MINES AND MINERAL STATISTICS.

ANNUAL REPORT

OF THE

DEPARTMENT OF MINES,

NEW SOUTH WALES,

FOR THE YEAR

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on both sides of the bed of the gully, and for a distance of half-a-mile along it from its junction with the right branch. In this area a reservoir might be made at an elevation of 100 feet above the town, to which the water might be conducted by a line of pipe about half-a-mile in length.

In conjunction with Mr. Warden Rowling, P.M., I have elsewhere defined the boundaries for the extension of the gold-field.

In conclusion, I may mention that specimens of auriferous quartz have been presented to the Museum of Mines by Messrs. Cameron and party, Messrs. May, Robinson, and Smith, Mr. Denecker, Messrs. Thomas, Luke, and party, and Mr. A. C. Thompson, while others have kindly promised to send specimens from their reefs.

I have, &c.,

C. S. WILKINSON,

The Under Secretary for Mines, Sydney. Geological Surveyor in charge.

Appendix C.

On a Species of Unio, discovered in the Home Rule Lead, Gulgong, New South Wales, by C. S. Wilkinson, F.G.S., Geological Surveyor in charge, New South Wales. By R. Etheridge, Junr., F.G.S. (Corr. Member R. Socs., Victoria and Tasmania).

1.—Introduction.

In a report to the Mining Department of New South Wales "On Payable Gold in our Coal Measures," published in the *Sydney Morning Herald*, Decr., 2nd, 1876, and several other newspapers,[1] my friend and former colleague, Mr. C. S. Wilkinson, F.G.S., announced the discovery by himself of a *Unio* in one of the "deep leads" of the Gulgong Gold-field. With his usual kindness, to which I have been beholden on more than one occasion, and with an utter disregard for the vicissitudes of the "post," my friend was kind enough to forward this unique specimen to me for description, and it now affords me much pleasure to be able to forward a few notes on it.

Before describing the specimen in detail I purpose giving a brief sketch of previous discoveries of fossils in beds intimately associated with Australian "deep leads" or other kinds of tertiary auriferous deposits. Succeeding this will be found a detailed list of the recent species of the genus *Unio*, found in Australian waters, for comparison with the fossil, with a few remarks upon them. The affinities of Mr. Wilkinson's *Unio* will then be entered into, and in conclusion it will be described.

2.—Fossils hitherto noticed in connection with Australian Gold Drifts.

In his memoir "On the Recent and Ancient Natural History of Victoria"[2] Professor M'Coy, F.G.S., recorded the discovery of the bones of a wombat (*Phascolomys*) "in the solid hard stony ferruginous auriferous drift, called 'cement' by the diggers, at a great depth in the sinkings at Dunolly, the material being so hard that the jaws could only be cleared by a stonemason's chisel." The occurrence of the remains of this wombat is again referred to in a further edition of the same memoir, under the title, "On the Recent Zoology and Palæontology of Victoria,"[3] where the name of *Phascolomys Pliocenus* M'Coy is proposed for them. Although again mentioned in a list of Victorian fossils prepared by Professor M'Coy for Mr. R. B. Smyth's first "*Progress Report*,"[4] the name, so far as I am aware, remained a manuscript one till the appearance of the first decade of the *Prodromus of the Palæontology of Victoria*, wherein *O. Pliocenus* is fully described and figured. Although "fossil bones of marsupials have been found in very recent accumulations covering wash-dirt,"[5] yet the occurrence of these or other fossils in connection with the older tertiary auriferous deposits appears to be by no means common. The next most important discovery of this kind was that by

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1 "*Sydney Evening News*." Nov. 30th, 1876. "*Queenslander*," Dec. 16th, 1876.
2 Victorian Intercolonial Exhib. Essays, 1868, p. 168—Annals Nat. Hist. 1862, i-ix, p. 137.
3 " " " " 1866. " " " 1867, xx. p. 175.
4 Geol. Survey Victoria—Report of Progress, 1874, p. 36.
5 Mining and Min. Statistics, Victorian Intercolonial Exhib. Essays, 1872, p. 18.

