The Foraminifera of the Older Tertiary (No. 2, Kent Town Bore, Adelaide).

By Walter Howchin, F.G.S.

[Read March 3, 1891.]

Plate XIII., figs. 11 to 13.

In 1881 a bore was put down in the Waterworks Yard, in the eastern suburb of Adelaide, under the control of the Hydraulic Department. Prof. R. Tate F.G.S. examined the cores as the work proceeded, and has described the section in detail. (Vide Trans. Roy. Soc., S.A., vol. V., p. 40). The first 69 feet of the section consists of Pliocene Drift, underlying which, in descending order, there follow about 290 feet of Lower Tertiary beds, the upper half of which are marine, and the lower lacustrine. The marine beds are fossiliferous at intervals throughout the section. The most important fossiliferous horizon occurs at the base of the marine rocks, the latter having the lithological features of brown and green clayey sands, 23 feet in thickness. It was from the examination of material from this bed that the following Foraminifera have been determined :—

FAMILY MILIOLIDÆ.

Genus—Biloculina, *d'Orbigny.*

1. *B. ringens*, Lamk. Sub-globose examples, such as Reuss has named *B. turgida*, but has not the value of a varietal distinction. Rare.

Genus—Miliolina, *Williamson.*

2. *M. trigonula*, Lamk. Rare.
3. *M. oblonga*, Montag. Large examples, some with produced neck. Rather scarce.
4. *M. seminulum*, Linn. Rather scarce.
5. *M. Ferussacii*, d'Orb. Compressed and starved examples. Rather scarce.

Genus—Cornuspira, *Schultze.*

6. *C. involvens*, Rss. Rather scarce.

FAMILY LITUOLIDÆ.

Genus—Haplophragmium, *Reuss.*

7. *H. agglutinans*, d'Orb. The few examples obtained of this species show a considerable range as to texture. The larger

examples are coarsely arenaceous, whilst the smaller specimens are smoother, with larger proportion of cement, and more distinct septation. Rare.

Genus—TEXTULARIA, *Defrance*.

8. *T. gibbosa*, d'Orb. Rare.
9. *T. agglutinans*, d'Orb. Moderately common.

Genus—GAUDRYINA, *d'Orbigny*.

10. *G. rugosa*, d'Orb. Rare.

Genus—BULIMINA, *d'Orbigny*.

11. *B. pupoides*, d'Orb. A few fine examples.
12. *B. pyrula*, d'Orb. Moderately common.

Genus—BOLIVINA, *d'Orbigny*.

13. *B. punctata*, d'Orb. Rare.

Genus—CASSIDULINA, *d'Orbigny*.

14. *C. subglobosa*, Br. Small examples, and rather scarce.

FAMILY LAGENIDÆ.

Genus—LAGENA, *Walker* and *Jacob*.

15. *L. lævis*, Montag. Rare.
16. *L. sulcata*, W. and J. Rare.
17. *L. squamosa*, Montag. Rare.
18. *L. hexagona*, Will. Rare.
19. *L. marginata*, W. and B. Rare.

Genus—NODOSARIA, *Lamarck*.

20. *N. (Dentalina) soluta*, Rss. Rather scarce.
21. *N.* " *obliqua*, Linné. Rare.
22. *N. scalaris*, Batsch. Rare, but includes one large example of six segments.
23. *N. verruculosa*, Neugeb. One example of four segments. Not very characteristic, as the costæ are serrate rather than tuberculated.

Genus—VAGINULINA, *d'Orbigny*.

24. *V. legumen*, Linné. Rare.

Genus—CRISTELLARIA, *Lamarck*.

25. *C. cultrata*, Mont. Rare.

Genus—POLYMORPHINA, *d'Orbigny*.

26. *P. gibba*, d'Orb. Common, often with tubulose growths.
27. *P. regina*, Br., P., and J. Rare.

