

tain amount of the pressure, still it is quite certain that all the lower portions of the dykes must have been formed under great pressure; but yet,—so far as I have been able to judge, with the exception of the dyke under consideration,—the stone has the same appearance whether taken from the upper or lower part of the dyke.

The commercial value of this dyke, with its cap, is very considerable. From the number of parallel joints stones with two beds can be obtained of almost any size, and the softer portions can be used for all purposes for which cut stone is required.

DESCRIPTION OF ROCKS.

1. Porphyritic dolerite lava stream with crystals of labradorite.
2. Trachyte from dyke at west edge.
3. Trachyte from dyke at centre decomposed.
4.)
5.) Basaltic tufas red and grey.
6.)
7. & 7A. Compact basalt showing somewhat globular structure
8. Trachyte dyke partly decomposed.
9. Porphyritic basalt.
10. Ditto
11. Dolerite lava with crystals of labradorite.
12. Trachyte.
13. Trachyte with crystals of sanidinè.
14. From the top of the cap.
15. „ „ „

ART LVI.—*On the Foraminifera of the Tertiary Beds at Petane, near Napier.*

By A. HAMILTON.

[*Read before the Wellington Philosophical Society, 24th July, 1880.*]

DURING the past year I have been collecting the fossils which occur so plentifully in the tertiary beds to the north of the inner portion of Napier harbour to determine their true age and position. When the fossils have been examined and tabulated, I hope to lay the results before you, but as Mr. G. R. Vine, junior, of Sheffield, has kindly forwarded to me some very interesting and valuable information concerning the Foraminifera occurring in these beds, I hasten to communicate the result of his examination of a

small fragment from these beds that I sent to him by post; the more readily as Mr. Vine's high reputation as a palaeontologist vouches for the precise identification of such very variable and difficult objects.

Mr. Vine adopts Dr. Carpenter's classification, viz. :—

Imperforate.

Perforate.

Miliolida. *Litnolida*.

Lagenida. *Globigerinida*. *Nummulinida*.

Grouping them as five families under two groups.

Although the amount of material was not larger than a walnut, the species and varieties were numerous, four out of the five families being represented. Amongst them occurred a solitary specimen of Entomostraca, probably a form of *Carbonia*.

LIST OF SPECIES AND VARIETES.

Sub-order, IMPERFORATA. Fam. MILIOLIDA.

Fig. 1, 2. *Miliola seminulum*, var. (*Biloculina*) *ringens*, Linne.

In England the Foraminifera are being arranged all under different types. Thus of the *Miliola*, 2 *seminulum* is the type. The variety follows, preceded by its sub-generic title as above.)

This variety is very widely distributed; it is found common and large in the Arctic Ocean (off Norway), at at from 30 to 160 fathoms. In North Atlantic, rare on marginal plateau. British: off the Shetlands, rare in 120 fathoms. Very rare in River Dee. Common in Tasmanian and Australian seas. Fossil in Boulder clays of Cheshire (drift). Miocene, Yarra Yarra, Victoria. The specimens from the material, are the largest and finest that I ever saw.

Figs. 3, 4. *M. seminulum*, var. *B. ringens*, sub. var. *elongata*, D'Orb.