Mr. Bernard Smith, in 1872, of shells in a ferruginous stratum with brown iron ore, 38 feet above the "wash-dirt," at the Welcome Rush, near Glenorchy, by Stawell, Victoria, and 78 feet from the surface. The fossils in question were stated by Professor M'Coy to be species of *Turritella*, *Terebra*, *Arca*, *Mactra*, and perhaps *Turbo*.[1] On the east side of the Glenorchy Road, 5 miles north-west of Stawell, this same deposit was again explored some years later by my friend Mr. Norman Taylor, who obtained a much more satisfactory collection of fossils. These have been examined by Professor M'Coy, and figured in Mr. Smith's second "*Progress Report*."[2] The more important species are

Ditrapa Warmbetiensis *M'Coy*.
Lepralia Stawellensis ,,
Tellina Krausei ,,
Nucula Marthæ ,,

A more detailed account of the occurrence of these fossils will be found in Mr. Taylor's "Final Report on the Geology of Stawell."[3] Mr. R. B. Smyth appears to consider the bed yielding these remains to be of the epoch of the "oldest drifts" (? Lower Pliocene),[4] and perhaps of the same age as the Flemington tertiary beds, near Melbourne.[5] The marine nature of the fossils is evident, and it is interesting to find from Professor M'Coy's report that *Tellina Krausei* and *Nuculi Marthæ* range as low as the Schnapper Point oligocene series of Hobson's Bay.

The *Unio* found by Mr. Wilkinson, and mentioned in the opening sentence of this paper, comes next in order. The information contained in the newspaper account is much augmented in Mr. Wilkinson's "Progress Report of the New South Wales Geological Survey during the year 1876,"[6] wherein he states that the discovery of this shell at a depth of 126 feet from the surface in the Home Rule Lead associated with fossil fruits, "is interesting, inasmuch as this is the first fossil shell of the kind yet found in pliocene tertiary gold drifts."[7] According to Mr. Wilkinson, another of the Gulgong Leads, the "Magpie," has yielded, at a depth of 40 feet, a portion of a tooth of *Diprotodon*, bones of *Halmaturus*, and an incisor and foot-bone of *Macropus*, a discovery of very considerable importance in the time-history of these marsupials.

Lastly, I must not omit to mention that Mr. R. M. Johnston, of Launceston, Tasmania, has discovered several specimens of a *Unio* in tertiary deposits around Launceston,[8] which he considers to be of lacustrine origin, associated with leaves and other remains of plants. I am not aware that the beds in question are auriferous.

Although not at present occupied with fossil plants, I cannot omit to mention the admirable work which has been done by my friend Baron von Müeller, M.D., F.R.S., in his researches amongst the fossil fruits from the "deep lead," of Haddon, Nitningbool, and other places in Victoria, and Orange and Gulgong in New South Wales.[9] I trust that we have only seen the commencement of his labours in this direction.

3.—The Recent Australian Species of the Genus Unio.

One of the branches of Australian zoology which has been least systematically worked at is that of the *Unionidæ*. Many so-called species have been described at various times, but so far as I can see, and I have investigated the subject to some extent, authors appear to have described forms with too little attention to their predecessors' work. The following list comprises all the species described from Australian waters, so far as I have been able to ascertain,

[1] Mining and Min. Statistics, Victorian Intercolonial Exhib. Essays, 1872, pp. 18 and 19– Geol. Mag. 1872, ix. p. 335—Smyth's Report of Progress, 1874, p. 36; *id.* 1875, p. 21.
[2] Geol. Survey of Victoria, 1875, pp. 21 and 22, f. 1-4; also P. Report, iii. 1876, p. 49.
[3] Progress Report, iii. 1876, p. 264.
[4] *Ibid*, p. 48.
[5] Progress Report, ii. 1875, p. 22.
[6] Annual Report, Department of Mines, New South Wales, for the year 1876. Sydney, 1877, pp. 147-177.
[7] *Ibid*, p. 172.
[8] "Regarding the composition and extent of certain Tertiary Beds in and around Launceston" (*Monthly Notices, R. Soc. Tas.*, June-August, 1873, pp. 39-47, 3 plates).
[9] "Succinct observations on a new genus of Fossil Coniferæ—Spondylostrobus."—(*Reports, Mining Surveyors and Registrars, Vict., March 31st, 1871.*) "New Vegetable Fossils of Victoria."—(*Ibid. June, 1871, to September, 1876.*) "Observations on New Vegetable Fossils," 8vo., Melbourne, 1874. "Descriptive Notes on the Tertiary Flora of New South Wales."—*Annual Report, Dept. of Mines, N.S. Wales*, for year 1876, Sydney, pp. 178-180.

and even one or two of these are perhaps doubtfully Australian. I have attempted no synonomy, such would be impossible without both the types and a large series of authenticated specimens before one; but I have simply given the views of one or two well-known writers on the subject, under each species, and I must leave those possessing good collections to work out the synonomy for themselves.