28. *P. lactea*, W. and J. Rare.
29. *P. communis*, d'Orb. Rare.
30. *P. elegantissima*, P. and J. Moderately common.

Genus—UVIGERINA, *d'Orbigny*.

31. *U. angulosa*, Will. A few very small examples.

FAMILY GLOBIGERINIDÆ.

Genus—PULLENIA, *Parker* and *Jones*.

32. *P. sphæroides*, d'Orbigny. Rare.
33. *P. quinqueloba*, Reuss. Rare.

FAMILY ROTALIDÆ.

Genus—SPIRILLINA, *Ehrenberg*.

34. *S. decorata*, Brady. In the paper on the "Muddy Creek Foraminifera" (Trans. R. Soc., S. Aus., vol. XII., p. 11), I have pointed out the slight variation which this species, as well as the next described, exhibits from the recent forms obtained from the Challenger material. The Kent Town examples possess the same varietal features as those obtained from Muddy Creek, but are in much greater numbers than in the latter district. Moderately common.

35. *S. tuberculata*, Brady. Moderately common.

Genus—DISCORBINA, *Parker* and *Jones*.

36. *D. globularis*, d'Orb. Rare.
37. *D. biconcava*, Parker and Jones. Rare.

Genus—PLANORBULINA, *d'Orbigny*.

38. *P. mediterranensis*, d'Orb. Rare.
39. *P. (?) acervalis*, Brady. A single example of very irregular acervaline growth. It does not conform to the usual character of this species, but may be only an aberrant growth.

Genus—TRUNCATULINA, *d'Orbigny*.

40. *T. lobatula*, W. and J. Rather scarce.
41. *T. Ungeriana*, d'Orb. One of the commonest species of the material.
42. *T. margaritifera*, Br., var. *Adelaidensis*, var. nov., pl. xiii., figs. 11-13. Test rotaliform, much compressed laterally, consisting of 2-3 convolutions, and about twelve chambers in all. Superior surface nearly flat. Inferior surface slightly convex. Sutural lines depressed, and on superior surface strongly curved. On the inferior side the septation is marked by irregular depressed lines, enclosing

inflated raised areas. Peripheral margin sharp and sometimes furnished with a keel of considerable extent. Primordial region umbonate on superior surface, a feature which in very thin examples is visible on inferior side as well as superior. Surface of test ornamented on both sides (with the exception of final segment) by thickly set minute tubercles. Diameter, $\frac{1}{25}$ in.

This variety is distinguishable from the type by its greater lateral compression, fewer chambers, irregular septation on inferior surface, umbonate features of early chambers, and the general distribution of ornamentation on both faces. It is moderately common in the material from the Adelaide Bore, and is one of the most interesting species of the section. The "Challenger" localities for the species were Phillippine Islands, New Hebrides, and coast of the Korea.

Genus—ANOMALINA, *d'Orbigny.*

43. *A. ammonoides*, Reuss. Rare.

Genus—PULVINULINA, *Parker* and *Jones.*

44. *P. Hauerii*, d'Orb. Rare.
45. *P. repanda*, F. and M. Rare.

Genus—ROTALIA, *Lamarck.*

46. *R. Soldanii*, d'Orb. Rare.

The Foraminifera, as determined from the material examined, have been referred to 46 species, belonging to 23 genera, and includes one variety not hitherto described. The Foraminifera as a whole bear a striking resemblance to those found in the Lower Bed of the Muddy Creek section, Victoria (*vide* Trans. Roy. Soc. S. Aus., vol. XII., p. 1), there being no less than 35 species common to the two localities, whilst only 11 are found in the Kent Town material which are unrecorded from Muddy Creek. It is also interesting to note that of the 35 species referred to, 16 are common to both the Upper and Lower Beds of Muddy Creek, whilst the remaining 19 are found in the Lower Bed only. The importance of the last mentioned fact will be understood when it is stated, that whilst 19 species distinctive of the Lower Bed are found in the Kent Town material, not one of the species limited to the Upper Bed of Muddy Creek has been detected in the Kent Town Bore. The palæontological evidence is therefore very definite in leading us to assign a geological age to the marine beds of the Kent Town Bore closely synchronous with those of the Inferior Beds of Muddy Creek, which, as determined by Prof. Tate from the higher organisms, must be low down in the Tertiary series. The remarkable affinities which the foraminiferal fauna exhibit to the Lower as compared with the

Upper portions of the Muddy Creek Beds gives independent confirmation of the conclusions already reached from their dissimilar fossil contents of a well-marked unconformability existing in the Tertiaries of Western Victoria.

