https://doi.org/10.24199/j.mmv.1972.33.05 7 February 1972

THE DUCK PONDS FOSSIL MARSUPIAL FAUNA, HOVELL'S CREEK, LARA, VICTORIA, AUSTRALIA

By H. E. Wilkinson

Geological Survey of Victoria, Honorary Associate National Museum of Victoria

Abstract

Fossil bones were obtained from depths of 6-14 m in excavations for the foundations for the railway viaduct at Duck Ponds (now Lara) in 1875. They came from fluviatile sediments overlying the Newer Volcanic lava flows, but underlying the freshwater Lara Limestone. The fauna contains *Thylacoleo, Diprotodon* and giant species of *Macropus* and *Protemnodon.* Stratigraphic and faunal considerations indicate that the Duck Ponds fauna is older than the Late Pleistocene Colongulac Fauna, but younger than the Chinchilla, Hamilton and Awe Faunas. The association of *Diprotodon* with the Lara Limestone (Keble 1945, Gill 1964) is shown to be incorrect.

Introduction

Duck Ponds Creek was the original name for Hovell's Creek, which flows into Corio Bay. The present town of Lara, which is situated on this creek about 6 km from its mouth, was originally known as Duck Ponds. In 1875 a viaduct was constructed to carry the railway across the creek, and in the excavations associated with this work, fossil bones were found.

The find was reported by Brough Smyth in 1876, and by Couchman in 1877. McCoy prepared a draft description of a jaw of *Thylacoleo carnifex* obtained from the excavations, but this was never published. Incisors of *Diprotodon* found at the same time were mentioned by Keble (1945) in his paper on the Diprotodontidae, but he was obviously unaware of the earlier references, and concluded, with some reservations, that the Duck Ponds *Diprotodon* came from the freshwater Lara Limestone. Gill (1964) used the supposed occurrence of *Diprotodon longiceps* in the limestone as part of his evidence for a probable Upper Pliocene age.

In fact, the bones came from fluviatile sediments which occur stratigraphically beneath the limestone. The National Museum archives and the labels on the specimens, in conjunction with the two contemporary published references given above, provide enough information to fully document the circumstances of discovery, and the provenance of the bones.

Growing interest in Australian mammal fossils, and the development of phylogenetic schemes, makes it important that all occurrences be dated as accurately as possible. There are relatively few localities older than Late Pleistocene, and 'Duck Ponds' appears to be at least Middle Pleistocene, or perhaps older. Since the opportunity to recollect may occur when the viaduct is duplicated, it seemed worthwhile to publish all the available information.

Opportunity is also taken to publish for the first time (Pl. 6) the superb plate of a jaw of *Thylacoleo carnifex* found at Duck Ponds, prepared for McCoy by Dr Wild. This was to be Plate LXX1 of Decade 8 of the Prodromus of the Palaeontology of Victoria, but along with a number of others which had reached page proof stage, was never published.

Discovery of the Bones

On 16 July 1875, T. Couchman (Secretary for Mines) wrote to McCoy as follows:

'Sir,

Herewith are forwarded for examination fossils numbered 3451 obtained from near Duck Ponds Station, Geelong and Melbourne Railway.

I shall be glad if you will be so good as to examine the specimens and report to this office the results of your examination'.

These were the specimens obtained by Mr Robert Watson C.E., referred to in Brough Smyth, 1876 (see below). On 13 August 1875, Mr James Blair of Lara wrote to McCoy about

the same discovery, with valuable information and an offer of further specimens:

'Sir,

I take the liberty of addressing you with reference to the specimens of bones recently discovered in this locality whilst sinking for the foundations of a new bridge for the railway.

The bones in question were found at a depth of 15 feet from the surface consisting of large joints, tusks etc. and appear to be in a state of petrefacation.

I have been informed that samples have been already forwarded to you for examination in order to ascertain to what species of animals they may have belonged, but if such is not the case I should find pleasure in furnishing you with a few pieces which are now in my possession.

You will be pleased therefore to signify at your earliest convenience whether you would wish that I so forward the specimens'.

No record exists that these specimens were ever received. Brough Smyth (1876, pp. 73-4) says:

'Mr Robert Watson C.E., Resident Engineer of the Victorian Railways Department, brought me lately a number of bones from a cutting near the Duck Ponds Station on the margin of Corio Bay, and Professor McCoy has found amongst them the os inominatum, several vertebrae, fragments of ribs, and molar and incisor teeth of the great extinct kangaroo, the *Macropus titan*'.