1. UNIO DEPRESSUS.—*Lamarck.*
   Hist. Nat. Anim. sans Vertèbres, 1819, vi. pt. 1., p. 79.
   Philippi, Conchylian iii., heft., 3 Nov., 1848, p. 81, t. 5, f. 5.
   Reeve, Conch. Iconica. xvi., Mon. Genus Unio, 1868, t. 18, f. 81.

See remarks under *U. Australis*, Lamarck; *U. Profugus*, Gould; *U. Balonensis*, Conrad; and *U. Angasi*, Reeve.

2. UNIO AUSTRALIS.—*Lamarck.*
   Hist. Nat. Anim. sans Vertèbres, 1818, vi. pt. 1., p. 80.

Dr. Isaac Lea, the eminent writer on the genus *Unio*, says, in the third edition of his "Synopsis of the Family Unionidæ,"[1] when speaking of this species, "I very much suspect that *Australis* and *Depressus* (Lamk.) are the same," an opinion which I think will in all probability prove to be correct, judging from specimens in my possession.

3. UNIO NOVÆ HOLLANDIÆ.—*Gray.*
   Proc. Zool. Soc., 1834, p. 57. River Macquarie, N.S.W.

Very little appears to be known about this species. It is a wide nodulose shell.

4. UNIO MULTIDENTATUS (*Parreyss m.s.*)—*Philippi.*
   Conchylien iii., heft. 2 Nov. 1847, p. 46., t. 3, f. 4.

A smooth oval shell. Lea cites it as Australian,[2] but gives no locality; Philippi merely says, "Nova Hollandia."

5. UNIO PROFUGUS.—*Gould.*
   Proc. Nat. Hist. Soc., Boston, 1850, iii., p. 295.
   Wilkes, U.S. Exploring Expedition, Moll. and Shells, 1852, p. 428, atlas, t. 37, f. 542, a. and b., Hunter R., N.S.W.

In the first part of the fourth edition of his "Synopsis,"[3] Lea places this form as a synonym of *U. Depressus* (Lamk.), although in that portion of the work devoted to the "Geographical Distribution" it is retained as a separate species.[4] This may be so, although, judging merely from Gould's figure, I think it is an open question.

6. UNIO AMBIGUUS (*Parreys's m.s.*)—*Philippi.*
   Conchylien iii., heft. 2 Nov., 1847, p. 47, t. 3, f. 2.
   Reeve, Conch. Iconica. xvi., Mon Genus Unio, 1868, t. 69, f. 355.

In the third edition of the "Synopsis,"[5] Lea places this as a synonym of *U. Australis* (Lamk.) Dr. Philippi considered *U. Ambiguus* (Parreyss) to be the young of *U. Australis* (Lamarck)[6]; "Nova Hollandia" (*Philippi*).

7. UNIO AUCKLANDICUS.—*Gray.*
   Diffenbach's Travels in N. Zealand, 1843, ii p. 257.
   Reeve Conch. Iconica xvi, Mon. Genus Unio, 1868, t. 30, f. 156.
   Hochstetter, New Zealand, &c., 1867, p. 269.

Lea gives this as an Australian species (vide Woodward), but cites no definite locality.[7] It is a smooth, oval, and elegant shell.

8. UNIO CUCUMOIDES.—*Lea.*
   Observations on the Genus Unio iii, p. 30, t. 7, f. 2.
   Reeve, Conch. Iconica xvi, Mon. Genus Unio, 1868, t. 20, f. 89.

A good and characteristically marked species—one of the best so amongst the Australian forms. It is a wide and very plicate shell. Hunter and Richmond Rivers, N.S.W.

9. UNIO SUPERBUS.—*Lea.*
   Observations on the Genus Unio iv, p. 39, t. 42, f. 11.
   Reeve, Conch. Iconica xvi, Mon. Genus Unio, 1868, t. 59, f. 295.

