

BLANDOWSKI'S MAMMALS: CLUES TO A LOST WORLD

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Wilhelm Blandowski was the first zoologist employed by the Victorian Government, being appointed Officer of the Museum of Natural History by Governor La Trobe on 1 April 1854. Although he remained in this position for less than four years he left an important legacy by beginning the documentation of Victoria's mammalian fauna before the full impact of European pastoralism and feral animals had become apparent. In particular, the 1856–57 zoological survey expedition to the lower Murray–Darling region provided a unique insight into the mammalian community that existed there before European occupation triggered a sudden decline in mammal species diversity, as happened progressively across the southern two thirds of Australia over the subsequent 90 years. Of the 34 mammal taxa recorded by the Blandowski Expedition, ten are extinct, nine no longer occur in the region, four are still present but with greatly reduced and fragmented distributions, seven have broad distributions in the region little changed since Blandowski's time, although severely fragmented, and the remaining four have probably expanded their distributions. The contributions of Blandowski and his assistant Gerard Krefft to our understanding of the nature and causes of these mammal declines are examined and discussed. Unfortunately, the surviving contemporary documentation of the Expedition and the associated specimens is inadequate to shed much light on the factors that triggered the initial mammal declines, but the results do not support recent suggestions that predation by the introduced house cat *Felis catus* was pivotal.

Key words: historic fauna survey, extinction of small- medium-sized mammals, impacts of pastoralism, feral predators.

INTRODUCTION

In February 1854 the Victorian Government voted to establish a Museum of Natural History (Pescott 1954) (later to become the National Museum of Victoria then Museum Victoria). Its first employee was a 32 year old Prussian, Johann Wilhelm Blandowski, who had travelled to Australia from his native Silesia (now Poland) to make his name as a natural scientist. Blandowski was energetic and ambitious, and quickly began natural history investigations, mounting expeditions to parts of central Victoria, the upper Yarra River and the Port Phillip–Western Port region. These early expeditions were a precursor to Blandowski's major collecting expedition to the area around the junction of the Murray and Darling Rivers in late 1856 and 1857.

In this paper I evaluate the significance of Blandowski's contribution to Australian mammalogy by reviewing Blandowski's published reports to the Philosophical Society of Victoria (Blandowski 1855a,b, 1856a,b, 1857) and the somewhat scant information that has survived the controversies that beset Blandowski after his return from the 1856–57 Expedition (Allen 2001). Three of the early papers

(Blandowski 1855a, 1856a,b) contain some of the earliest published observations of the distribution, habitats and breeding seasonality of mammals in Victoria. These early observations have received little attention, unlike the information and specimens resulting from the 1856–57 Expedition. Accordingly, the more interesting mammal observations made during the early expeditions are included here, as part of the legacy of Wilhelm Blandowski. I then compare and contrast the mammalian fauna documented by the 1856–57 Expedition with that found during modern fauna surveys in the Murray–Darling region, and examine what the historical information reveals about the possible causes of the catastrophic decline in the mammalian community of the lower Murray–Darling, an event that may have gone unrecorded had the 1856–57 Expedition not taken place.

Victoria in the 1850s – some historical and political context

Within 18 years of the Henty brother's occupation of land at Portland Bay in 1832, virtually all of the fer-

Table 1. A timeline of significant socio-political and scientific events in the formative years of the State of Victoria.

Date	Socio-political events	Scientific events
1832	Henty brothers settle at Portland Bay.	
1835	Batman sets up camp at Indented Head, Port Phillip.	
1835-36		Thomas Mitchell explores 'Australia Felix'.
Sept 1836	Port Phillip District formally opened for settlement.	
1841-1842		John Gould publishes 'A Monograph of the Macropodidae'.
1842	Melbourne declared a municipality (of NSW).	
May 1845		John Gould publishes the first installment of 'The Mammals of Australia'.
1846		Melbourne Botanic Gardens established
1849	Surveyor White marks boundary between Port Phillip District and South Australia.	
Nov 1850	Separation bill passed by British Parliament creating Colony of Victoria.	
1 July 1851	Governor Fitzroy issues writs for first elections of the Colony of Victoria.	
2 July 1851	Gold discovered at Clunes.	
Oct 1852		Geological Society of Victoria founded – the first specialist scientific society in Australia.
1853		Von Mueller appointed Government Botanist.
1854	Eureka Stockade uprising, Ballarat.	
1854		Museum of Natural History opens. April - Blandowski appointed Government Zoologist. The University of Melbourne established.
1855		Philosophical Institute of Victoria founded (evolved into The Royal Society of Victoria).
Nov 1855	First fully-elected Government of Victoria.	Victorian Zoological Society formed [evolved into Acclimatisation Society and Melbourne Zoological Gardens].
1856		Public Library opened on Swanston Street.
Dec 1856- Nov 1857		Government and Philosophical Institute Expedition to the junction of the Murray and Darling Rivers.
Aug 1857		Von Mueller appointed Director of Botanic Gardens.
1858		McCoy becomes director of National Museum of Victoria.
1859		Charles Darwin publishes 'On the Origin of Species by Means of Natural Selection'.
Aug 1860	Victorian Exploration Expedition (Burke and Wills) sets off for the north coast	
1862		Victoria's first wildlife legislation passed – An Act to provide for the preservation of Imported Game and during the breeding season of Native Game.
May 1863		John Gould completes 'Mammals of Australia'
1866		Victoria's first conservation reserve established at Tower Hill.
1880		Field Naturalists Club of Victoria formed.
1884		Forbes-Lieth and Lucas publish the first catalogue of Victorian mammals.

tile plains and foothills of the Port Phillip District of New South Wales (i.e. south of the Murray River) had been claimed and at least partially occupied by (mostly) British squatters (for a map see pp. 62-63 of Camm & McQuilton 1987). The Government of New South Wales progressively released tracts of land for occupation, but occupation often preceded official release because squatters frequently pushed beyond the boundaries of the released land. The occupation of these lands was characterized by a brutal disregard for the British Government's instructions that the rights of the indigenous people be recognized.

In November 1850 the British Parliament passed a Separation Bill creating the Colony of Victoria with Melbourne as its administrative centre. Victoria's first Legislative Council was formed in 1851 and the State Constitution was proclaimed in 1855. The first elections under the new constitution were held for both Houses of Parliament in 1856, after which the Parliament of Victoria was formally opened.

In July 1851 gold was discovered, first at Clunes and then in rapid succession at numerous localities in a broad band across Victoria from the far north-east to Stawell in the central west. With gold came a surge of immigrants, unimagined wealth for some, social upheaval, and significant ecological disturbance on the goldfields. Between 1851 and 1854 the population of Melbourne trebled and had increased sevenfold by the end of the decade (Finney 1993). This increase in population and wealth fostered the growth of a cultured and learned society.

In accord with the worldwide blooming of the natural history sciences in the first half of the nineteenth century, Melbourne also rapidly developed a considerable community of people interested in natural history (Finney 1993). The decade of the 1850s saw the establishment of many scientific societies and institutions in Melbourne, including several that have endured to the present day – for example, Geological Society of Victoria, Royal Botanic Gardens and Herbarium, Melbourne Zoological Gardens, Museum Victoria, State Library of Victoria, The University of Melbourne and The Royal Society of Victoria (Table 1).

The Museum of Natural History and Wilhelm Blandowski

Blandowski disembarked first in Adelaide, South Australia, on 14 September 1849, but later traveled overland to Melbourne sketching and mapping vol-

canoes at Mt Gambier on the way (Darragh 1993, this volume). He then worked on the Castlemaine goldfields where he achieved some financial success as a mining engineer (Paszowski 1967). He returned to Melbourne in March 1853 to pursue his real interest – natural history. Educated in the natural sciences, Blandowski petitioned Governor La Trobe to provide him with a sinecure so that he could travel widely with a view to producing a book on the natural features and natural history of the newly proclaimed colony. Governor La Trobe declined Blandowski's requests for financial support, but instead appointed him as the first Scientific Officer of the recently established Museum of Natural History, on 1 April 1854. Shortly thereafter, Blandowski was among a group of learned men who met on 17 June 1854 to form the Philosophical Institute of Victoria (Paszowski 1967), later to become The Royal Society of Victoria.