General Microzoa.—The following were observed in course of examination of material, viz. :—Several species of Entomostraca, otolites, small fish bones, and a few straight and rough arenaceous tubes of doubtful affinities.

DESCRIPTION OF PLATE XIII., figs. 11 to 13.

Figs. 11-13. *Truncatulina margaritifera* var. *Adelaidensis*, Howchin.
Fig. 11. Lateral view of superior surface of test. x 36 diam.
Fig. 13. Lateral view of inferior side, showing oral aperture somewhat broken.
Fig. 12. Peripheral aspect, showing the compressed features of the test oral aperture aud biconvex outline of the primordial region.

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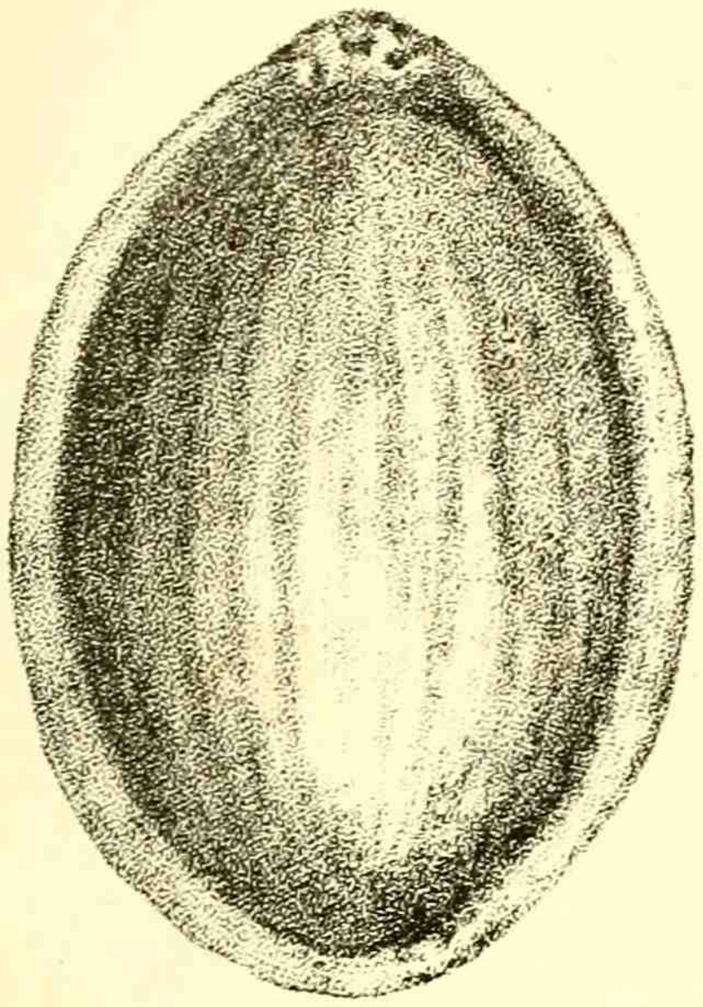

