

Newton R. B. Notes on fossils from Madagascar, with descriptions of two new species of Jurassic Pelecypoda from that island.// The quarterly journal of the Geological Society of London, 1889.- Vol. 45, p. 2, №178.- p. 331-338, pl. 14.

Joliaf

will require to be modified, and perhaps some of the opinions expressed cancelled; and until the region is explored and surveyed by practical and competent men we cannot hope to see the geological structure of the country properly unravelled or its phenomena fully explained.

EXPLANATION OF PLATE XIII.

Geological Map of the Northern part of Madagascar.
(Scale about 80 miles=1 inch.)



APPENDIX.

NOTES on FOSSILS from MADAGASCAR, with DESCRIPTIONS of two NEW SPECIES of JURASSIC PELECYPODA from that ISLAND. By R. BULLEN NEWTON, Esq., F.G.S., British Museum (Natural History).

[PLATE XIV.]

THESE fossils were referred to me for determination by Dr. Woodward, F.R.S.

They are mostly in a bad state of preservation, many of them being merely casts. The collection, however, is important as forming nearly the first series of Malagasy fossils that have ever reached this country, and, on this account, we are considerably indebted to the collector, the Rev. Richard Baron, for having furnished us with material explaining the palæontological history of certain parts of Madagascar. The specimens, obtained from various localities in the north-west of the island, represent the Eocene, Cretaceous, and Jurassic formations. I have included in this Appendix a notice of a few fossils kindly lent me by the Rev. Dr. Deane of Edgbaston, which were collected several years ago in South-west Madagascar by the Rev. J. Richardson of Antananarivo. They consist of Jurassic specimens, three of which are in such good condition that I have had them figured, one being a new species of Pelecypoda, viz. *Sphæra madagascariensis*.

In drawing up this paper I wish to acknowledge assistance kindly rendered me by R. Etheridge, Esq., F.R.S.; G. C. Crick, Esq., F.G.S.; and C. D. Sherborn, Esq., F.G.S., in their respective subjects.

TERTIARY.

PISCES.

Some *Fish Otoliths* accompanying the collection were, I am informed, discovered on the surface of the ground at Ankoala, so, in all probability, they are of recent origin, though bodies similar to them in form and structure do occur in the Upper Eocene (Barton Beds) of Hampshire.

MOLLUSCA.

This group is represented by several internal casts of Gasteropoda

and Pelecypoda. These are not determinable; but they are of undoubted Eocene age, being associated with forms of Foraminifera belonging to that period.

FORAMINIFERA.

These have been examined and identified by Prof. T. Rupert Jones, F.R.S., and include the following species:—

1. *ALVEOLINA OBLONGA*, d'Orbigny, 1826. (Pl. XIV. figs. 18, 19.)

The specimen figured is partially imbedded in the matrix, though it is well preserved and of large size. The outer layer of the test is mostly removed, exhibiting the very fine and close transverse striæ which occur between the longitudinal flutings. This species is very abundant, and forms the chief feature of the limestone in this area.

Dimensions.—Length=13 millim., maximum breadth=8 millim. Eocene (Paris; Bavaria; Egypt). North of Majamba Bay.

2. *NUMMULITES SUB-BEAUMONTI*, de la Harpe, 1883.

Eocene (Switzerland). North of Majamba Bay.

3. *NUMMULITES ACUTUS*, J. de C. Sowerby (sp.), 1840.

Eocene (India). North of Majamba Bay.

4. *NUMMULITES OBESUS* (Leymerie, MS.), d'Archiac & Haime, 1853.

Eocene (Southern Europe and Asia Minor). North of Majamba Bay.

5. *NUMMULITES BEAUMONTI*, d'Archiac & Haime, 1853.

Eocene (Switzerland; Palestine; Egypt; India). North of Majamba Bay.

6. *NUMMULITES BIARITZENSIS*, d'Archiac & Haime, 1853. (Pl. XIV. fig. 17.)

The external covering of this specimen is partly removed, showing a fine natural dissection within. This fractured surface is also interesting as exhibiting five separate coatings in its structure.

Diameter=12 millim., maximum thickness=5 millim.

Eocene (Southern Europe; Asia Minor; Egypt; India; Java). North of Majamba Bay.

7. *NUMMULITES RAMONDI*, DeFrance, 1825.

Eocene (France, Germany, Hungary, Russia, Egypt, Arabia Petrea, Western Asia, India, &c.). North of Majamba Bay.