During 1854 and 1855 Blandowski undertook several extended field excursions during which he made geological and natural history observations and collected specimens for the Museum of Natural History. For about three months in 1854 he was in the ranges north of Melbourne, including Mt Macedon, McIvor Range and the Seymour area (Blandowski 1855a). In November 1854 Blandowski traversed the Mornington Peninsula, visiting Point Nepean and Cape Schank (Blandowski 1856a). In January 1855 he visited Western Port, including French and Phillip Islands, and as far east as Cape Paterson (Blandowski 1856b).

Expedition to the junction of the Murray and Darling Rivers

1856 was a difficult year for Blandowski. Government financial difficulties provided Frederick McCoy, Professor of Natural Sciences at The University of Melbourne, the opportunity to move the museum collections to the University and effectively to demote Blandowski from the position of curator to collector (Wilkinson 1996; Darragh, this volume). In late 1856, following Blandowski's application to his employer, the Surveyor-General, the Victorian Government sponsored an expedition to investigate the natural history of the relatively poorly-known semi-arid country around the confluence of the Murray and Darling Rivers. Blandowski was appointed leader of the Expedition, 32 months after his appointment as Scientific Officer of the Museum of

Natural History (Darragh, this volume). Blandowski (1857) states:

On the 2nd December, 1856, I received orders from the Government to proceed to the junction of the Darling and Murray Rivers, for the purpose of making investigations on the natural history of that district, and also, with a view of collecting as many specimens as possible for the collections of the Natural History Museum, and marking the distribution of animal life along my route.

Clearly, Blandowski's instructions were to conduct a natural history survey, to collect specimens

for the museum, and to begin to document the distributions of fauna. The Government allocated £2000 for Expedition expenses, a significant investment indicative of the importance that it placed on this research.

Blandowski wasted no time in acting on his orders – he left Melbourne four days later:

with a very complete field equipment, consisting of five horses, two bullocks, two drays, four tents, a full set of tools and implements, and also a photographic apparatus (Blandowski 1857).

In fact when the Expedition left Melbourne it had no bullocks and only three horses which were

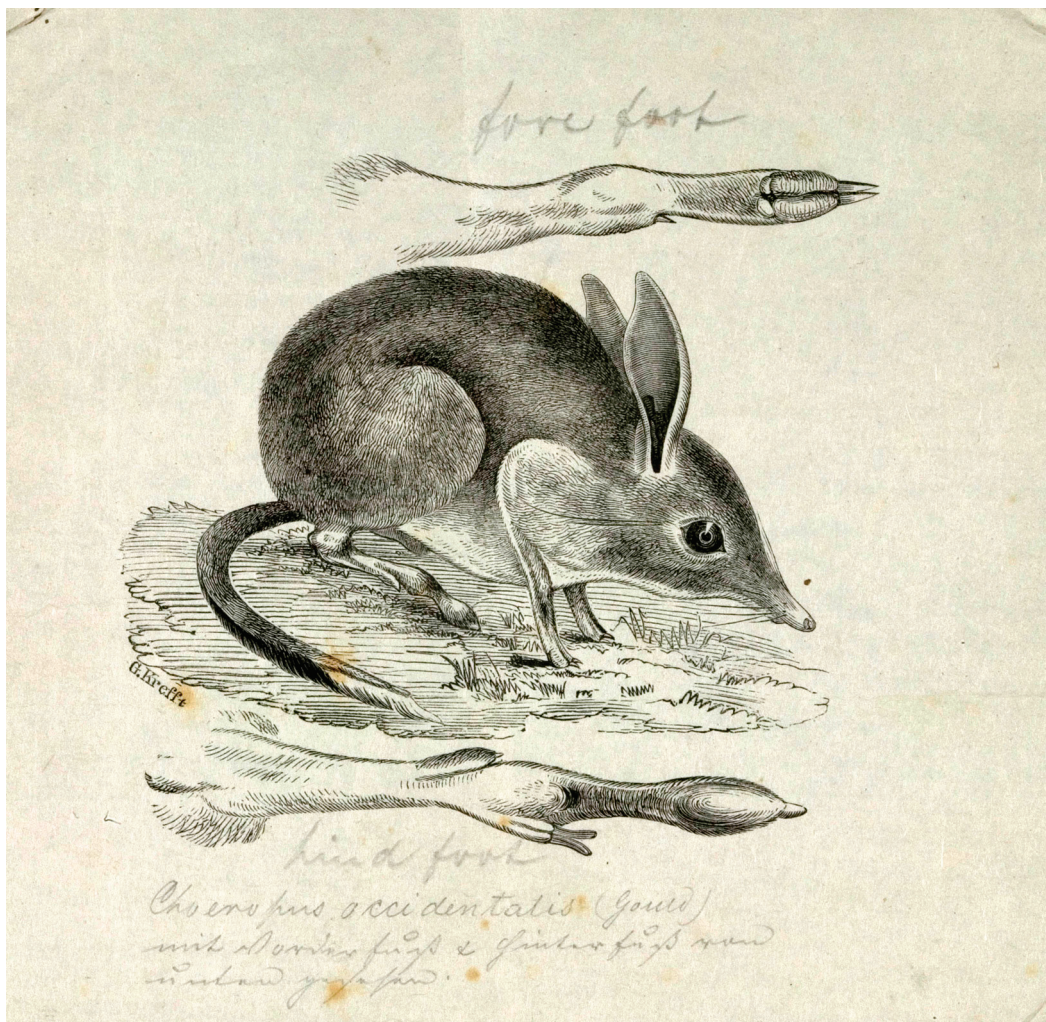


Fig. 1. Gerard Krefft. The extinct pig-footed bandicoot, *Chaeropus ecaudatus*, from an original illustration drawn from life at Mondellimin, 1857. Wood engraving on paper, c.1858-59. Museum Victoria.

found inadequate for the task, so two bullocks were then acquired (Krefft n.d.a). The Expedition began with a team of four assistants, but due to hardship and mismanagement, experienced a high turnover of staff. Of 18 men employed at various stages during the Expedition only Gerard Krefft was present from beginning to end (Blandowski 1857).

Gerard Krefft

Krefft, another Prussian well educated in the natural sciences, played a pivotal role in the scientific aspects of the Expedition. Krefft had arrived in Melbourne in November 1852. He then spent several years seeking gold on the central Victorian goldfields before returning to Melbourne in late 1856. Krefft was apparently studying the works of John Gould in the Melbourne Public Library, and polishing his natural history drawing skills, when he first made acquaintance with Blandowski, shortly before being appointed to the 1856-57 Expedition at the age of 26 years (Whitley 1959; Nancarrow, this volume). During the Expedition, Krefft was responsible for overseeing the preparation of specimens and the registration and record-keeping for all the biological material. Krefft apparently also carried out much of the day-to-day work around the camp, including cooking and caring for the horses and bullocks. He was also required to act as Blandowski's amanuensis, taking dictation from Blandowski by candlelight after dinner (Whitley 1959).

Krefft proved to be a keen and perceptive observer of wildlife and a fine natural history illustrator. Throughout the Expedition he kept numerous mammal species in captivity to learn more about their habits, documenting diet and breeding information, including seasonality and litter size. He is the only person known to have kept the pig-footed bandicoot *Chaeropus ecaudatus* in captivity and his observations are virtually the only natural history notes on this animal. Krefft's illustration of *C. ecaudatus* (Fig. 1) far surpasses that of Richter in Gould (1845-1863) in capturing the essence of the animal, not least because it was drawn from life rather than from a stuffed skin (other examples of Krefft's illustrations are shown in Figures 4,7, 8 and 9).

Without Krefft's diligence and commitment it is probable that far less information of scientific value would have been documented (see Krefft n.d.a, 1866a), nor would it have survived after Blandowski's falling out with the Melbourne establishment

and his refusal to hand over all the specimens, or the specimen registers, to his employers at the museum. Fortunately, after Krefft's return to Melbourne he was employed by the newly-appointed Director of the re-named National Museum of Victoria, Professor Frederick McCoy, as a collector and draughtsman, allowing him to document and catalogue the specimens that Blandowski had delivered to the institution (Whitley 1959; Krefft n.d.b). In contrast, Blandowski apparently never reported for work at the museum after his return to Melbourne (Paszowski 1967).