This shell is stated by Lea to be from New Holland,[8] although, in the fourth edition of the "Synopsis," it is not specially noticed as being an Australian form. The statement requires confirmation.

10. UNIO CULTELLIFORMIS.—*Conrad.*
    Proc. Acad. Nat. Sciences, Philadelphia, v, p. 10.
    Jour. Acad. Nat. Sciences, Philadelphia, 2nd ser. ii, p. 295, t. 26, f. 2.

Originally described by Conrad as a distinct species—*U. cultelliformis*. Was subsequently placed as a synonym of *Unio depressus*—Lamarck—as it "appears to be an adult, or a large variety of Lamarck's species." In the third edition of the "Synopsis,"[9] Lea doubted the authenticity of this shell as an Australian species at all, but thought it might be a form of the American *Unio complanatus*. In the fourth edition of the "Synopsis," however, Lea both repeats his view,[10] and at the same time places *U. cultelliformis* as a distinct species in that portion of the work devoted to the "Geographical Distribution."[11] He does not agree with Conrad in referring it to Lamarck's species. Bogan R.

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[1] 1852, p. 28, note 5. [2] Synopsis Farr. Unionidæ, 4th ed., 1870, p. 103. [3] 1870, p. 54. [4] p. 103. [5] 1852, p. 28. [6] Conchylien iii, Left. 3 Nov., 1848, p. 81. [7] Synopsis, 4th ed., 1870, p. 103. [8] Observations iv. p. 39. [9] 1852, p. 32, note., [10] 1870, p. 52. [11] p. 102.

11. UNIO BALOUNENSIS.—*Conrad.*
Jour. Acad. Nat. Sciences, Philadelphia, 2nd sec. ii, p. 295, t. 26, f. 3.
Lea[1] places this species as a synonym of *U. depressus* (Lamk.), in which he is followed by Reeve[2]; but again, in the "Geographical Distribution" of the fourth edition of the "Synopsis,"[3] he retains it as a distinct species. Conrad does not admit Lea's view of the matter, but considers his *U. Balounensis* and Lamarck's *U. depressus* as distinct. Baloune R.

12. UNIO NEPEANENSIS.—*Conrad.*
Jour. Acad. Nat. Sciences, Philadelphia, 2nd ser. ii, p. 296, t. 26, f. 4.
Reeve, Conch. Iconica xvi, Mon. Genus Unio, 1868, t. 23, f. 110.
An oblong-oval shell, rather inclined towards a square form, having on the umbones irregular angulated wrinkled plicæ, concentrically arranged. Lea considers this identical with *U. dorsuosus* (Gould)[4]. Nepean R.

13. UNIO SHUTTLEWORTHIS.—*Lea.*
Observations on the Genus Unio vi, pt. 1, p. 24, t. 28, f. 19.
Reeve, Conch. Iconica xvi, Mon. Genus Unio, 1868, t. 32, f. 167.
A fine large shell, which Dr. Lea gives as from "Australia." It has a purple and iridescent nacre. Through the kindness of the Rev. J. E. Tenison-Woods I am in possession of a specimen from the Bogan River, near its junction with the Burdekin River, N.Q.

14. UNIO MUTABILIS—*Lea.*
Observations on the Genus Unio vii, pt. 2, p. 66, t. 38, f. 167.
Reeve, Conch. Iconica xvi., Mon. Genus Unio, 1868, t. 24, f. 112.
A widely-elliptical, smooth, compressed, and very inequilateral shell. Murray R., S.A.; Brisbane Water; New Zealand.

15. UNIO VITTATUS.—*Lea.*
Observations on the Genus Unio vii, pt. 2, p. 67, t. 38, f. 128.
Reeve, Conch. Iconica, xvi, Mon. Genus Unio, 1868, t. 18, f. 83.
An elliptical, inflated, and inequilateral shell—cardinal teeth, double in the right valve, and single in the left valve. Australia (*Lea.*)

16. UNIO WILSONI.—*Lea.*
Observations on the Genus Unio vii, pt. 2, p. 74, t. 40, f. 137.
Reeve, Conch. Iconica, xvi Mon. Genus Unio, 1868, t. 88, f. 472.
Dr. Lea remarks that this is a very simple species, with no marked character beyond the double cardinal tooth in the right valve. Eastern branch of Isaac's Plain, N.S. Wales.