A footnote to this says:

'Mr James Wilkinson, who has charge of some of the works now being constructed at the Duck Ponds, has collected a great number of fossil bones from depths varying from twenty-five to thirty-three feet, and he has been so good as to present them to me. They are of great value, and this gentleman is deserving of the highest commendation for the care and trouble he has taken in procuring these specimens. Professor McCoy is now examining the collection'.

On 28 January 1876, Brough Smyth sent the collection made by James Wilkinson to Professor McCoy, and asked for a report. He remarked that Mr Wilkinson had been 'so good as to present all the bones to the Department except three which are specially labelled —to be returned'. McCoy was obviously a bit tardy in supplying the report, for Couchman wrote to him on 27 September 1876 asking for it. The original of the report, in McCoy's handwriting, is in the archives of the National Museum. It is dated 4 October 1876 and addressed to Couchman:

'Sir,

Referring to your letter of the 27th September, I beg to report that the specimens from the Duck Ponds forwarded to me 28-1-1876 were incisor tusks of *Diprotodon* and incisors and molars of the Gigantic Extinct Kangaroo *Macropus titan* and *M. atlas*, with numerous portions of the skeletons of these animals which mark the newer Pliocene Tertiary periods. One of these specimens is the leg of a horse, and no doubt was mixed with the others through some unintentional carelessness which might give rise to serious errors; this specimen is numbered 138 in the consecutive series of numbers from 1 to 142 on those specimens forwarded by Mr Wilkinson and is manifestly in a different state of preservation from the others, appearing to have been partially burnt'.

Couchman published his own version of this report in 1877 (p. 18), which deleted the reference to the horse bone, adjusted the number of specimens, and added the identification of a 'jaw of *Protemnodon*'. The reference to *Protemnodon* must have been added by McCoy before Couchman's report was published.

On 7 May 1877, the Rev. C.S.Y. Price presented a piece of macropod jaw to the National Museum. The label states that it was 'Obtained at Ducks Ponds 40 ft. deep in clay when digging for the foundations of the railway bridge'.

The upper and lower incisors of *Diprotodon* (NMV P1892-3), and the jaw of *Thylacoleo* (P5287, Pl. 6) from Duck Ponds, which McCoy intended to describe in the unpublished Decade 8 of the Prodromus, were also donated by the Rev. Mr Price, presumably at the same time.

In a paper on the freshwater limestones of the Geelong district (Pritchard 1895), the only fossil mentioned from the Lara Limestone is a freshwater mussel, although the marsupial fauna from the probably equivalent limestone at Limeburners Point is discussed in detail. Since the purpose of the paper was to document the known fauna of the limestones, the absence of a reference to *Diprotodon* at Lara can be taken as negative evidence that it was not found in the limestone there, since Pritchard would presumably have been aware of the true provenance of the Lara fossil marsupials.

Keble (1945) discussed this locality at some length. He assumed that the Duck Ponds specimens were obtained from the freshwater Lara Limestone, despite his own admission that there is little mineral replacement and an absence of adherent matrix, and his stated doubt as to whether they were *in situ*. His main reason

for this assumption was the occurrence of fossil bones in the lithologically similar freshwater limestone at Limeburners Point at Geelong. Keble presented detailed evidence to support his view that the limestone was of early Upper Pleistocene age, including data derived from logs of the bores put down by the Railways to test the foundations for the viaduct. These bores disclosed 'flood plain' sediments beneath the limestone, and it will be demonstrated below that this is the formation which yielded the bones.

Gill (1964) also thought the bones came from the limestone, but disagreed with Keble's age determination. He thought that the age was probably Upper Pliocene because the limestone infills a valley which was blocked by earth movements of that age. He used the fossils to support this contention: 'If one distinguishes between the fossils found in the limestone, and those found in cavities in the limestone, this also has a fauna older than the accepted Pleistocene one. The *Diprotodon* found in the Lara Limestone is not the Pleistocene *D. optatum,* but the related *D. longiceps'*.

The Geological Survey of Victoria adopted a position between these extremes and indicated an age of approximately Middle Pleistocene on the Geelong 1:63,360 geological map, 1963.