The death of Krefft's father in 1858 obliged Krefft to return to Germany. However, he returned to Australia in 1860 and obtained a position as Assistant Curator at the Australian Museum in Sydney. This position allowed Krefft the time and facilities to properly document the findings of the 1856-57 Expedition (Krefft 1866a,b).

In the field

The Expedition set off from Melbourne on 6 December 1856, proceeding north-west through country previously travelled by Blandowski via Keilor, Sunbury, past Mt Macedon to Lancefield and Mt Ida. It then followed the Campaspe River to the Murray at Echuca, arriving in late January 1857 (Iredale & Whitley 1932). The Expedition then proceeded slowly downstream along the Murray floodplain, held up by rudimentary tracks, straying horses and bullocks and a lack of reliable labour, exacerbated by Blandowski's over-bearing nature. Much of January and February 1857 was spent at Gunbower Creek to rest livestock, repair drays and also to make collections, notably at nearby Mt Hope. The first consignment of specimens was taken to Echuca for dispatch to Melbourne in mid February 1857. The party left Gunbower on 1 March and arrived at Lake Boga on 7 March. Blandowski then rode on ahead of the main party, which finally reached the confluence of the Murray and Darling Rivers on 8 April 1857, 'safe, but in a most deplorable condition' (Blandowski 1857), and over four months after leaving Melbourne.

A base camp was established on the south bank of the Murray River at Mondellimin (Fig. 2).¹ This camp was occupied until sometime in late November 1857 (the actual date of decampment seems not to have been recorded). However, Blandowski himself left for Melbourne via Adelaide on a paddle steamer on 6 August 1857, taking with him many of the ac-



Fig. 2. Mützel's representation of the Mondellimin camp looking south from the New South Wales side of the Murray River, 1857. Plate 21 from Blandowski's 'Australien in 142 Photographischen Abbildungen' (1862). Courtesy of Haddon Library, Faculty of Archaeology and Anthropology, Cambridge.

cumulated specimens – 28 boxes containing over 16 000 specimens (Paszkowski 1967).

While based at Mondellimin, Blandowski and his party established a friendly relationship with the local Nyeri Nyeri aboriginal people (Allen, this volume). He made good use of their knowledge to assist in the capture of animal specimens.² Blandowski paid for specimens brought to the Mondellimin camp (Fig. 3) with flour, sugar, tea, blankets and clothing (Blandowski 1857) and also, according to Krefft (n.d.a), in cash, at the 'exorbitant rate' of one shilling per specimen. At times the rate of presentation of specimens by the Nyeri Nyeri was so great as to overwhelm the capacity of Krefft and the Expedition taxidermist, Manson, to process them. Without doubt, this strategy increased the capture rate for

cryptic or scarce mammal species such as dasyurids, bandicoots, rodents (for example see Fig. 4) and small macropodoids. It did however mean that very few bats were collected because taboos discouraged their capture or harm by the Nyeri Nyeri.

It is difficult to assign accurate localities to many of the specimens because of inadequacies in documentation of the movements of Expedition members during their stay at Mondellimin, and because a large proportion of the specimens were brought to the camp from unknown localities by the indigenous people. The possibility of a trade in specimens over considerable distances with neighbouring aboriginal groups cannot be discounted, and may account for the acquisition of specimens of more arid-adapted species such as the



Fig. 3. Mützel's representation of Nyeri Nyeri people delivering specimens to the Mondellimin camp and bargaining with Blandowski for reward. Gustav Mützel (artist), William Blandowski (direction), *Blandowski's Camp*. Plate 22 from Blandowski's 'Australien in 142 Photographischen Abbildungen' (1862). Courtesy of Haddon Library, Faculty of Archaeology and Anthropology, Cambridge.

kultarr *Antechinomys laniger* and crescent nailtail wallaby *Onychogalea lunata*.

Blandowski himself undertook two lone journeys on horseback (Blandowski 1857):

- the first, beginning shortly after the establishment of the Mondellimin camp, for a period of three weeks downstream along the Murray River to the vicinity of Moorundee, 5 km downstream of the present day township of Blanchetown, at least 400 km by river from Mondellimin,
- the second for a period of 24 days from 27 May 1857 upstream along the Darling floodplain as far as Mt Murchison, north-east of Wilcannia, some 330 km north-north-east of Mondellimin.

Thus, Blandowski himself was present at Mondellimin for only 10.5 weeks out of roughly 32 weeks that the Mondellimin camp was occupied. In undertaking these lone excursions through sparsely settled country Blandowski displayed considerable bush craft in being able to navigate and live off the land. However, their purpose is far from clear and little of value appears to have been achieved.

Wakefield (1966a) was the first to fully appreciate and document the significance of the findings of the 1856-57 Blandowski Expedition. Using Krefft's published report of the Expedition (Krefft 1866a),³ Krefft's catalogue of specimens (Krefft n.d.b), his unpublished diary (Krefft n.d.a), and museum specimen registers, Wakefield provided a comprehensive



Fig. 4. Watercolour by Krefft of the greater stick-nest rat *Leporillus conditor* with detail of aboriginal hunters clubbing the rats trapped by a low netting fence encircling the stick nest. Blandowski Collection, Museum für Naturkunde, Humboldt Universität, Berlin.

review of the available material and identified all existing specimens. Wakefield (1966a) was also able to highlight inconsistencies and anomalies in the records and to overcome many of them, including re-interpretation of the provenance of some contentious specimens, refining earlier, less well-founded interpretations (e.g. by Brazenor 1950 and Marlow 1958). Further interpretation of Krefft's material has since been undertaken (Allen 1983; Bennett et al. 1989; Peake n.d. [1990]; Dickman et al. 1993; Menkhorst 1996a), in the light of new information on the distribution and status of mammals in south-eastern Australia. I have not re-examined all of the Blandowski mammal specimens in Museum Victoria because this was done thoroughly by Wakefield (1966a). The only variation to Wakefield's interpretation is the use of the name Bolam's mouse *Pseudomys bolami* instead of sandy inland mouse *P. hermannsburgensis* (Waite, 1896) following the re-instatement of *P. bolami* to species status (Kitchener et al. 1984) and the assign-

ation of specimens from the Murray Mallee region to *P. bolami* (Robinson et al. 2000b). Scientific and English names of mammals follow the checklist provided in Menkhorst & Knight (2004). Authors of scientific names are presented in Tables 2 and 5, or at first mention in the text for all other species.

RESULTS

Blandowski's mammal observations and collections

1. Discovery Bay, October 1850

Illustration number 60 in Blandowski's *Australien in 142 Photographischen Abbildungen* (Blandowski 1862) shows Blandowski confronting a seal on a beach (Fig. 5). Handwritten notes on Blandowski's preliminary sketch of this scene, held in the Museum für Naturkunde, Humboldt Universität, Berlin, indicate that the animal was encountered on Discovery

Bay, near the mouth of the Glenelg River, south-west Victoria, on 15 October 1850 (Fig. 6). Darragh (this volume) documents Blandowski's explorations and work as a surveyor in South Australia and south-west Victoria between his disembarkation at Adelaide in September 1849 and his arrival in Melbourne sometime in 1852. The notes on this sketch indicate that he was in the vicinity of the mouth of the Glenelg River in mid-October 1850 and this is confirmed in his letter to Sturt describing his explorations in the south-east of South Australia (Darragh, this volume).