17. U. (ALASMODON) STUARTI.—*Adams and Angas.*
Proc. Zool. Soc., 1863, p. 417.
App. to Stuart's Explorations in Australia, 1864, p. 491.
Reeve, Conch. Iconica xvi, Mon. Genus Unio, 1868, t. 54, f. 279.
A smooth, oblong shell. Mt. Margaret Lagoon, Central Australia (*Adams and Angas*); Port Jackson, N.S.W. (*Lea*). I have a young form of this shell, thanks to the Rev. J. E. T.-Woods, from Abbott Bay, Cape Upstart, N.Q.

18. U. (ALASMODON) EVANSI.—*Adams and Angas.*
Proc. Zool. Soc., 1864, p. 39.
Reeve, Conch. Iconica xvi, Mon. Genus Unio, 1868, t. 56, f. 285.
A smooth, subrotund shell. Lagoons of Murray R., S.A.

19. UNIO PARRAMATHENSIS.—*Lea.*
Observations on the Genus Unio xi, p. 64, t. 20, f. 59.
An oval, sulcate form, which (Dr. Lea remarks) is in outline very close to *U. Wilsoni* (Lea), but the two species differ much in colour of epidermis and in the beaks. Parramatta River, N.S.W.

20. U. MORETONICUS.—*Reeve.*
Conch. Iconica xvi, Mon. Genus Unio, 1868, t. 24, f. 118.
After describing this species, Mr. Lovell Reeve, in another portion of his "Monograph,"[5] appears to consider it as only a synonym of *U. Australis* (Lamarck). Lea has entered it in the fourth edition of his "Synopsis" as a distinct species.[6] Moreton Bay (*Reeve*); Tasmania (*Reeve and Ten.-Woods*).

21. U. ANGASI.—*Reeve.*
Conch. Iconica xvi, Mon. Genus Unio, 1868, t. 55, f. 282.
Reeve assigned this species to Lea, but the latter repudiates the authorship.[7] He considers it as a synonym of *M. depressus* (Lamarck). Strangeways River, N. Australia (*Reeve*). I am indebted to Mr. W. T. Bednall, of Adelaide, for specimens of this species from near Port Darwin, N.A.

22. U. JEFFREYSIANUS.—*Lea.*
Observations on the Genus Unio xiii, p. 27, t. 7, f. 20.
Dr. Lea states that amongst other shells this resembles the Australian species *U. vittatus* (Lea). Australia (*Lea*).

[1] Synopsis, 3rd ed., 1852, p. 33. [2] Conch. Iconica xvi, Explanation of table 18. [3] 1870, p. 103. [4] Synopsis, 4th ed., 1870, p. 30. [5] Explanation of table 69. [6] 1870, p. 43. [7] Synopsis, 4th Ed., 1870, p. 54, note 5.

23. UNIO FULMINEUS (*Parreyss, m.s.*)—*Philippi.*

Conchylien iii, heft. 2 Nov. 1847, p. 46, t. 3, f. 5 and 6.

Stated by Philippi to be from "Nova Hollandia," on the faith of Parreyss, but Dr. Isaac Lea, in the 4th Ed. of the "Synopsis" places it as a synonym of *Unio corrugatus* (Retz), and does not record it at all as an Australian, but as an Asiatic species. It is evidently a well-marked form, and could be easily distinguished by the radiately-angular ornamentation. Its reference as an Australian shell requires confirmation.

24. UNIO CUMINGII.—*Dunker.*

Lea, Synopsis of the Unionidæ, 4th Ed., 1870, p. 31.

This is placed by Lea as a synonym of *Unio cucumoides* (Lea). I am not acquainted with Dunker's original description, but doubtless Dr. Lea is correct. The locality given is Richmond River, Australia.

25. UNIO SP. IND.

Conrad, Jour. Acad. Nat. Sciences, Philadelphia, 2nd ser., ii, p. 296, t. 26, f. 6; Bogan River.

Mr. Conrad remarks that this cannot be distinguished from a common variety of *Unio complanatus*, an American shell.

As before stated, the title of the foregoing names to rank as representing good and well defined species can be ascertained only by the examination and comparison of a large number of specimens, and an inspection of as many of the types as are in existence; the notes attached to each will at once show how great a difference of opinion exists between authorities as to their value. The list of recent species was merely introduced here as introductory to a comparison with the Gulgong fossil, which will next engage our attention.