8. *ASSILINA SPIRA*, de Poissy (sp.), 1805. (Pl. XIV. fig. 16.)

Diameter of specimen figured=18 millim.; largest specimen collected=22 millim.

Specimen imbedded in the rock, and "worn or dissolved down so

as to show the septa." (Prof. T. R. Jones). It is associated with *Nummulites Ramondi*, DeFrance.

Eocene (Southern Europe and India). North of Majamba Bay.

- | | |
|----------------------|---------------------------------|
| 9. ORBITOIDES, sp. | } Eocene. North of Majamba Bay. |
| 10. ORBITOLITES (?). | |
| 11. ROTALIA (?) | |

CRETACEOUS.

CEPHALOPODA.

1. NAUTILUS FITTONI, Sharpe, 1853.

Upper Cretaceous (England and Germany). Two or three miles north of Ambohitrombikely.

2. BELEMNITES CONICUS, Blainville, 1827.

Neocomian (S. France). Ankaraobato.

3. BELEMNITES POLYGONALIS, Blainville, 1827. (Pl. XIV. figs. 3, 4.)

The laterally compressed form of this species serves to distinguish it from all other Belemnites. The alveolar cavity in our specimen is rather more elliptical than round, as is usually the case; but this may be due to weathering. The longitudinal impressions are distinct on both sides.

Neocomian (South of France). Ankaraobato.

4. BELEMNITES PISTILLIFORMIS, Blainville, 1827.

Neocomian (South of France). Beseva.

5. BELEMNITES BINERVIUS, Raspail, 1829.

Neocomian (S. of France). N.W. Madagascar.

PELECYPODA.

6. ALECTRYONIA (OSTREA) UNGULATA, Schlotheim (sp.), 1813. (Pl. XIV. fig. 12.)

There are several specimens to represent this very variable shell; but the specific character is unmistakable in all, that of the smooth median space which traverses the dorsal region of both valves.

Dimensions of specimen figured:—length=65 millim.; width at expansion=26 millim.; width at terminal part of shell=13 millim.

Upper Cretaceous (Campanien) (England, France, Belgium, Russia, Spain, Algeria, Asia Minor, S. India, N. America, &c.). 2 or 3 miles north of Ambohitrombikely.

7. ALECTRYONIA (OSTREA) PECTINATA, Lamarek (sp.), 1806 and 1809.

(= *Ostrea frons*, Parkinson, sp., 1811.)

Upper Cretaceous (Santonien) (England, France, Germany, Russia, Algeria). Beseva.

8. *ALECTRYONIA DESHAYESI* (?), Fischer, 1835.

Upper Cretaceous (Santonien) (France, Russia, Algeria, India).
2 or 3 miles north of Ambohitrombikely.

9. *GRYPHLEA VESICULARIS*, Lamarck (sp.), 1806 and 1809.

Upper Cretaceous (Campanien) (England, France, Russia, Spain,
Asia, and America). 2 or 3 miles north of Ambohitrombikely.

10. *EXOXYRA RATISBONENSIS*, Schlotheim (sp.), 1813.

(= *Gryphæa columba*, Lamarck, 1819.)

Middle Cretaceous (Carentonien) (England, France, Germany,
Russia, Spain, Asia). 2 or 3 miles north of Ambohitrombikely.

JURASSIC.

CEPHALOPODA.

1. *BELEMNITES SAUVANAUSUS*, d'Orbigny, 1842.

Oxfordian (France). North of Andranosamonta.

2. *PERISPHINCTES (AMMONITES) POLYGYRATUS*, Reinecke (sp.), 1818.

Oxfordian (England; Germany). North of Andranosamonta.

3. *STEPHANOCERAS (AMMONITES) MACROCEPHALUM*, Schlotheim (sp.), 1813.

Oxfordian (England; Germany; France). North of Andranosamonta.

4. *STEPHANOCERAS (AMMONITES) HERVEYI*, J. Sowerby (sp.), 1818.
(Pl. XIV. figs. 1, 2.)

This specimen agrees in all its characters with Sowerby's type. The inner volutions are distinct, though somewhat concealed within a deep umbilicus; the primary ribs bifurcate and pass over the back, where they meet the corresponding primaries on the other side, with a free rib occasionally intervening. Height 37 millim.; width 33 millim.; diameter of umbilicus 11 millim. It may be remarked that this specimen bears a strong resemblance to *Ammonites Bainii*, Sharpe, from the secondary rocks of South Africa. (Trans. Geol. Soc. 1856, vol. vii. pl. xxiii. fig. 2, p. 197.)