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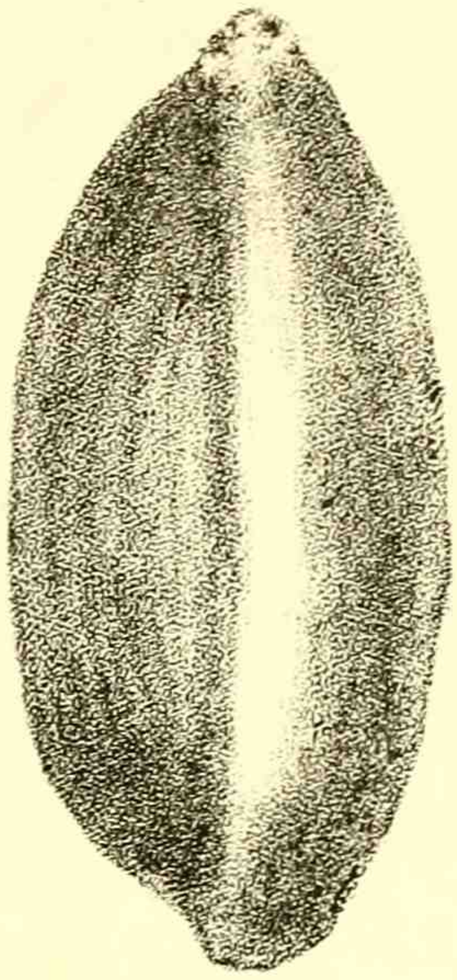

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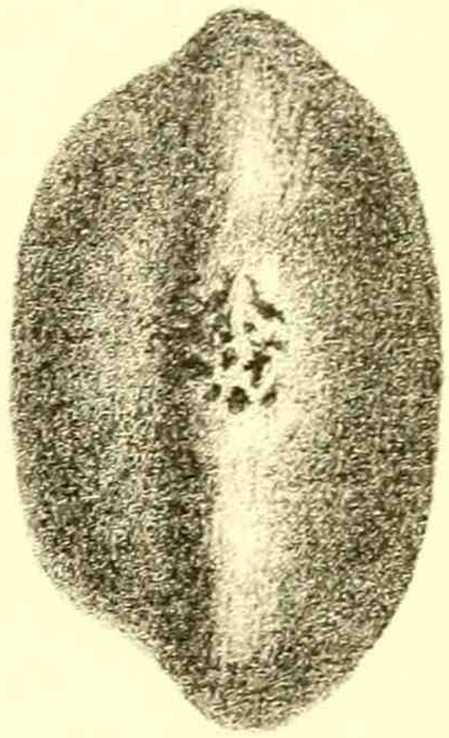

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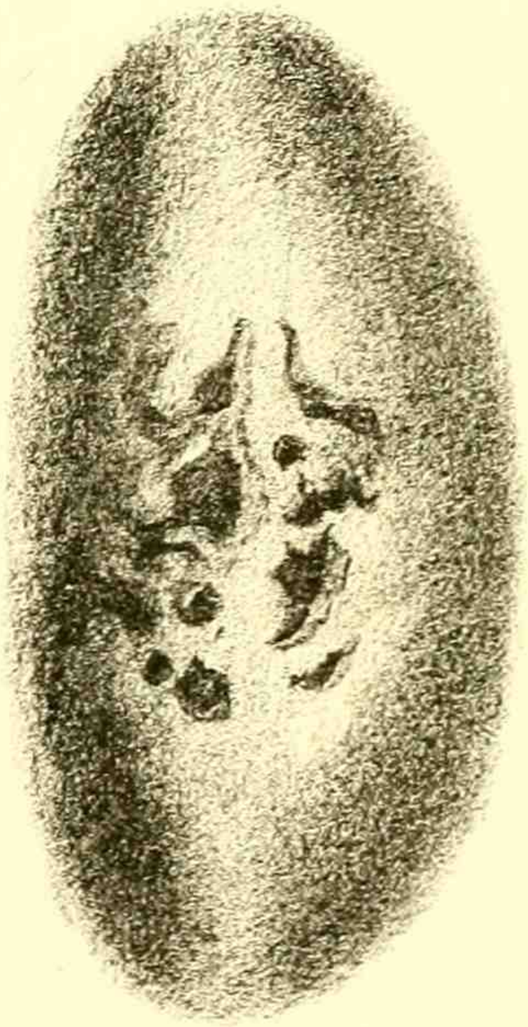