4.—ON THE AFFINITIES OF THE GULGONG FOSSIL UNIO.

In comparing Mr. Wilkinson's specimen with the known recent Australian forms, three species may be at once eliminated from consideration, as their form and general appearance are sufficient evidence for their discrimination, viz., *Unio superbus*, Lea; *U. fulmineus*, Philippi,[1] and *U. cucumoides*, Lea. With two others I am not sufficiently acquainted to institute a comparison, *Unio Cumingii*, Dunker, and *U. Novæ Hollandiæ*, Gray. The Gulgong specimen is one of those forms inclined towards the widely elliptical Uniones, so that we may still further dismiss from consideration those not possessing this outline, but on the contrary, distinguished in some degree or other by more of the simply oblong, sub-oval, transversely-elliptical, or trapezoidal form; such are *Unio depressus*, Lamk.; *U. Australis*, Lamk.; *U. vittatus*, Lea; *U. Balouensis*, Conrad; *U. Nepeanensis*, Conrad; *U. Ambiguus*, Parreyss; *U. Moretonicus*, Reeve; *U. Evansii*, Adams and Angas (as figured by Reeve); *U. Wilsoni*, Lea; *U. profugus*, Gould; *U. multidentatus*, Philippi; and *U. Jeffreysianus*, Lea.

With the remaining forms a more detailed comparison is necessary. *Unio mutabilis*, Lea, is too widely elliptical, or too lithodomoid for the Gulgong fossil, too accuminate anteriorly, and the distant growth markings are wanting. *U. Paramattensis*, Lea, appears to be somewhat nearer our shell, but the umbones are rather too posterior in position, there is too largely a developed umbonal slope, and in our fossil there is no trace of a carinato posterior slope as in Lea's species. *U. Shuttleworthii*, Lea, is too strong a form in every way, the posterior triangulation affording a good point of separation, whilst the smooth even surface of the fossil does not at all correspond with the coarse furrowed condition of that species. The same points may be taken as distinguishing *Unio Angasi*, Reeve, especially as Mr. Edgar Smith, of the British Museum, suggests to me that *U. Shuttleworthii* is only an old form of this. The fossil form appears to lack the long straight hinge line, well-defined anterior end, and long obliquely truncated posterior end of *U. Stuarti*, Adams and Angas. After a careful consideration of all the facts, it appears to me that *U. mutabilis*, Lea, *U. Aucklandicus*, Grey, and another form, *U. lutulentus*, Gould,[2] all put in a claim for relation with our fossil, but of these *U. Aucklandicus* has the strongest claim. I am glad to say that in this opinion I am supported by Mr. Edgar Smith (Zool. Dept., Brit. Museum) and Mr. G. Sharman (Mus. Pract. Geology), who were both kind enough to compare the specimen with type forms of *U. Aucklandicus* in the conchological collection of the British Museum, irrespective of my own investigations. This view is borne out by the fact that *U. Aucklandicus* is stated by Lea[3] to be an Australian shell as well as a New Zealand form, and its occurrence in the fossil state is at the same time not unrecorded, for Capt. F. W. Hutton, F.G.S., &c., has

[1] If it is an Australian species. [2] Wilkes, U.S. Exploring Exped., Mollusca and Shells, by Gould, 1852, p. 428. Atlas, t. 37, f. 542, a and b. [3] Synopsis of the Unionadae. 4th ed., 1870, p. 103.

provisionally described the shell from the coal formation of Dunstan, Otago[1]; he says, "as the teeth cannot be seen, the identification of this species is doubtful." I may add that the same remark applies in the present instance, for the external portions of the shell only are visible. As a means of rendering a distinction between the typical form of the species and the fossil, I have much pleasure in proposing for the latter the varietal name of *Unio Aucklandicus*, Gray, var. *Wilkinsoni*, mihi.

5.—Description of the Specimen

Unio Aucklandicus, *var.*, *Wilkinsoni*, *var. nov.*

Chars.—Shell oblongorate, very inequilateral, expanding a little posteriorly; anterior side very short and rounded; posterior side obliquely truncated and obscurely bi-angled; umbones quite anterior, decorticated and depressed; epidermis yellowish-olive, delicately thread-striated on the posterior side, but almost quite smooth and shining on the anterior side and body of the shell; anterior muscular sears deep and well defined; pallial line well marked in the anterior region.