Comment: The title of illustration number 60 is '*Otaria Australis*', a synonym for *Neophoca cinerea* Peron, 1816 (Walton 1988), the Australian sea lion. However, the structure of the hind flippers, shape of the head and pelage colour all suggest that the ani-

mal illustrated is the leopard seal *Hydrurga leptonyx* (de Blainville, 1820). Blandowski's original sketch (Fig. 6) has the hind flipper structure and pelage pattern of a leopard seal, but the distinct forehead is more reminiscent of a sea lion. Thus, the identity of the seal remains open to conjecture. *H. leptonyx* would seem more likely based on the illustrations (Figs 5 & 6) and the frequency of occurrence of the two species in south-western Victoria – *H. leptonyx* is a regular, though rare, seasonal visitor (Warneke 1996a); *N. cinerea* is a very rare vagrant (Warneke 1996b) and would have been more so in the first half of the 19th century because its colonies in Bass Strait had already been wiped out by uncontrolled sealing (Warneke 1966b). If it is accepted that the seal encountered by Blandowski was *H. leptonyx*, then it



Fig. 5. Mützel's illustration showing Blandowski in heroic pose with what appears to be a leopard seal, *Hydrurga leptonyx*, although labelled *Otaria Australis*, a synonym for *Neophoca cinerea*, the Australian sea lion. Gustav Mützel (artist), William Blandowski (direction). Plate 60 from Blandowski's 'Australien in 142 Photographischen Abbildungen' (1862). Courtesy of Haddon Library, Faculty of Archaeology and Anthropology, Cambridge.

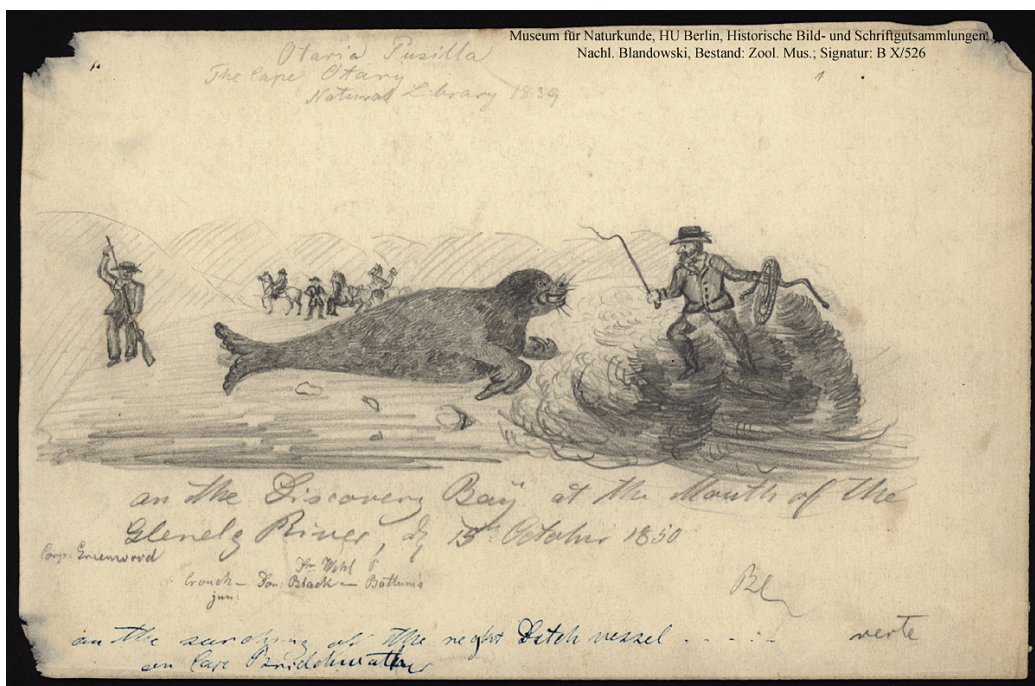


Fig. 6. Blandowski's sketch and notes on the leopard seal *Hydrurga leptonyx* encountered at the mouth of the Glenelg River, October 1850. Reproduced with permission of Museum für Naturkunde der Humboldt-Universität zu Berlin, Historische Bild- u. Schriftgutsammlungen. Bestand: Zool. Mus. Signatur: B VIII/ Blandowski Mammals.

represents the earliest Victorian record of the species and falls within the spring peak of records on the Victorian coast, and in a region with a history of visitation by *H. leptonyx* (Warneke 1996a).

2. The Early Expeditions – Central Victoria

Sometime between his appointment as Officer of the Museum of Natural History in early April 1854 and October of that year, Blandowski travelled north from Melbourne and spent about three months visiting Mt Macedon and Mt Diogenes (Hanging Rock), the McIvor Range and the 'Black Range' to the south-east of Seymour. On 21 October 1854 he presented a paper to the Philosophical Institute on observations made during this trip (Blandowski 1855a). Mammal observations presented in that paper include:

Water rat *Hydromys chrysogaster* – 'incredible numbers of water rats (*Hydromys leucogaster*) frequent the lagoons of the Goulburn [River] during the spring months.'

Common wombat *Vombatus ursinus* (Shaw, 1800) – Blandowski describes an unsuccessful attempt by aboriginal assistants to dig a wombat (as

Phascolomys wombat) out of its burrow by sinking a shaft (to a claimed depth of 22 feet!) into the supposed resting site of the wombat as determined by one aboriginal who entered the burrow and followed it to the sleeping chamber. Wombat flesh is said to be considered a great delicacy by the 'natives'.

Koala *Phascolarctos cinereus* (Goldfuss, 1817) – Blandowski provides accurate observations on behaviour, daily routine and breeding seasonality of the koala. Some of these observations were derived from an animal he kept in captivity for three weeks.

Comment: At this time, koala population densities in Victoria are believed to have been low, compared to levels reached 2-3 decades later (Parris 1948; Warneke 1978), following the cessation of Aboriginal hunting which is postulated to have kept koala populations at low levels (Strahan & Martin 1982).

Eastern grey kangaroo *Macropus giganteus* Shaw, 1790 (as *Halmatura gigantean*) – said to have 'now entirely disappeared from the neighbourhood of Mt Macedon, a locality in which it was formerly exceedingly plentiful. The Black Ranges, however, on the Goulburn, are yet inhabited by considerable numbers of these animals.'

Black wallaby *Wallabia bicolor* (Desmarest, 1804) (as *Macropus nalabatus* [presumably erroneous for *ualabatus*]) – ‘plentiful in the lonely passes of Mt Macedon’.

Potoroidae – Blandowski claimed to recognize two species of ‘*Hypsiprymnus* (Kangaroo rat)’ but his descriptions are insufficient to allow identification. His ‘common variety, with the white-pointed tail’ may be the southern bettong *Bettongia gaimardi* (Desmarest, 1822) which frequently has a white tip to the tail (Menkhorst & Knight 2004) but his ‘new species, the tail of which is completely destitute of fur’ is perplexing – he may have been confused between potoroids and bandicoots, e.g. long-nosed bandicoot *Perameles nasuta* Geoffroy, 1804, although their tails are not completely naked but are sparsely-furred.

Spot-tailed quoll *Dasyurus maculatus* (Kerr, 1792) (as tiger cat *Dasyurus maculatus*) – ‘Of late years it has become very scarce, so that it is with difficulty obtained at the present time. During a stay of two months in and around Mt Macedon I was only enabled to procure one specimen.’

Comment: There are no records in Museum Victoria of this specimen (R. O’Brien pers. com., 2008). However, McCoy (1861) stated that several specimens of *D. maculatus* had reached the museum from the forests close to Melbourne. Perhaps Blandowski’s specimen, collected 5–6 years earlier, was one of these.

Eastern quoll *Dasyurus viverrinus* (Shaw, 1800) (as native cat *Dasyurus viverrinus*) – ‘these little animals are extremely courageous when attacked: and are very plentiful around sheep stations, where the settlers use every means for exterminating them. There are now large numbers of them in localities where, before the intrusion of the European, they were extremely rare; in short, their numbers have augmented in proportion as those of the dingo have diminished, in accordance with that inscrutable law of nature which regulates the equilibrium of animal life.’

Comment: Other, later, reports also comment on the abundance of this species in the late 1800s and early 1900s (McCoy 1867 (in Seebeck & Warneke 2001:281); Buckland 1954; Wakefield 1954; Seebeck 1984) before a catastrophic population decline in the early 1900s that led to its extirpation on the Australian mainland.

White-footed rabbit-rat *Conilurus albipes* (Lichenstein, 1829) – ‘This little animal is well known to hut keepers and to residents in the bush, on account of its prying and inquisitive propensities, and

the fondness which it appears to possess for sugar and other stores.’