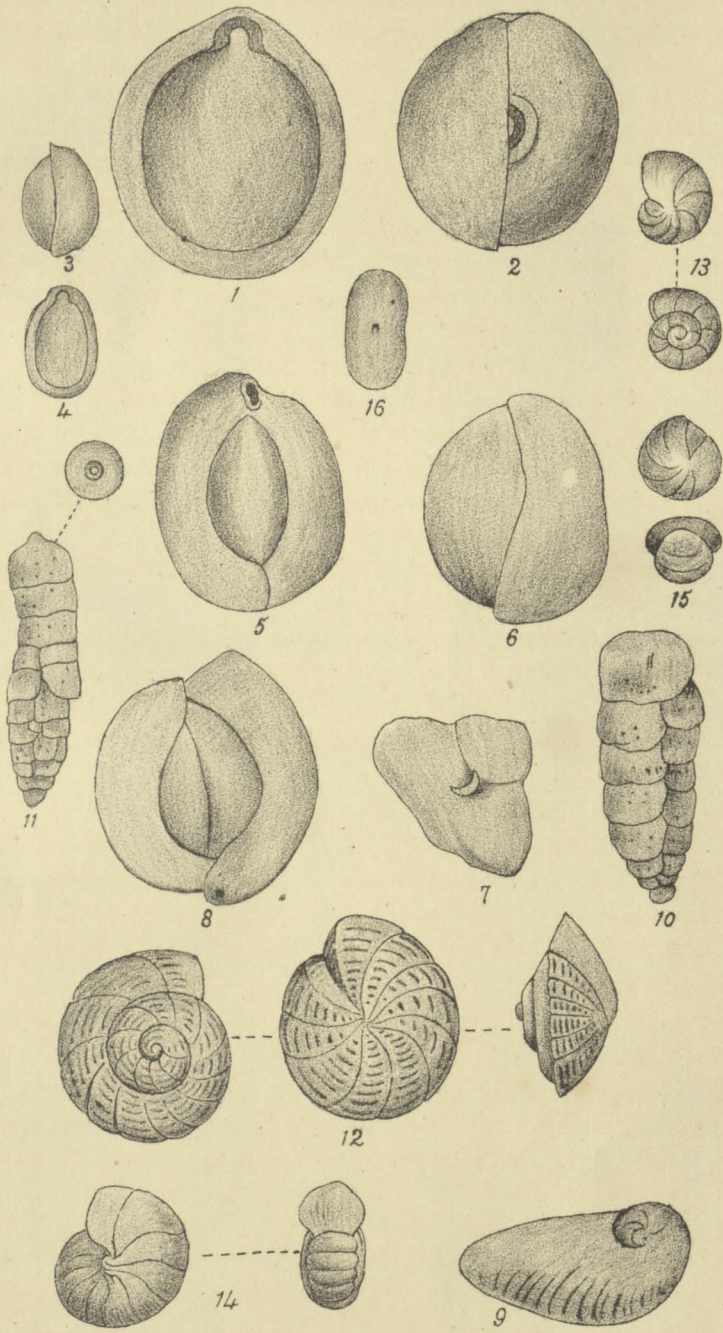
Much smaller here than the *B. ringens*, it is more elongate and less globose in form; it is simply a sub-variety of variety *ringens*, and cannot be really called a species. Rare and small in North Atlantic, in 1450, 1950, 2050 fathoms. British: River Dee, frequent. Fossil: Boulder clays, Cheshire; Yarra Yarra, Victoria.

Figs. 5, 6, 7. *M. seminulum*, var. (*Quinqueloculina*) *triangularis*. D. Orb.

This is a triangular form of the type which takes its place in some localities. Here the type is not found, but is represented as above. Very rare and small in North Atlantic at various depths. Fossil in Miocene as before. Recent also in Mediterranean, Tasmanian seas, Indian Ocean, etc. Is very rarely recorded as a distinct variety, generally classed under the typical name, *Seminulum*. Here it is rather common in various sizes.