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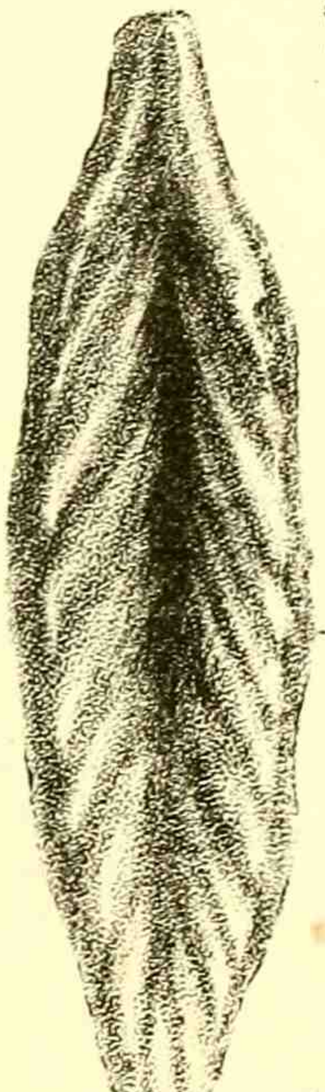

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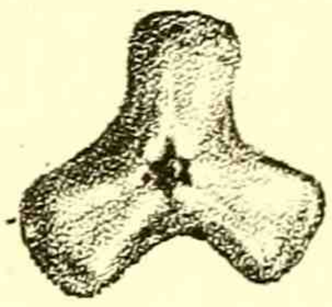

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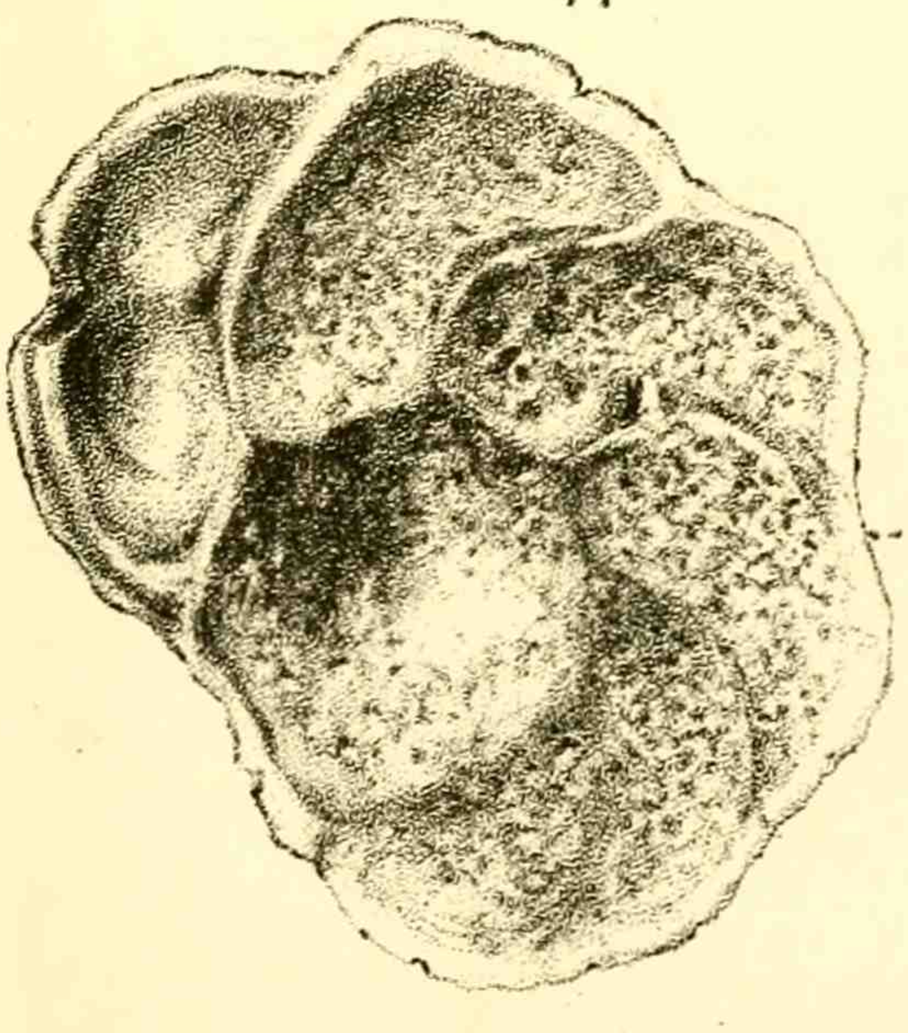