Comment: These notes accord well with the few other references in the historical literature to this extinct species. The last specimens of *C. albipes* were collected only eight years later in 1862 (Williams & Menkhorst 1996) and no museum specimens collected in Victoria remain (apart from subfossil skeletal material). It is not clear from Blandowski’s writing that he actually observed *C. albipes* – his account may have been based on second-hand information gleaned from local people. One of the few references to this species as a living animal in Victoria is that of John Cotton in a letter to his brother written in 1846 (Mackaness 1978, letter no. 26). Although Cotton was confused about the name of this animal, his sketch accompanying the letter (not published in Mackaness 1978 but now in the State Library of Victoria) is clearly *C. albipes* (Peake n.d. [1990]; Williams & Menkhorst 1996). Cotton, arguably Victoria’s first ornithologist and a skilled observer and painter of wildlife (McEvey 1974), owned a sheep station ‘Doogallook’, on the Goulburn River between the Yea River and King Parrot Creek, in the vicinity of the present day Homewood, and 25 km south-east of Seymour. It is possible that Blandowski visited Doogallook whilst exploring the Black Range, south-east of Seymour. John Cotton died in 1849 (McEvey 1974) so Blandowski could not have met him, but may have exchanged information about local wildlife with other members of the Cotton family, or their neighbours, a possible source of Blandowski’s information on *C. albipes*.

Yellow-bellied glider *Petaurus australis* Shaw, 1791 – Blandowski is confused about the taxonomy of gliding possums but refers to the ‘peculiar shrieks’ of what can only be *P. australis*, and also describes animals that are clearly the greater glider *Petauroides volans* (Kerr, 1792) and feathertail glider *Acrobates pygmaeus* (Shaw, 1794).

Order Chiroptera – ‘as yet only two species of chiroptera have been discovered in Victoria, viz., the vampire bat, and the common small bat.’

Comment: The lack of understanding about the diversity of microchiropterans in Victoria is instructive because nine species that are now widespread and common in Victoria had been described by 1850, though none of the type localities were in Victoria (data extracted from Walton 1988). This seems to indicate that Blandowski had not attempted to investigate this Order of mammals in any detail – the third volume of Gould (1845–1863), covering the eutherian

mammals, was yet to be published. Vampire bat refers to species of flying-fox, in this case either the grey-headed flying-fox *Pteropus poliocephalus* Temminck, 1835 or little red flying-fox *P. scapulatus* Peters, 1862.

3. The Early Expeditions – Mornington Peninsula

On 20 November 1854 Blandowski began an excursion along the eastern shore of Port Phillip and across the Mornington Peninsula to Cape Schank. There are three references to mammals in his report to the Philosophical Society (Blandowski 1856a):

The eastern grey kangaroo *Macropus giganteus* (as *Macropus major*) – was found to be ‘extremely plentiful between Frankston and Cape Shank’ (sic).

Swamp rat *Rattus lutreolus* (Gray, 1841) – ‘Bush Rats’ are said to occur in ‘swarms’. ‘These animals burrow in great numbers close together, and patches of ground completely honey-combed by them are everywhere observable. Such spots are, on account of the size and depth of these holes, dangerous to pass over with a horse.’

Comment: The description of the burrow systems indicates that this observation applies to *Rattus lutreolus*.

Short-beaked echidna *Tachyglossus aculeatus* (as porcupine *Echidna hystrix*) – ‘is plentiful along the sand hummocks along the southern coast’, a situation little changed until the encroachment of housing and golf developments in recent decades.

4. The Early Expeditions – Western Port

Blandowski spent some time on Phillip Island during January and February 1855. His report (Blandowski 1856b) refers to four species of mammal:

The Australian fur seal *Arctocephalus pusillus doriferus* (Schreber, 1775) and the difficulties of hunting them due to the treacherous seas are discussed.

Water rat *Hydromys chrysogaster* – ‘the water rat exists in the lagoons of Phillip Island in considerable numbers, but appears to me to be much smaller than the species of the main land.’

The ‘brush-tailed or white-tipped wallaby’ ‘exists in great numbers on Phillip Island’ and is said to be the only marsupial present on the island. It is stated that this species is absent from the other islands of Western Port. The identity of this species is not clear but is most likely the black wallaby *Wallabia bicolor*, which frequently has a white-tipped tail (Menkhorst & Knight 2004) and still occurs on Phillip Island but is absent from French Island (Menkhorst

1996a). The term wallaby is taken to indicate a larger animal than the other two small macropodoids known to have occurred on Phillip Island in historical times – long-nosed potoroo *Potorous tridactylus* (Kerr, 1792) and rufous-bellied pademelon *Thylogale bilardieri* (Desmarest, 1822) (Menkhorst 1996a). Blandowski had previously referred to potoroids as *Hypsiprymnodon* (kangaroo-rat) and during the nineteenth century small macropods, including species of *Thylogale*, were often referred to as pademelons rather than wallabies.

The absence of the dingo *Canis lupus dingo* on Phillip Island is noted as curious given that the ‘shores of the mainland opposite this island swarm with multitudes of hungry wild dingos’.

5. The 1856-57 Expedition to the lower Murray and Darling Rivers

The Blandowski Expedition collected specimens of 32 mammal species (Table 2) plus an unknown number of microchiropteran bat species (at least three, but because no specimens remain the actual number cannot be determined). Fifteen of the species collected on the Expedition had not been previously recorded from south-eastern Australia (Table 2), representing an increase of about 42% in the mammal species listed for Victoria at that time.

Of the 32 species, ten taxa are now extinct – five full species and five subspecies, a further nine species are no longer found in the region, seven species are still present where suitable habitat remains, two species are still present but with severely contracted ranges and four species have probably expanded their ranges (Table 3). Krefft’s writings provide insights into the timing, speed and pattern of these population declines. Relevant passages from Krefft (1866a) and his unpublished journal are quoted in Table 4.

Krefft’s notes provide the only primary source of information on the behaviour and habitat utilization of *Chaeropus ecaudatus*, and some valuable insights into the natural history of several other extinct taxa, notably the eastern subspecies of the western barred bandicoot *Perameles bougainville fasciatis* (Fig. 7), the eastern subspecies of the bilby *Macrotis lagotis cambrica* (Fig. 8), the eastern subspecies of the burrowing bettong *Bettongia lesueur graii*, and the lesser stick-nest rat *Leporillus apicalis* (Fig. 9). The specimens of Gould’s mouse *Pseudomys gouldi* obtained by Blandowski during his excursion upstream along the Darling River (Wakefield 1966a) were the last ever collected (Watts & Aslin 1981).

Table 2. Mammal species recorded during the Blandowski Expedition, 1856–57 (Krefft 1866a; Wakefield 1966a). At least two other species of microchiropteran are likely to have been captured but no specimens survive and their identity remains uncertain. Numbers in parentheses indicate the number of specimens listed by Krefft (n.d.c) (after Wakefield 1966a). Taxonomy and nomenclature follow Menkhorst and Knight (2004).

* species recorded from Victoria before the Expedition (from Seebeck 1995).

Scientific name	Common name
Subclass Prototheria	<i>Monotremes</i>
Family Ornithorhynchidae	
<i>Ornithorhynchus anatinus</i> (Shaw, 1799)	*Platypus (0)
Family Tachyglossidae	
<i>Tachyglossus aculeatus</i> (Shaw, 1792)	*Short-beaked echidna (2)
Subclass Marsupialia	<i>Marsupials</i>
Family Dasyuridae	
<i>Antechinomys laniger</i> (Gould, 1856)	Kultarr (2)
<i>Antechinus flavipes</i> (Waterhouse, 1838)	Yellow-footed antechinus (1)
<i>Dasyurus geoffroii</i> Gould, 1841	Western quoll (11)
<i>Phascogale calura</i> Gould, 1844	Red-tailed phascogale (5)
<i>Phascogale tapoatafa</i> Meyer, 1793	*Brush-tailed phascogale (1)
<i>Sminthopsis crassicaudata</i> (Gould, 1844)	*Fat-tailed dunnart (14)
<i>Sminthopsis murina</i> (Waterhouse, 1838)	Common dunnart (13)
Family Myrmecobiidae	
<i>Myrmecobius fasciatus</i> Waterhouse, 1836	Numbat (0)
Family Peramelidae	
<i>Chaeropus ecaudatus</i> (Ogilby, 1838)	*Pig-footed bandicoot (6)
<i>Isodon sp.</i>	a short-nosed bandicoot (62)
<i>Macrotis lagotis</i> (Reid, 1837)	Bilby (3)
<i>Perameles bougainville</i> Quoy & Gaimard, 1824	Western barred bandicoot (13)
Family Vombatidae	
<i>Lasiorhinus latifrons</i> (Owen, 1845)	Southern hairy-nosed wombat (0)
Family Phalangeridae	
<i>Trichosurus vulpecula</i> (Kerr, 1792)	*Common brushtail possum (7)
Family Petauridae	
<i>Petaurus breviceps</i> Waterhouse, 1839	*Sugar glider (0)
Family Pseudocheiridae	
<i>Pseudocheirus peregrinus</i> (Boddaert, 1785)	*Common ringtail possum (1)
Family Potoroidae	
<i>Aepyprymnus rufescens</i> (Gray, 1837)	*Rufous bettong (8)
<i>Bettongia lesueur</i> (Quoy & Gaimard, 1824)	Burrowing bettong (43)
<i>Bettongia penicillata</i> Gray, 1837	Woylie (28)