Lower Oolite (England; France; Germany). S.W. Madagascar. Collected by the Rev. J. Richardson.

5. *STEPHANOCERAS (AMMONITES) CALLOVIENSE*, J. Sowerby (sp.), 1815.

Callovian (Britain; N. of France; &c.). 5 or 6 miles south of Ankaramy.

GASTEROPODA.

6. *NERITA* BUVIGNIERI, Morris and Lycett, 1850. (Pl. XIV. fig. 5.)

The only difference between the Malagasy shell and this species, to which I have referred it, appears to be an absence of the decussations or transverse lines between the longitudinal ribs. In all other characters it agrees perfectly well.

Lower Oolite (Britain ; France). Near Ankoala.

7. *NERINÆA* (allied to) *EUDESII*, Morris and Lycett, 1850.

Lower Oolite (Britain ; France). S.W. Madagascar. Collected by the Rev. J. Richardson.

8. *NERINÆA* (allied to) *VOLTZII*, Deslongchamps, 1842.

Lower Oolite (Britain ; France). Near Ankoala.

9. *NATICA* (allied to) *INTERMEDIA*, Morris and Lycett, 1850.

Lower Oolite (Britain ; France). Iraony.

10. *NATICA* (allied to) *VERNEUILI*, d'Archiac, 1843.

Lower Oolite (England ; France). Iraony.

11. *NATICA* (allied to) *CINCTA*, Phillips, 1829.

Lower Oolite (England ; France). Iraony.

PELECYPODA.

12. *ALECTRYONIA* (*OSTREA*) *GREGARIA*, J. Sowerby (sp.), 1815, *var.*

Lower Oolite (England ; France ; Germany). Near Ankoala.

13. *OSTREA* *SOWERBYI*, Morris and Lycett, 1853.

Lower Oolite (England ; France). Near Iraony.

14. *PERNA* *MYTILOIDES*, Lamarek, 1819.

Lower Oolite (England ; France ; Germany). Iraony.

15. *PTEROPERNA* *COSTATULA*, Deslongchamps (sp.), 1824.

Lower Oolite (England ; France). Iraony.

16. *MODIOLA* *IMBRICATA*, J. Sowerby, 1818.

Lower Oolite (England ; Germany). 2 or 3 miles north of Ambohitrombikely.

17. *CYPRICARDIA* *ROSTRATA*, J. Sowerby (sp.), 1821.

Lower Oolite (England ; Germany). 1 or 2 miles south of Ambohitrombikely.

18. *CYPRICARDIA* (allied to) *BATHONICA*, d'Orbigny, 1850.

Lower Oolite (England ; France). 2 or 3 miles north of Ambohitrombikely.

19. PHOLADOMYA AMBIGUA, J. Sowerby, 1819.

Lower Oolite (England ; France). Iraony.

20. CEROMYA CONCENTRICA, J. de C. Sowerby (sp.), 1825.

Lower Oolite (England ; France). Iraony.

21. OPIS (allied to) TRIGONALIS, J. de C. Sowerby (sp.), 1824.

Lower Oolite (England ; France). Iraony.

22. LUCINA BELLONA, d'Orbigny, 1849.

Lower Oolite (England ; France). Iraony.

23. MYOPSIS DILATUS, Phillips (sp.), 1829.

Lower Oolite (Britain). Iraony.

24. ASTARTE (allied to) ANGULATA, Morris and Lycett, 1854.

Lower Oolite (Britain). Iraony.

25. ASTARTE (?) BARONI, n. sp. (Pl. XIV. figs. 9-11.)

Description.—Shell equivalve, very inequilateral, elongately ovate, thick, tumid ; umbones contiguous and incurved ; lunule small, oval ; anterior sides short, posterior curved and sharply keeled, forming the boundaries to a deeply excavated escutcheon, which extends from the umbones to the posterior angle, measuring in its greatest width 9 millim.

Dimensions.—Length=35 millim. ; height=29 ; breadth=20.

This species resembles the *Cyprina boloniensis* of de Lorient (Mém. Soc. Phys. Genève, 1868, pl. v. figs. 9, 9a, p. 54), but differs from it in the greater length and width of the escutcheon-groove, which occupies the whole of the dorsal area of the shell ; in de Lorient's specimen it extends to within 4 millim. of the posterior angle.

I have placed this species provisionally in the genus *Astarte*, as its dentition is unknown. Certainly it possesses external characters more in common with that genus than with *Cyprina*.