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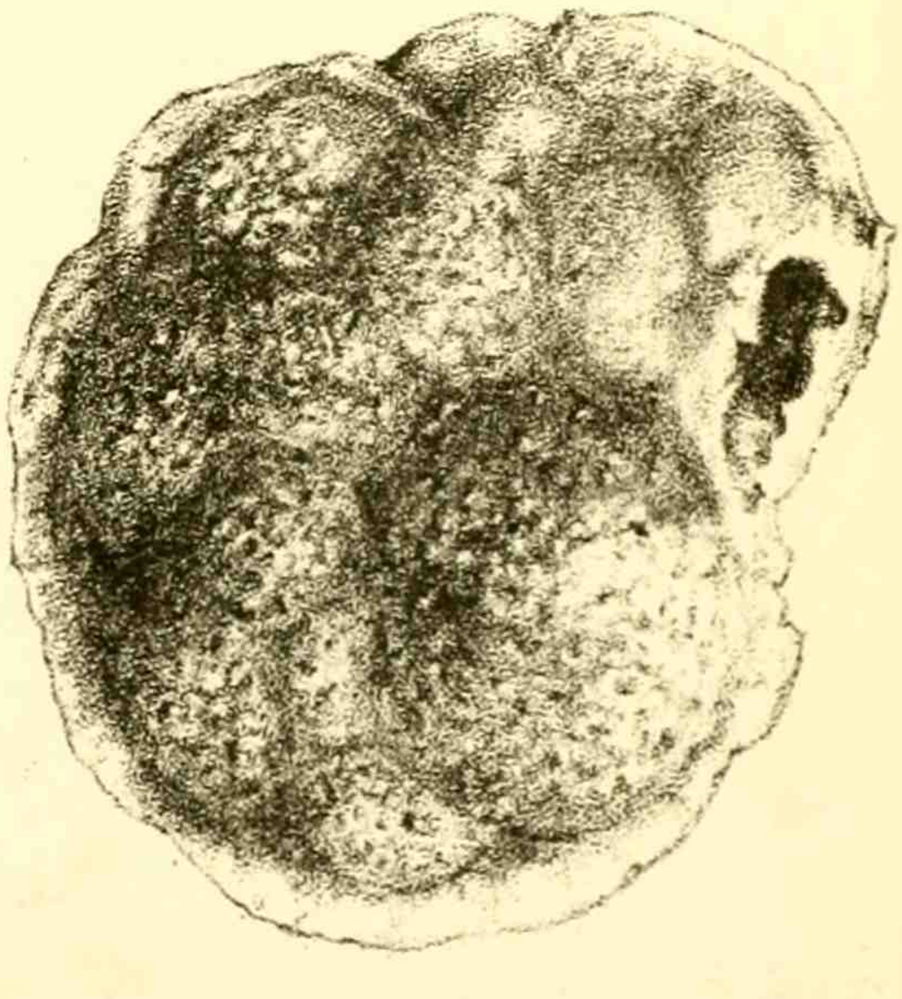

A.L.R.

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