Obs.—The state of preservation of the specimen does not permit of a more detailed description than the above, and as we have merely the exterior exhibited to us, the dental formula cannot be given. The characters of the anterior muscular impression and the pallial line are revealed by the accidental removal of the shelly matter, more especially in the left valve. During fossilization a slight amount of crushing has taken place, otherwise the original form of the shell is perfectly well preserved.

Locality and Horizon.—In buff-coloured pipeclay(?), Home Rule Lead, Gulgong Goldfield, New South Wales, at a depth of 126 feet from the surface, associated with the following fossil fruits:—Octhodocaryon Wilkinsonii, *F. v. M.*; Eisothecaryon semiseptatum, *F. v. M.*; Illicites astrocarpa, *F. v. M.*; Pentacoila Gulgongensis, *F. v. M.*; Pleiacron elachocarpum, *F. v. M.*; Acrocoila anodonta, *F. v. M.*; Phymatocaryon bivalve, *F. v. M.*, Plesiocapparis leptocelyphis, *F. v. M.*; Spondylostrobus Smythii, *F. v. M.*; Var. cryptaxis, *F. v. M.*

Collector.—C. S. Wilkinson, Esq., F.G.S., Government Geologist of New South Wales.

N.B.—I am greatly indebted to Miss Alice Gray, Edinburgh, for the accompanying accurate drawing.

Appendix D.

Descriptive Notes on the Tertiary Flora of New South Wales, by Baron Ferd. von Müeller, C.M.G., M. & Ph. D., F.R.S. (Vegetable Fossils of the Upper Pliocene age, discovered at Gulgong, by C. S. Wilkinson, L.S., F.G.S., Government Geologist; and described by Baron Ferd. von Müeller, C.M.G., M.D., F.R.S.)

Plate III, Fig. 1.

Spondylostrobus Smythii—*Var Cryptaxis.*

Valves longer than the auxiliary body, or nearly as long, the latter concealed by them; narrow interstices only, or none, between the valves.

Eisothecaryon—*F. von Müeller.*

Fruit rather small, bony, globular, slightly depressed or compressed, faintly wrinkled outside, indehiscent, or towards the summit bivalvular, septum intruding longitudinally, and from one side only into the cavity, reaching the middle of the fruit, flat towards the wall, but turgid towards the centre of the cavity; seed unknown.

I have preferred placing into a new genus to regarding it merely as a species of the genus Villaresia of the living creation, although the existence of two Villaresia in Eastern Australia at the present day strengthens much the assumption of its being represented there also at the pliocene period. If, however, the view held by many should be adopted also in this instance, that the congruency of merely one organ of a fossil plant with that of a living one ought to suffice for establishing generic identity, then this new fossil would find its systematic location in Villaresia.

[1] Cat. Tertiary Moll. and Echinodermata of N. Zealand, &c., 1873, p. 25.

Plate III.

Fig. 1.—Spondylostrobus Smythii, *var. Cryptaxis.*

a Side view of fruit.
b Apex of same, showing five valves.
c Apex of a six valved variety of same species.

Fig. 2.—Eisothecaryon semiseptatum.

a Side view of fruit.
b Base of same.
c Side view of a slightly compressed form.
d Interior view of same, showing seed cavity.

Fig. 3.—Phymatocaryon bivalve.

a Anterior view of fruit, showing the valves partly open.
b Apex of same, showing seed cells.
c Side view of same.
d Interior view of one valve, showing seed cavity.
e Side view of fruit, exhibiting two prominent tubercles.
f, g Side view of apex of a compressed form, showing prominent ridge.

Fig. 4.—Wilkinsonia bilaminata.

a Side view of fruit.
b Marginal view of same.

Fig. 5.—Unio Aucklandicus, *var. Wilkinsoni, var. nov.* (See Appendix D.)
All natural size.

Plate IV.

Fig. 1.—Octhodocaryon Wilkinsoni.

a Anterior view of an oval and compressed form of fruit.
b, c Base and transverse section of same.

Fig. 2.—*a, b* Anterior view and base of a larger and spherical form of fruit.
c Transverse section of same fruit.

Fig. 3.—Illicites astrocarpa.