I propose to name this shell *Astarte* (?) *Baroni*, in honour of its discoverer, the Rev. Richard Baron.

Lower Oolite. Ankoala. Collected by the Rev. R. Baron.

26. SPHÆRA MADAGASCARIENSIS, n. sp. (Pl. XIV. figs. 6-8.)

Description (Right valve).—*Shell* equivalve, subequilateral, solid, ventricose ; posterior dorsal and ventral margins rounded, anterior dorsal side oblique and deep ; hinge-area massive and arched, containing two blunt principal teeth separated by a pit, the margin of which forms a slight lunular expansion beneath the umbo ; posterior tooth transverse, the anterior one longitudinal, with a somewhat flattened upper surface ; ligament-groove narrow, round and prominent ; small pit-markings are present on the posterior lateral extremity of the hinge ; surface ornamented with coarse concentric furrows.

Dimensions.—Length=47 millim.; height=47; breadth (for both valves)=42 millim.

Observations.—The specimen under description consists of a right valve, the dentition of which agrees so closely with that of the *Sphæra* of James Sowerby that I have no hesitation in placing it under that genus. The specific distinctions are, however, sufficiently marked to separate it from the type form of *Sphæra corrugata*, found in the Neocomian beds of Sandown Bay, which has an almost straight hinge-line, with a massive flat expansion at each extremity, giving it a very quadrate appearance; it also possesses a deep pit situated beneath the posterior expansion of the hinge-area. The external surface has, in addition to the concentric furrows, close and transverse striæ producing a fimbriated character, which is not observable in the Malagasy specimen.

This new shell also differs considerably from the other species of *Sphæra* known to occur in the British and Foreign Oolites, chiefly on account of its large size and arched hinge-line.

Lower Oolite, South-west Madagascar. Collected by the Rev. J. Richardson.

BRACHIOPODA.

1. TEREBRATULA MAXILLATA, J. de C. Sowerby, 1823.

Lower Oolite (England; France). S.W. Madagascar. Collected by the Rev. J. Richardson.

2. WALDHEIMIA PERFORATA, Piette, 1856.

Lias (England; France; Germany). West of Ankaramy.

3. RHYNCHONELLA (allied to) VARIABILIS, Schlotheim (sp.), 1813.

Lower Oolite (Britain; France; Germany; Russia). Near Ankoala.

4. RHYNCHONELLA (allied to) PLICATELLA, J. de C. Sowerby (sp.), 1825.

Lower Oolite (Britain; France). Near Ankoala.

5. RHYNCHONELLA (allied to) TETRAËDRA, J. Sowerby (sp.), 1815.

Lias (Britain; France; Germany). West of Ankaramy.

6. RHYNCHONELLA OBSOLETA, J. Sowerby (sp.), 1815.

Lower Oolite (France; Germany). South-west Madagascar. Collected by the Rev. J. Richardson.

ECHINODERMATA.

1. PENTACRINUS (fragment of stem).

Lias? North of Andranosamonta.

2. ACROSALENIA (fragments of test).

Lias? North of Andranosamonta.

3. *Stomechinus* (allied to) *bigranularis*, Lamarck (sp.), 1816.
(Pl. XIV. figs. 13–15.)

The test of this specimen is more depressed than in the typical form, less pentagonal in shape, and the tubercles are rather more numerous. The mouth-opening is much injured and incomplete, and only one of the notches in the peristome is indistinctly preserved. The tubercles are raised on bosses surrounded by smooth areolæ, each areola being encircled by a series of granules. The base of the test is ornamented with well-developed tubercles, and is in contrast with the comparatively smooth appearance of the upper surface. The anal opening is large (5 millim. diameter), and surrounded by a series of granules which border a well-developed apical disc, the details of which are very clear and specific. The perforations of the oculars appear to be elongate in shape, in the genitals they are round. Two or three granules are also present on the ocular plates. The structure of the ambulacral and interambulacral areas is much the same as in the species to which I have referred this specimen; the poriferous zones are narrow, the pores being arranged in trigeminal pairs.

Dimensions.—Diameter = 37 millim.; height = 22.

Lower Oolite (England; France). South-west Madagascar.
Collected by the Rev. J. Richardson.

