. p. 87, pl. x. figs. 1-6. *R. Schroeteriana* (Parker and Jones, M.S.) Carpenter, 1862, Introd. Foram. p. 212, pl. iv. fig. 3, pl. xiii. figs. 7-9. *Rotalina Schroeteriana* (Carpenter) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 422, pl. xix. figs. 10-12. *R. Schroeteriana* (P. and J.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 338, pl. lxxvi. fig. 1.

This fine species is abundant, large and typical, at Stations 14 and 17.

Schroeter records it from Tranquebar, and states that the examples are the size of poppy-seeds. Brady * writes, "No well-marked specimens of *Rotalia Schroeteriana* have been met with in the 'Challenger' dredgings. Though somewhat local in distribution, it is by no means rare amongst the islands of the Eastern Archipelago, at depths of less than 50 or 60 fathoms." The 'Gazelle' Stations are West Australia, Amboyna and New Guinea, at depths of from 30 to 560 fathoms. The 'Albatross' locality is not recorded.

Rotalia Schroeteriana Parker and Jones, var. *inflata* var. n.,
plate X. fig. 5.

This is an interesting variety which occurs in great profusion throughout the region. The conical form of the test and the flat superior face indicate that it is a modification of *R. Schroeteriana*; whilst being constant in maintaining the conical shape, the surface

* Chall. Rept., 1884, p. 707.

is subject to great variation, being smooth in some examples, whilst others are beset with tubercles and spines in various degrees. The peripheral margin is more or less fimbriate and often deeply indented at the sutures. A series of umbilical lobes is always present.

The example illustrated shows all these characters in a modified form.

Rotalia papillosa Brady.

R. papillosa Brady, 1884, Chall. Rept., p. 708, pl. cvi. fig. 9.
R. papillosa (Brady) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 322, pl. lxxvi. fig. 2.

At Station 13 in Area 1 this form is common, and it occurs sparingly at a few other Stations in both Areas.

Brady states that it was obtained at seven 'Challenger' Stations in the South Pacific, and at one in the North Pacific, at depths of from 2 to 37 fathoms. The 'Albatross' locality is not recorded.

Rotalia annectens Parker and Jones, plate X. fig. 6.

Rotalia annectens Parker and Jones, 1865, Phil. Trans., vol. clv. pp. 387, 422, pl. xix. fig. 11.

Parker and Jones describe this as "A well-developed conus-shaped *Rotalia*, which has on its under or umbilical surface, partially formed secondary chambers, owing to angular processes of the septa nipping the umbilical lobes. It is thus a passage-form between *R. Schroeteriana* P. and J., and *R. (Asterigerina) lobata* d'Orbigny." The localities given are Hong Kong (anchor-mud) and Fiji (coral-reef).

The Malay examples are less conical than the type, and the angular processes of the septa are not so well marked.

It occurs sparingly at Stations 14 and 17.

Rotalia annectens Parker and Jones, var. *concinna* var. n.,
plate X. fig. 7.

This is a neat compact form, subject to but little variation. The sutures on the inferior face of the test are deeply excavated, forming angular depressions which increase in width as they recede from the peripheral margin. They are bordered by two rows of tubercles, which combine to form a zigzag beading encircling the test. The supplementary chambers are obtuse on the superior margin, and usually cover the whole of the umbilical region. In the example selected for illustration these lobes are absent from

a portion of the test, and are replaced by large clear tubercles or beads.

The variety occurs at the same Stations as the type, as well as at a few others in both Areas.

Rotalina calcar d'Orbigny sp.

Calcarina calcar d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 276, No. 1; Modèle, No. 34. *Rotalia calcar* (d'Orb.) Brady, 1884, Chall. Rept., p. 709, pl. cviii. fig. 3. *Rotalina calcar* (d'Orb.) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 423, pl. xix. figs. 1-3.

Rotalia venusta Brady.

Rotalia venusta Brady, 1884, Chall. Rept., p. 708, pl. cviii. fig. 2. *Rotalina venusta* (Brady) Egger, 1893, Abhandl. k. bayer. Akad. Wiss., Cl. II. vol. xviii. p. 422, pl. xix. figs. 13-15.

Whilst a few more or less typical examples of these two species occur in the Malay Archipelago, the greater mass is made up of forms in which the characters of both are so intermixed that it is useless to attempt to separate them. They both occur in considerable numbers at several of the Stations in both Areas.

For the occurrence of *R. venusta*, Brady names five South Pacific Stations, 3 to 11 fathoms; and off Calpentyn, Ceylon, 2 fathoms, or thereabouts. The 'Gazelle' locality is off the Cape of Good Hope, 50 fathoms.

Rotalia pulchella d'Orbigny sp.