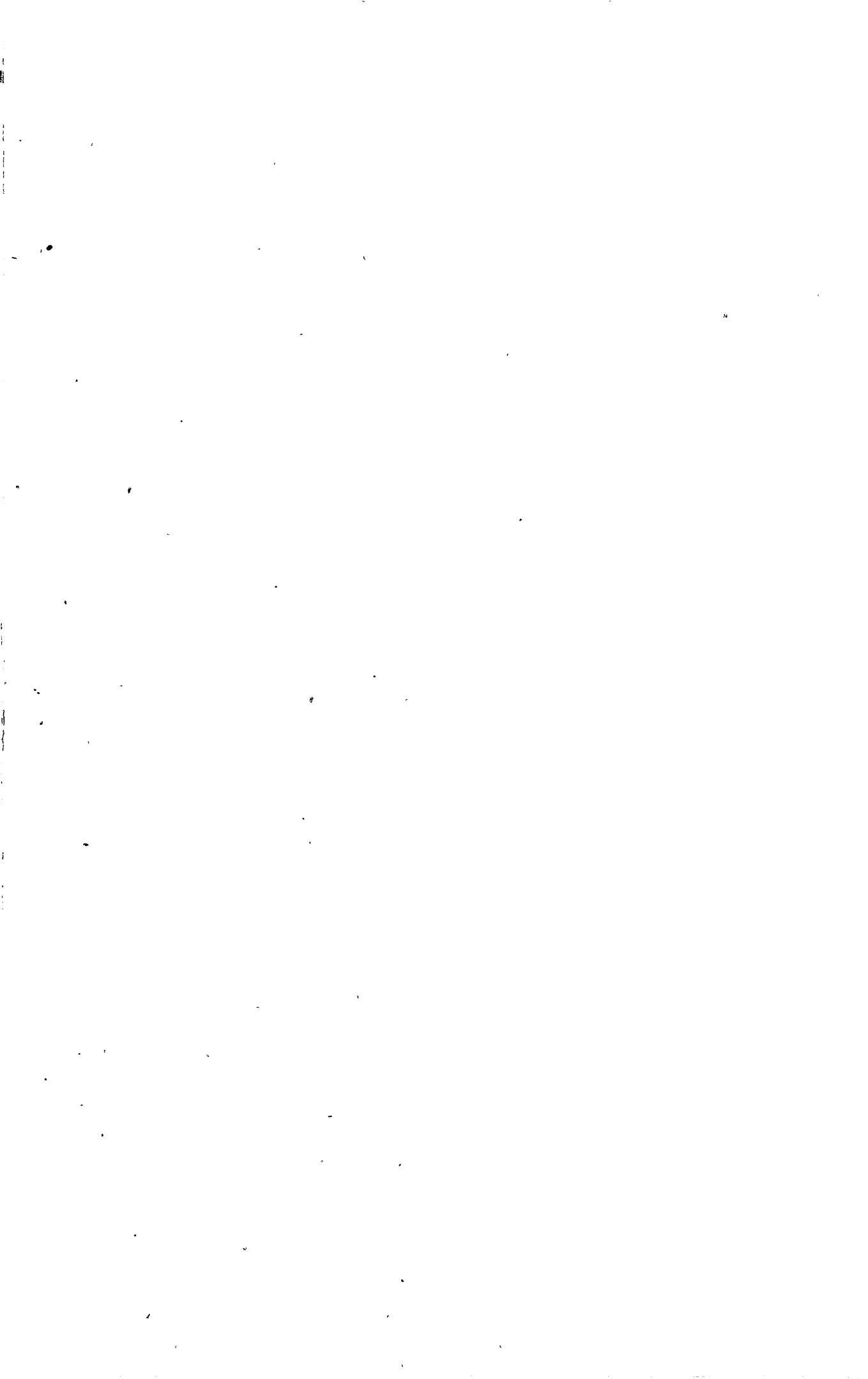
Fig. 8. *M. seminulum*, var. (*spiroloculina*) *planulata*. Lamarck.

This differs in some respects from the forms called "planulata" by authorities, but I know of no other name for it. It is large, flat, much



FOSSIL FORAMINIFERA.

Hamilton, del.



worn, irregularly striated, and rare. I may have to call it by a different name. Recent in Atlantic, Arctic, British Seas; fossil in London clay, Sheppey.

Sub-Order PERFORATA. Fam. LAGENIDA.

Fig. 9. *Nodosaria (Cristellaria) crepidula*. Fichted and Moll.

Very rare and choice here. Middle size, flat worn, septæ indistinct. Recent, Atlantic, and Arctic; rare. Fossil, boulder clays, Cheshire; London clay. Miocene, Yarra Yarra, trias, lias, and chalk.

Fam. GLOBIGERINIDA.

Fig. 10. *Texularia agglutinans*. (Type) D'Orbigny.