Stratigraphic Sequence

The oldest rocks exposed at Lara are the Newer Volcanic basalt flows. No radiometric dates are available as yet for the Lara-Werribee area, the nearest being at Albion and Newport, some 40 km NE. The Melbourne 1:250,000 geological map shows dates of 2·55 to 2·74 m.y. at Albion, and 2·49 to 2·50 m.y. at Newport, but basalt dates for the Melbourne area range from 4·55 to 0·79 m.y., so it would be unwise to place too much emphasis on a possible extrapolation from Albion and Newport to Lara.

Overlying the basalt flows in the Hovell's Creek valley are Keble's early 'flood plain' deposits, which consist of muds, clays, sands and gravel. The sequence is known from railway bores for the foundations of the viaduct. At 6·4 m below the creek, the bores disclosed a bed of 'quartz gravel and rotten shells' overlying 'stiff clay' (Keble 1945).

The interior of a macropod femur in the Wilkinson Collection contains clay, and coarse quartz sand with small molluscs up to about 5 mm diameter. There are small pelecypods, probably *Corbiculina,* and the gasteropods *Coxiella* and *Lenameria.* There is an admixture of ecologies here, since *Corbiculina* occurs in freshwater lakes and streams, *Lenameria* is normally a swamp dwelling gasteropod, and *Coxiella* is found in swamps and lakes in which the water ranges from slightly brackish to very salt. They were probably derived from varying ecologies marginal to Hovell's Creek. The material preserved in the femur almost certainly corresponds with the bed of 'quartz gravel and rotten shells' which was met in the railways bore 6·4 m under the bed of Duck Ponds Creek. A sample of matrix taken from the bones presented by Wilkinson is a clayey fine sand, probably corresponding to the 'stiff clay'.

The Lara Limestone is of freshwater origin, and contains small freshwater gasteropods, as well as the *'Unio'* recorded by Pritchard (1895). One of the railway bores disclosed 1·5 m of limestone, 1·5 m above sea level and 4·3 m above the layer of 'rotten shells' (Keble 1945). Thus the freshwater limestone overlies the post-volcanic, fluviatile sediments, and was in turn succeeded by calcareous clays, sands and gravel. Keble thought that regional subsidence on the Lovely Banks Monocline took place at the end of this cycle, with younger alluvial terrace sediments being deposited subsequently, which he correlated with his Braybrook and Maribyrnong cycles in the Maribyrnong valley.

Estuarine sediments with marine molluscs occur along the banks of the present Hovell's Creek, in places directly overlying the freshwater Lara Limestone, which is bored by marine molluscs. These beds were radiocarbon dated at 5,620 ± 90 B.P. (Gill 1961, 1971). They thus correspond to a mid-Holocene higher sea level. Fragments of mineralized bone occur in these beds, suggesting that the Pleistocene bone beds were subject to marine erosion during the higher sea level, and frag-

ments have been incorporated in the shell beds. A note by Daintree on Quarter Sheet 24 NE. referring to this deposit says 'The estuary deposit consists of shells, quartz gravel, nodules of limestone, and contains numerous fragments of bones'. This map was published in 1863, 12 years before the railway bridge work began.

Age of Marsupial Fauna

The Duck Ponds fauna contains giant forms only, and there is little adjustment needed to McCoy's original determinations, except for the apparent absence of *Sthenurus atlas*. The fauna has not yet been studied completely, but the provisional faunal list is as follows:

Thylacoleo carnifex Owen
Diprotodon cf. *longiceps* McCoy
Protemnodon cf. *anak* Owen
Macropus titan Owen

The National Museum collections include a probable topotype ramus of *T. crassidentatus* Bartholamai (P15921), which is labelled 'Darling Downs', but has the typical Chinchilla preservation and matrix. It is more complete than the holotype, and compares closely in tooth dimensions, and especially in the massiveness of the horizontal ramus, angle of elevation of the lower incisor, and more or less triangular cross section of that tooth. The *Thylacoleo* from Duck Ponds (P5287) was compared with this specimen, and a series of typieal *T. carnifex,* and this clearly showed that its affinities were with the latter. The relatively slender ramus, more nearly rectangular incisor cross section, and steeper angle of elevation, of the lower incisor identify it as *T. carnifex.*

Diprotodon longiceps was maintained by Keble (1945) to be a valid speeies but this a matter in need of re-evaluation. Specimens of *Diprotodon* with narrower molars than typical *D. optatum* are known from North Melbourne and Footscray, as well as the type locality at Lake Ondit, near Colac. These are all from deposits which are probably of somewhat greater age than the Late Pleistoeene deposits with typical *D. optatum,* so there is a likelihood that *D. longiceps* is an Early to Middle Pleistoeene species.