Calcarina pulchella d'Orbigny, 1839, Foram. Cuba, pp. 80, 92, pl. v. figs. 16-18. *Rotalia pulchella* (d'Orb.) Brady, 1884, Chall. Rept., p. 710, pl. cxv. fig. 8. *R. pulchella* (d'Orb.) Flint, 1899, Rep. U.S. Nat. Mus. for 1897 (1899), p. 332, pl. lxxvi. fig. 3.

This beautiful little form is very abundant at Station 17, and occurs sparingly at other Stations in both Areas. The inferior surface of the test is much more complex than would appear from the published drawings, and is almost identical with that of *R. annectens* var. *concinna*. The superior face is usually of a delicate fawn colour.

With respect to its general distribution, d'Orbigny found a few examples in sand from Cuba; Brady gives 'Challenger' Stations, Kandavu, 255 fathoms; and Humboldt Bay, Papua, 37 fathoms. He also states that it has been obtained from the Straits of Banca, 7 or 8 fathoms; off Java; and off Penang. The 'Albatross' locality is not recorded.

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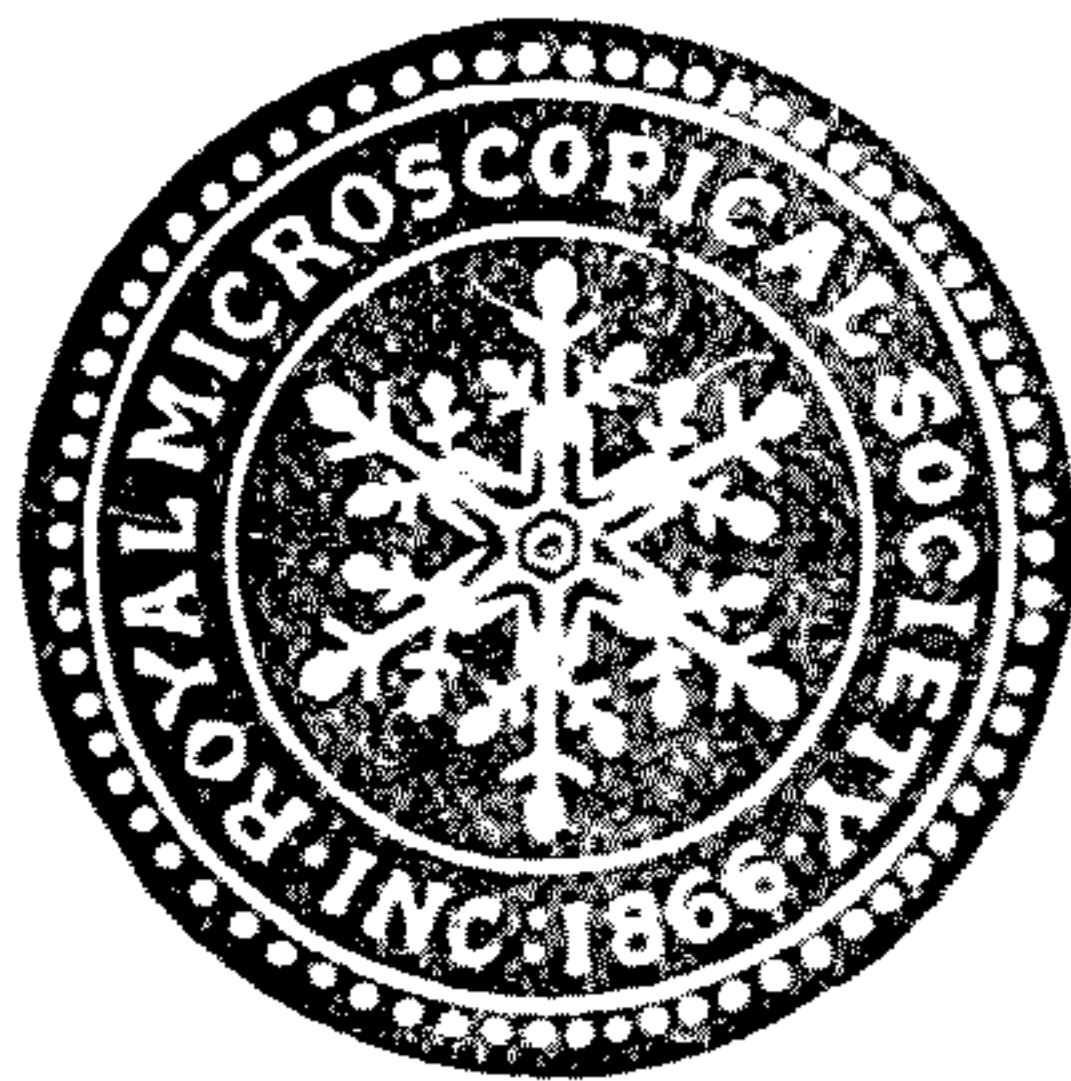
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Minimis partibus, per totum Naturæ campum, certitudo omnis innitur
quas qui fugit pariter Naturam fugit.—*Linnaeus.*

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