Table 2 (continued). Mammal species recorded during the Blandowski Expedition, 1856-57 (Krefft 1866a; Wakefield 1966a). At least two other species of microchiropteran are likely to have been captured but no specimens survive and their identity remains uncertain. Numbers in parentheses indicate the number of specimens listed by Krefft (n.d.c) (after Wakefield 1966a). Taxonomy and nomenclature follow Menkhorst and Knight (2004).

* species recorded from Victoria before the Expedition (from Seebeck 1995).

Family Macropodidae	
<i>Lagorchestes leporides</i> (Gould, 1841)	*Eastern hare wallaby (41)
<i>Macropus fuliginosus</i> (Desmarest, 1817)	*Western grey kangaroo (1)
<i>Macropus rufus</i> (Desmarest, 1822)	*Red kangaroo (4)
<i>Onychogalea fraenata</i> (Gould, 1841)	Bridled nailtail wallaby (66)
<i>Onychogalea lunata</i> (Gould, 1841)	Crescent nailtail wallaby (1)
Subclass Eutheria	<i>Eutherians</i>
Family Vespertilionidae	
<i>Nyctophilus geoffroyi</i> Leach, 1821	Lesser long-eared bat (2)
<i>Chalinolobus morio</i> (Gray, 1841)	Chocolate wattled bat (1)
Family Muridae	
<i>Hydromys chrysogaster</i> Geoffroy, 1804	*Water rat (2)
<i>Leporillus apicalis</i> (Gould, 1853)	*Lesser stick-nest rat (96)
<i>Leporillus conditor</i> (Sturt, 1848)	*Greater stick-nest rat (7)
<i>Notomys mitchellii</i> (Ogilby, 1838)	*Mitchell's hopping mouse (96)
<i>Pseudomys bolami</i> Troughton, 1932	Bolam's mouse (47)
<i>Pseudomys desertor</i> Troughton, 1932	Desert mouse (37)
<i>Pseudomys gouldi</i> Waterhouse, 1839	Gould's mouse (2)
Family Canidae	
<i>Canis lupus dingo</i> (Meyer, 1793)	*Dingo (2)

Other interesting observations include:

- that kangaroos (red kangaroo *Macropus rufus* and western grey kangaroo *M. fuliginosus*) were generally uncommon (as was the emu *Dromaius novaehollandiae* (Latham, 1790)), perhaps a reflection of aboriginal hunting pressure.
- that *Hydromys chrysogaster* was not found downstream of Lake Boga and that 'the animal is not found on the lower Darling, at least, I was assured by the natives that they had never seen it.' *Hydromys chrysogaster* is today locally common in the area, inhabiting mostly artificial waterbodies rather than the Murray River itself (Seebeck 1996).
- An intriguing suggestion that the house mouse *Mus musculus* Linnaeus, 1758 might have already been present at Mondellimin in 1857. Krefft states in reference to a pair of captive western quolls *Dasyurus geoffroyi* 'having made their escape at last, they kept close to the huts and tents

of camp, completely clearing the place of mice and other vermin.' Alternatively, Krefft's 'mice' may have been Bolam's mouse *Pseudomys bolami* which was apparently locally common.

- a passing comment about the occurrence of the southern hairy-nosed wombat *Lasiorhinus latifrons* (as *Phascolomys latifrons*), 'in the neighbourhood of the north-west bend of the Murray' (i.e. near Morgan, South Australia) – information possibly gathered by Blandowski on his side-trip to Moorundee.
- the absence of *Phascolarctos cinereus* and gliding possums of the genus *Petaurus* on the lower Murray and Darling.

The list of mammal species now known to occur in the region (Bennett et al. 2006) includes 27 species that were not collected by the Blandowski Expedition (Table 5). More than half of these are microchiropteran bats (16 species) which Krefft acknowledges were not adequately represented in the

Table 3. Taxa recorded by the 1856-57 Expedition and their current status in the region. Taxonomy and nomenclature follow Menkhorst and Knight (2004).

Taxa that are extinct (10 taxa): <i>Myrmecobius fasciatus rufus</i> , <i>Chaeropus ecaudatus</i> , <i>Perameles bougainville fasciatus</i> , <i>Macrotis lagotis cambrica</i> , <i>Bettongia penicillata penicillata</i> , <i>Bettongia lesueur grayi</i> , <i>Lagorchestes leporides</i> , <i>Onychogalea lunata</i> , <i>Pseudomys gouldi</i> , <i>Leporillus apicalis</i>
Taxa that no longer occur in the Murray Mallee bioregion but are extant elsewhere (9): <i>Antechinus flavipes</i> , <i>Dasyurus geoffroyi</i> , <i>Phascogale calura</i> , <i>Antechinomys laniger</i> , <i>Isodon sp.</i> , <i>Pseudocheirus peregrinus</i> , <i>Aepyprymnus rufescens</i> , <i>Onychogalea fraenata</i> , <i>Leporillus conditor</i>
Taxa that no longer occur in the area sampled by the Expedition but are extant elsewhere in the Murray Mallee bioregion (2): <i>Pseudomys bolami</i> , <i>Canis lupus dingo</i>
Taxa that have declined significantly in the Murray Mallee bioregion but still occur in the area covered by the Expedition (2): <i>Ornithorhynchus anatinus</i> , <i>Notomys mitchellii</i>
Taxa whose broad distributions are little changed in the Murray Mallee bioregion or other areas traversed by the Expedition (7): <i>Phascogale tapoatafa</i> , <i>Sminthopsis crassicaudata</i> , <i>Sminthopsis murina</i> , <i>Petaurus breviceps</i> , <i>Trichosurus vulpecula</i> , <i>Chalinolobus morio</i> , <i>Nyctophilus geoffroyi</i>
Taxa that have possibly increased in distribution within the region (4): <i>Tachyglossus aculeatus</i> , <i>Macropus fuliginosus</i> , <i>Macropus rufus</i> , <i>Hydromys chrysogaster</i>

Table 4. Species recorded during the Blandowski Expedition 1856-57 whose status in the region has changed since that time. Under 'Krefft's comments' selected passages from Krefft (n.d.a, 1866a) are quoted along with information collated by Wakefield (1966a) from museum catalogues. Current understanding of species status in the lower Murray-Darling region is derived from Wakefield (1966b), Robertson et al. (1989), Menkhorst (1996a), Val et al. (2001), Bennett et al. (2006), and the database of the Atlas of Victorian Wildlife (Department of Sustainability and Environment, Melbourne). Taxonomy and nomenclature follow Menkhorst and Knight (2004).