Here this species varies considerably from the forms described by Parker and Jones in Phil. Trans., 1865 (N. Atlantic and Arctic Foraminefera), and again the forms there figured differ much from the figures given by Mackie and Jones in "Geologist." * * * It is found in Arctic and Davis Straits, 20 to 30 fathoms, rather common; also off Norway, 30 to 200 fathoms. Fossil in chalk, eocene, miocene, etc., and its representatives *T. eximia* and *T. gibbosa* in carboniferous limestone of England and Wales.

Fig. 11. *Texularia agglutinans*, var. (*Bigenerina*) *nodosaria*. D'Orb.

This form begins with a Texularian, and passes into a Nodosarian growth. The transition between the variety and the type can be easily traced in the material sent. Occurs, recent, all over the world. It has its representative in the carboniferous shales of England and Scotland.

Fig. 12. *Rotalia beccarii*, var. *craticulata*. Parker and Jones.

I think that this is the first time that this variety has been found fossil. It was described by Parker and Jones in Phil. Trans., Royal Soc., Lond., 1865.

Here it is the commonest form, and rather large. It is one of the highest of the Rotalinæ, having a rough outline of a "canal system," characteristic of the Nummulinidæ. Recent in the Fiji Islands.

Fig. 13. *Planorbulina arcta*, var. (*Truncatulina*) *lobatula*. W. and J.

A plano-convex form of the type, having the chambers embracing on the upper side; under side flat, showing primordial. Recent in all seas.

Fossil in London clay, chalk; represented in the carboniferous limestone by *T. carbonifera*, Brady, and *T. Boueana*, D'Orb.

Fam. NUMMULINIDA.

Fig. 14. *Polystomella crispa*, var. *Nonionina umbilicatululu*, Montague.

Rare and small. A variety of *P. crispa*, in which the canal system processes are obsolete. Rare to common in various depths of North Atlantic and Arctic Oceans. Rare as British.

Fossil—Boulder clays, London clay, miocene, chalk.

Fig. 15. *Pullenia sphaeroides*. D'Orb.

Also belonging to the family Globigerinida. I have two small specimens coming near to *Pullenia sphaeroides*, D'Orb. It is very rare here, equally rare in miocene, Yarra Yarra, Victoria. Recent. Very rare in North Atlantic. Rather common on the Norwegian coast; 20–200 fathoms.

DESCRIPTION OF PLATE.

- 1-2. *Biloculina ringens*, Lamarck.
 - 3-4. „ *elongata*, D'Orb.
 - 5-7. *Quinqueloculina triangularis*, D'Orb.
 8. *Spiroloculina planulata*, Lamarck.
 9. *Cristellaria crepidula*, F. et M.
 10. *Texularia agglutinans*, D'Orb.
 11. *Bigenenerina nodosaria*, D'Orb.
 12. *Rotalia craticulata*, P. et J.
 13. *Truncatulina lobatula*, W. et J.
 14. *Nonionina umbilicatula*, Montague.
 15. *Pullenia sphaeroides*, D'Orb.
 16. *Carbonia* —?
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ART. LVII.—On the Genus *Rhynchonella*. By ALEX. MCKAY.

[Read before the Wellington Philosophical Society, 10th October, 1880.]

It is by the permission of the Director of the Geological Survey that I have the pleasure of placing this paper before the Society.

Of the mollusca *Rhynchonella*, although it is represented by but two living species, is, if the fossil species be taken into consideration, numerically the most important genus belonging to the Brachiopoda.

In Woodward's "Manual of the Mollusca," the genus is said to include 332 fossil species; some 60 species obtained in New Zealand have to be added, thus bringing the total to something like 400 species.

At the present time *R. nigricans* alone survives in the southern seas, and is found on the New Zealand coast.

This species is the only one found in our upper and middle tertiary strata. In the upper Eocene rocks of New Zealand, represented by the Mount Brown and Hutchinson quarry beds, another form appears, but this with its close ally *R. nigricans* is the only species yet known from our tertiary strata.

From our upper secondary rocks two more species are added to the list, *Rhynchonella Squamosa*, Hutton, and a species not yet described, which is found in cretaceous rocks of the East Coast of Auckland.