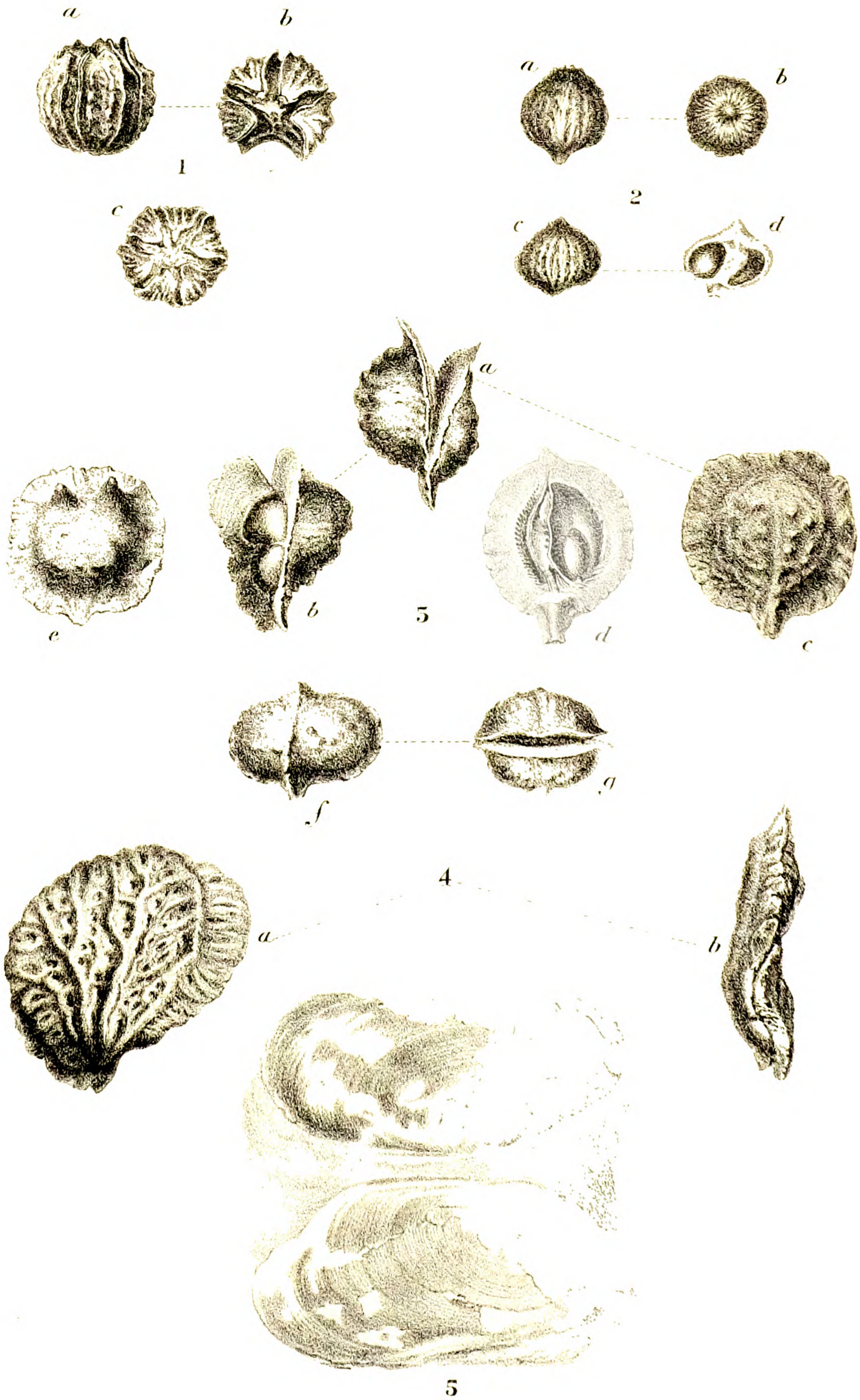
a Side view of fruit.
b, c Base and apex of same in view.

Fig. 4.—*a, b, c* Side view, base and apex of a large form of fruit.

Fig. 5.—Plesiocapparis leptocelyphis.

a, c Views of apex and base of fruit.
b Transverse section of same fruit.
d, e Views of seeds.
All natural size.

[Two plates.]



Helena Forde del Nos 1 to 4. A Gray del. No 5. Arthur J. Stopps lith.

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