Species	Krefft's comments	Current status
<i>Tachyglossus aculeatus</i> Short-beaked echidna	The only specimens seen by Krefft were two preserved skins collected by a shepherd at Mount Hope. 'The natives further down the river did not appear to be aware of such an animal as the echidna'.	Widespread but not often seen; absent from chenopod shrublands on the alluvial plains (Bennett et al. 2006). Wakefield (1966b) suggested that the lack of records from the Blandowski Expedition indicates that the short-beaked echidna may have spread into the mallee region in the last 100 years.
<i>Antechinomys laniger</i> Kultarr	'Two single specimens ... were obtained through the natives at Gol Gol Creek'. 'The natives informed me that the animal was very rare ... while some asserted they had never seen the animal before.'	Nearest modern records are from Kinchega National Park, New South Wales (Ellis & Henle 1988), 200 km nne of Mondellimin.
<i>Antechinus flavipes</i> Yellow-footed antechinus	'A very common form on the banks of the Murray, it was procured from Echuca to the Darling junction'. 'It used to be so common near the camp on the Murray that I have often captured several specimens whenever a load of wood was brought in.'	Common in riverine woodland where woody debris is allowed to accumulate. Distribution has contracted upstream - downstream limit is now near Murrabit, 230 km se of Mondellimin (Bennett et al. 2006).
<i>Dasyurus geoffroyi</i> Western quoll	'along the scrub on the banks of the Murray'	Blandowski specimens are the last records in Victoria or New South Wales. Now confined to sw Western Australia.

Table 4 (continued). Species recorded during the Blandowski Expedition 1856-57 whose status in the region has changed since that time. Under 'Krefft's comments' selected passages from Krefft (n.d.a, 1866a) are quoted along with information collated by Wakefield (1966a) from museum catalogues. Current understanding of species status in the lower Murray-Darling region is derived from Wakefield (1966b), Robertson et al. (1989), Menkhorst (1996a), Val et al. (2001), Bennett et al. (2006), and the database of the Atlas of Victorian Wildlife (Department of Sustainability and Environment, Melbourne). Taxonomy and nomenclature follow Menkhorst and Knight (2004).

Species	Krefft's comments	Current status
<i>Phascogale calura</i> Red-tailed phascogale	'My specimens were captured near Williams' Station, Gol Gol Creek' 'The few specimens brought to me by the natives were generally found in hollow limbs of trees.'	Now confined to sw Western Australia. Blandowski specimens are the only evidence that it ever occurred in Victoria or New South Wales (Marlow 1958; Menkhorst 1996c).
<i>Myrmecobius fasciatus</i> Numbat	'Not found close to the [Murray] river and as far as my inquiries among the natives went, has never occupied that part of the country'. 'I have been informed by Mr Scott, the owner of a station at Tapio, about 80 miles from the Darling junction that the Banded Myrmecobius is by no means rare; and that the natives could procure specimens for me; but a few bad skins were all I obtained.' [Tapio Station was much closer to the junction than 80 miles].	Eastern subspecies <i>rufus</i> is extinct. It appears that no specimens were kept and Krefft's comments are the only evidence that numbats ever occurred in New South Wales (Marlow 1958).
<i>Chaeropus ecaudatus</i> Pig-footed bandicoot	'About 8 specimens were secured...all specimens procured on the N.S.W. side of the Murray.' 'This singular animal...is exceedingly rare, and is disappearing as fast as the native population. The large flocks of sheep and herds of cattle occupying the country will soon disperse those individuals which are still to be found in the so called settled districts, and it will become more and more difficult to procure specimens for our national collections.'	Extinct. The last specimen was collected in 1901 but Aboriginal people in the central deserts of Western Australia knew of it into the 1950s (Burbidge et al. 1988)
<i>Isoodon</i> sp. A short-nosed bandicoot	'Murray scrub'. Up to 62 specimens collected.	Identity uncertain – may be <i>Isoodon obesulus</i> or <i>I. auratus</i> or an undescribed intermediate form (Wakefield 1966b; Menkhorst 1996d). Nearest extant <i>Isoodon</i> population is <i>I. obesulus</i> in the Mt Lofty Ranges, South Australia, 310 km wsw and The Grampians, Victoria, 350 km s of Mondellimin.
<i>Perameles bougainville</i> Western barred bandicoot	'Common on all parts of the Murray River.'	The eastern subspecies <i>fasciatus</i> is extinct. Species now confined to two islands off Western Australia.
<i>Macrotis lagotis</i> Bilby	'Like many other species has long ago retreated to the north of the Murray.'	South-eastern subspecies <i>cambrica</i> is extinct. Last recorded in New South Wales in 1912 (Marlow 1958). Being re-introduced to Scotia Sanctuary, sw New South Wales.
<i>Pseudoecheirus peregrinus</i> Common ringtail possum	'a rare animal on the Murray and Darling. I secured no more than two specimens during my whole stay.'	No longer present in region. The nearest recent record is from Gunbower Forest, about 270 km se of Mondellimin.

Table 4 (continued). Species recorded during the Blandowski Expedition 1856-57 whose status in the region has changed since that time. Under 'Krefft's comments' selected passages from Krefft (n.d.a, 1866a) are quoted along with information collated by Wakefield (1966a) from museum catalogues. Current understanding of species status in the lower Murray-Darling region is derived from Wakefield (1966b), Robertson et al. (1989), Menkhorst (1996a), Val et al. (2001), Bennett et al. (2006), and the database of the Atlas of Victorian Wildlife (Department of Sustainability and Environment, Melbourne). Taxonomy and nomenclature follow Menkhorst and Knight (2004).

Species	Krefft's comments	Current status
<i>Aepyprymnus rufescens</i> Rufous bettong	'has not been observed by me westward of the Murrumbidgee.' 'Only met with at Gunbower and perhaps some 50 or so miles down the river.' [Collected in the vicinity of Gunbower and Mt Hope]. 'Strictly nocturnal in its habits, it will when disturbed during the day often take shelter in some hollow log.'	No longer present in region – nearest populations are in coastal northern New South Wales.
<i>Bettongia lesueur</i> Burrowing bettong	'I have never met with this <i>Bettongia</i> on the Victorian side of the Murray but on the N.S.W. it is found in abundance'. 'Has long retreated before the herds of cattle with which the plains bordering the Murray are now stocked; and it is no longer to be found south of that river, so, at least, the natives assured me.'	Eastern subspecies <i>grayi</i> is extinct.
<i>Bettongia penicillata</i> Woylie	'on the banks of the Murray as far as Euston, to the eastward of that township but few specimens have been observed'	Eastern subspecies <i>penicillata</i> is extinct.
<i>Lagorchestes leporides</i> Eastern hare wallaby	'Common upon the level country between the Murray and Darling.'	Extinct, not recorded since 1891.
<i>Onychogalea fraenata</i> Bridled nailtail wallaby	'of very common occurrence, to be met with any part of the Murray scrub. It is often found in great numbers near some sandhill studded with underwood, not strictly nocturnal it often feeds during the day-time and is very swift.' 'The most common of all the species of the kangaroo tribe.' [First collected on Mr Gardiner's home station in the Patho Plains area in late January 1857].	No longer present in the region, only one population survived – w of Rockhampton Queensland. Being re-introduced to Scotia Sanctuary.
<i>Onychogalea lunata</i> Crescent nailtail wallaby	'taken west of the Darling'	Extinct. Known to Aboriginal people in the central deserts until about the 1940s (Burbidge et al. 1988).
<i>Macropus rufus</i> Red kangaroo	'The range of this species to the eastward does not extend much beyond Mt Hope.' [in fact no specimen was procured at Mt Hope although they had a report from a station employee of 'a small herd being found there'].	Most easterly occurrence now is Hattah-Kulkyne National Park, some 200 km nw of Mt Hope.
<i>Leporillus apicalis</i> Lesser stick-nest rat	'I observed the first specimens in the neighbourhood of Euston, and found it in great numbers along Sir Thomas Mitchell's old track on both sides of the Murray. It also occurs on the Darling.' 'Has become very scarce along the left [south] bank of the Murray.'	Extinct. Disappeared quickly from a vast range across arid Australia, the last specimen was collected in 1933 in far nw South Australia (Robinson et al. 2000b).

Table 4 (continued). Species recorded during the Blandowski Expedition 1856-57 whose status in the region has changed since that time. Under 'Krefft's comments' selected passages from Krefft (n.d.a, 1866a) are quoted along with information collated by Wakefield (1966a) from museum catalogues. Current understanding of species status in the lower Murray-Darling region is derived from Wakefield (1966b), Robertson et al. (1989), Menkhorst (1996a), Val et al. (2001), Bennett et al. (2006), and the database of the Atlas of Victorian Wildlife (Department of Sustainability and Environment, Melbourne). Taxonomy and nomenclature follow Menkhorst and Knight (2004).