The macropods do not seem to be very different from the Late Pleistocene forms, but this needs further study. Lack of adequately identified comparative material makes this difficult at this stage.

At a time when the radiometric age of the Plio-Pleistocene boundary is placed by various authors at from 3·5 m.y. to 1·79 m.y., the use of Lyellian ages is a source of confusion. However, if the 1·79 m.y. boundary proposed by Bandy and Wilcoxon (1970) is accepted, then the Duck Ponds Fauna is probably best described as Lower to Middle Pleistocenc. This would fit the probable Plio-Pleistocene age of the underlying basalt, and the relative position of the fauna with respect to the definitely older Awe, Hamilton and Chinchilla Faunas. A recent discussion on these faunas is contained in Turnbull and Lundelius, 1970.

Since the limestone became exposed to solution by ground water, small caverns have developed, and bones are sometimes found in these when exposed by quarrying operations. Geological Survey localities Ad 33 and Ad 34 refer to such occurrences. A small collection of bones 'from a depth of nine feet in limestone in a quarry at Lara' was donated by F. Parsons on 19 July 1913. *Vombatus hirsutus, Dasyurus quoll* and *Rattus* sp. have been identified in this collection. On 7 November 1947, Mr Parsons presented two macropod molars from '10 feet below surface under solid limestone, Mitchells Quarry on Forest Road, Lara'. These are the 'bones in cavities in the limestone' referred to by Gill (1964), and represent the extant fauna. They are probably not older than very Late Pleistocene, and may be relatively recent in age.

Summary and Conclusion

The Duck Ponds Marsupial Fauna came from fluviatile sediments occupying a valley developed on Newer Volcanic lava flows, and underlying the Lara Limestone. The small fauna obtained from the railway viaduct foundation excavations in 1875 is of Pleistocene aspect. The presence of *Diprotodon* cf. *longiceps* in association with *Thylacoleo carnifex* supports the Early to Middle Pleistocene age suggested on stratigraphic grounds, rather than an Upper Pliocene one.

Until radiometric dates for the basalt become available, it is not possible to be more precise, but it does seem that the Duck Ponds fauna helps to fill in the gap between the Late Pleistocene faunas and the earlier Plio-Pleistocene ones. Therefore every effort should be made to obtain a good collection when the railway is eventually duplicated.

Acknowledgements

The putting in order of the Museum archives by Mr A. G. Parsons made possible the documentation used in this paper. Mr T. A. Darragh assisted with other information, and Mr E. D. Gill advised on the Plio-Pleistocene problem.

In anticipation of an obvious question, James Wilkinson was not, to the best of my knowledge, a relative.

References

Bandy, O. L., and Wilcoxon, J. A., 1970. The Pliocene-Pleistocene boundary, Italy and California. Geol. Soc. Amer. Bull. 81: 2939-2948.

Bartholamai, A., 1962. A new species of *Thylacoleo* and notes on some caudal vertebrae of *Palorchestes azael*. *Mem. Qld. Mus.* 14(2): 33-40.

Couchman, T., 1877. *Prog. Rept. geol. Surv. Vict.* 4: 18.

Daintree, R., 1863. Geol. Surv. Vict. Quarter Sheet 24 NE.

Gill, E. D., 1961. ANZAAS Committee for the Investigation of Quaternary shoreline changes. *Aust. J. Sci.* 24: 121-124.

————, 1964. Rocks contiguous with the basaltic cuirass of Western Victoria. *Proc. R. Soc. Vict.* 77: 331-335.

————, 1971. Radiocarbon Dating in Victoria. *Proc. R. Soc Vict.* 84: 71-85.

Keble, R. A., 1945. The stratigraphical range and habitat of Diprotodontidae in Southern Australia. *Proc. R. Soc. Vict.* 57: 23-48.

Pritchard, G. B., 1895. Notes on the freshwater limestones of the Geelong district. *Geelong Naturalist.* 4(3): 37-40.

Smyth, R. Brough, 1876. *Prog. Rept. geol. Surv. Vict.* 3: 73-4.

Turnbull, W. D., and Lundelius, E. L., 1970. The Hamilton Fauna. A Late Pliocene mammalian fauna from the Grange Burn, Victoria, Aust. *Fieldiana:* Geology Vol. 19.