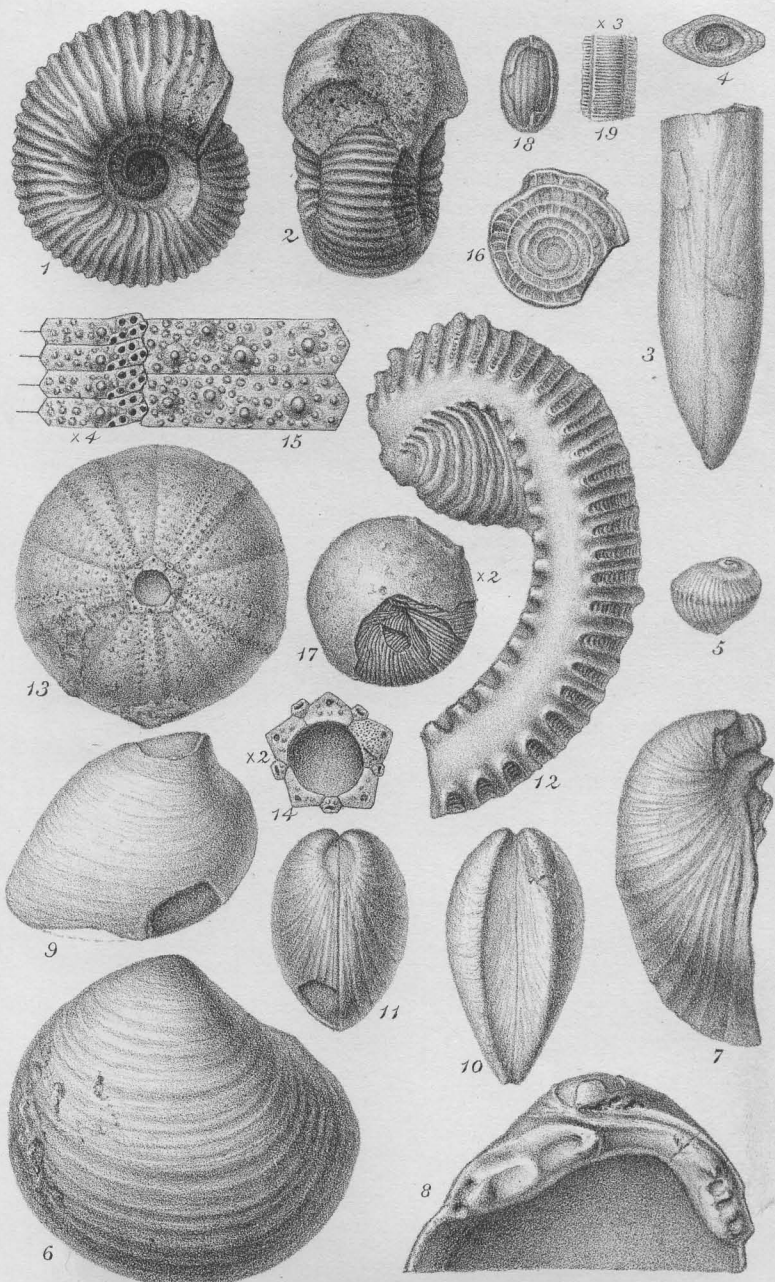
ACTINOZOA (Corals).

Isastrœa and, probably, *Thamnastrœa*, the structures of which are badly preserved and indistinct. The former may probably be *Isastrœa Fischeri* (Fromentel, MS.), Fischer, 1873, *Comptes Rendus*, 1873, vol. 76, p. 113; but as the description of that species is unaccompanied by a figure, it is of little value.

Lias, five or six miles south of Ankaramy.

EXPLANATION OF PLATE XIV.

- Figs. 1, 2. *Stephanoceras (Ammonites) Herveyi*, front and side views.
3, 4. *Belemnites polygonalis*, lateral view and transverse section.
5. *Nerita Buvignieri*, dorsal view.
6–8. *Sphæra madagascariensis* (n. sp.), exterior, interior, and profile views.
9. *Astarte (?) Baroni* (n. sp.), side view.
10. Ditto, posterior view, showing escutcheon.
11. Ditto, anterior view, showing lunule.
12. *Alectryonia (Ostrea) unguolata*, dorsal view of left valve.
13. *Stomechinus* (allied to) *bigranularis*, upper surface.
14. Ditto, apical disk. $\times 2$.
15. Ditto, ambulacral and interambulacral plates, with poriferous zones.
 $\times 4$.
16. *Assilina spira*.
17. *Nummulites biaritzensis*. $\times 2$.
18. *Alveolina oblonga*.
19. Ditto, showing transverse striæ. $\times 3$.



Berjeau & Highley del. et lith.

Hanhart imp.