Geological Maps

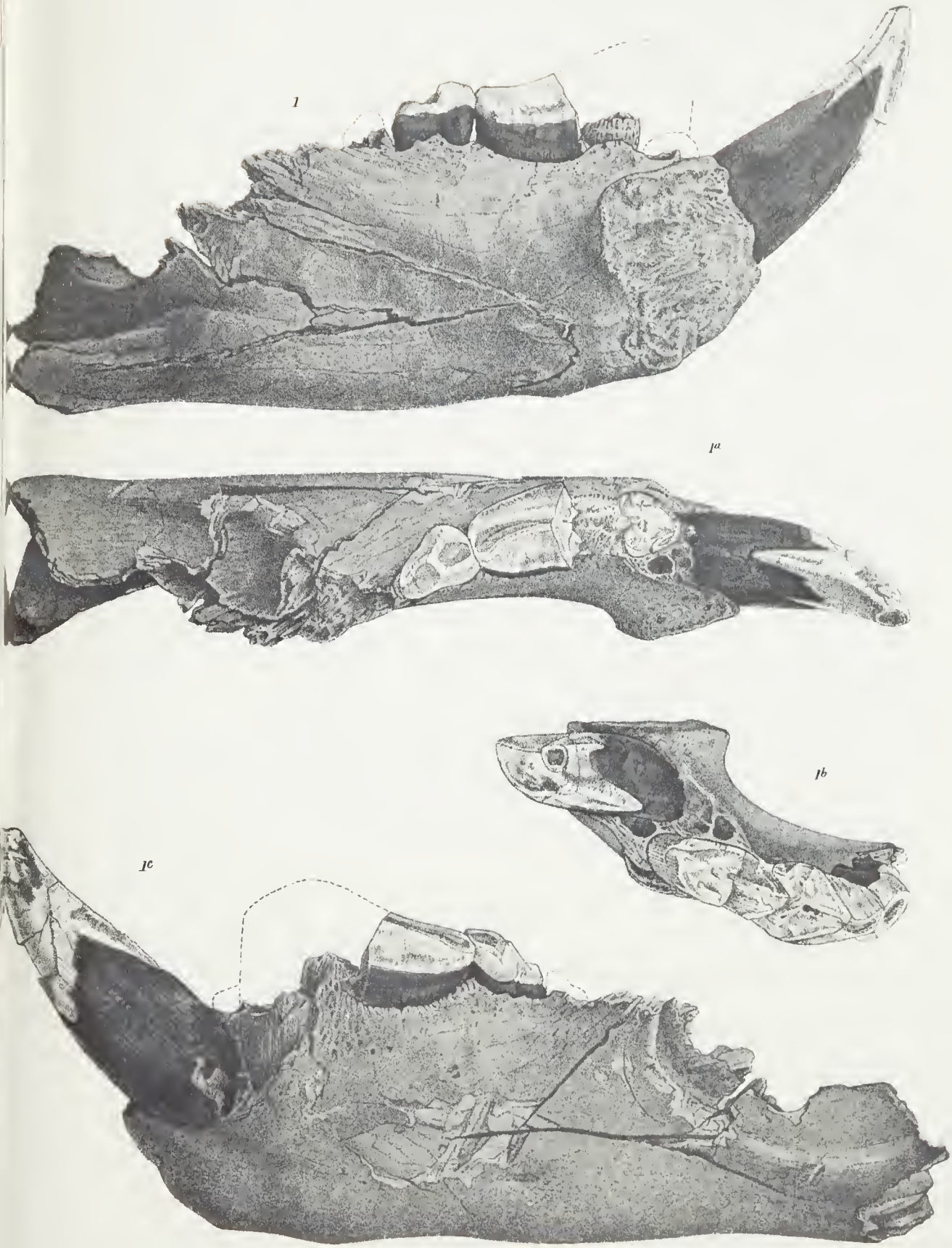
Geological Survey of Victoria, 1963. Geelong 1: 63, 360

Geological Survey of Victoria, 1966. Queenscliff 1: 250,000 (Provisional)

Geological Survey of Victoria, 1970. Melbourne 1: 250,000

Plate 6

Reproduction of lithograph of incomplete right ramus of *Thylacoleo carnifex* Owen. P5287, from excavations for railway viaduct over Duck Ponds (= Hovells Creek, Lara, Victoria), prepared for Professor McCoy by Dr Wild as Pl. LXXI of the unpublished Decade 8 of the Prodromus of the Palaeontology of Victoria.


1
1a
1b
1c