Species	Krefft's comments	Current status
<i>Leporillus conditor</i> Greater stick-nest rat	'All the specimens procured by the natives were obtained when I was encamped with them near Mt Lookout, a sandhill about 10 miles north of the Darling Junction.' 'I do not think that it occurs south of the Murray, where, according to the aborigines, it was found in large numbers not many years ago'. 'It is one of the many species that will soon be extinct, as I found that it had already retreated before the herds of sheep and cattle across the Murray. Only a few empty nests were occasionally met with south of that river.'	Extinct on mainland Australia – the last mainland specimen came from the Ooldea area in the early 1920s. Survives only on the Franklin Islands, Nuyts Archipelago, South Australia (Robinson et al. 2000a). Re-introduction to predator-proof enclosures is underway at several mainland locations including Scotia Sanctuary.
<i>Notomys mitchellii</i> Mitchell's hopping mouse	'The first pair obtained were brought to me by natives in the vicinity of the Murrumbidgee [River].' 'This animal is very plentiful on the Darling: and as many as 50 specimens were often procured by the native women in an afternoon.'	Presumed extinct in New South Wales; rare and restricted to remnants of deep sand mallee with a heath understorey in north-west Victoria (Bennett & Lumsden 1996). Most easterly population is in Annuello Flora and Fauna Reserve, 45 km sw of the junction of the Murrumbidgee and Murray Rivers.
<i>Pseudomys bolami</i> Bolam's mouse	'distributed all over the Murray scrub'	No longer present in Victoria, disjunct populations persist in the Murray Mallee of South Australia and far western New South Wales.
<i>Pseudomys desertor</i> Desert mouse	Found in large numbers between Gol Gol Creek and the Darling.	No longer found in New South Wales or Victoria, nearest population is an isolated one in Telowrie Gorge, southern Flinders Ranges, South Australia (Robinson et al. 2000b).
<i>Pseudomys gouldi</i> Gould's mouse	'received through native tribes living some 100 miles further north.' 'Mr Bl. brought it from there' [the Darling]	Extinct. The single remaining Blandowski specimen is the last collected.
<i>Canis lupus dingo</i> Dingo	'not so plentiful as in former years as the strychnine of the settler has killed a great many and only a few individuals are to be met with in the most scrubby country or among the rocks of Mt Hope.'	No longer present in area. Nearest population is in Big Desert, 150 km ssw of Mondellimin, though this may no longer include pure Dingos.

collections because the Nyeri Nyeri did not wish them to be harmed, for cultural reasons, and therefore did not collect them and discouraged the Expedition members from doing so. The other obvious component of these unrepresented species is the small mammals that are restricted to mallee vegetation communities, particularly where the hummock grass *Triodia* provides excellent shelter for small mammals and other fauna (Menkhorst & Bennett 1990). The lack of records of Mallee ningau *Nin-*

gaui yvonneae, western pygmy possum *Cercartetus concinnus*, little pygmy possum *C. lepidus* and silky mouse *Pseudomys apodemoides* indicates that the Blandowski Expedition did not adequately sample this environment, perhaps because the aboriginal collectors knew that specimens were more difficult to obtain in such country. These, and three very small terrestrial dasyurids (< 20 g) (Gile's planigale *Planigale gilesi*, narrow-nosed planigale *P. tenuirostris*, stripe-faced dunnart *Sminthopsis macrourua*) and



Fig. 7. Gerard Krefft. Woodcut of the extinct western barred bandicoot *Perameles bougainville fasciatus*, from sketches made at Mondellimin. Wood engraving on paper, c.1858-59. Museum Victoria.

the tiny arboreal *Acrobates pygmaeus* would have been of little interest to aboriginal people as a food resource. Two larger rodents (plains mouse *Pseudomys australis* and long-haired rat *Rattus villosissimus*), which the available records indicate did not occur that far south, and whose populations are known to fluctuate wildly in abundance, are, not surprisingly, absent from the records. The absence of the euro *Macropus robustus erubescens* is perhaps more surprising as it would have been valued by the Nyeri Nyeri as a source of food and skins. Although not recorded from Victoria (Menkhorst 1996b), a sparse population was present along the north bank of the Murray River in the Rufus River area in the 1960s (Simpson 1973). There is no way of knowing whether the species inhabited the region in 1857, though it would seem plausible. Rufus River is 70-80 km downstream of Mondellimin and perhaps beyond the area sampled by the Expedition.

DISCUSSION

The 1856-57 Blandowski Expedition was the first formal Government wildlife survey to be undertaken

in Victoria and, probably, in Australia (i.e. for which the sole aim was to document the animal life of a region, rather than to investigate potential for economic development or to claim land for future occupation and development). Another 117 years were to pass before equivalent broad-scale, Government-funded fauna surveys took place in Victoria – systematic flora and fauna surveys of all public land began in 1974 as a component of the land-use studies of the Land Conservation Council of Victoria (Emison et al. 1984; Clode 2006).

In total, Blandowski's observations provide a unique insight into the status and distribution of Victoria's mammals during the mid-1850s, almost 30 years before the publication of the first list of Victorian mammals (Forbes-Leith & Lucas 1884).

The state of knowledge before the Expedition

Blandowski's series of publications in the mid- late-1850s provide some of the earliest attempts to list the mammal fauna of particular regions of southern Australia. In 1854, when Blandowski began work at the Museum of Natural History, information about



Fig. 8. Gerard Krefft. Woodcut of the extinct south-eastern subspecies of the bilby *Macrotis lagotis cambrica*, from sketches made at Mondellimin. Wood engraving on paper, c.1858-59. Museum Victoria.

Victoria's mammals was scant and scattered through accounts of exploration and pioneering settlement (e.g. Mitchell 1839; Haydon 1846), and mostly consisted of reports of incidental sightings (Seebeck 1995). At that time, about 36 mammal species had been recorded from Victoria (Seebeck 1995) and knowledge about the fauna of south-western New South Wales was even less advanced (Marlow 1958; Dickman et al. 1993).

At the time of the Expedition, John Gould was only part way through the 18 year publication period of his seminal work on the mammals of Australia (Gould 1845-1863) – part 8 of the 13 parts was released in London in early December 1856 (Sauer 1982:61), just as Blandowski and Krefft were setting off for the Murray River. However, Gould's monograph of the Macropodidae had been completed in 1842 (Gould 1841-42). During June and July 1839,

Gould visited the 'Murray scrubs' (i.e. a region supporting mallee vegetation) between the Mt Lofty Ranges and the lower Murray River in South Australia, an area only about 240 km west-south-west of Mondellimin, and with a similar climate and vegetation. During this field excursion Gould collected some 40 specimens of quadrupeds (Tree 2003) and his monograph on the Macropodidae (Gould 1841-42) included all the species subsequently recorded by the Blandowski Expedition. The first seven parts of *Mammals of Australia* (Gould 1845-1863), which were published before the Expedition and therefore were available to Blandowski and Krefft, contain plates 1-105 (there being 15 plates to each part (Sauer 1982: 61)). These cover all the monotremes and marsupials except for some of the Potoroidae, but the Potoroidae had already been covered in Gould (1841-42). Thus, while the Expedition did not have the benefit of



Fig. 9. Gerard Krefft. Tillikin – lesser stick-nest rat. *Leporillus apicalis*. Watercolour and ink on paper, c.1857. Mitchell Library, State Library of New South Wales Collection.

Gould's coverage of the eutherian mammals, it seems reasonable to assume that Blandowski and Krefft had seen Gould's text and illustrations on the monotremes and almost all of the marsupials known to science at the time.

Contribution to understanding of mammal declines

The mammalian fauna recorded by Blandowski and Krefft bears little resemblance to that recorded in modern times (Wakefield 1966a,b; Simpson 1973; Bennett et al. 1989, 2006; Robertson et al. 1989; Dickman et al. 1993; Val et al. 2001). The mid-sized (100 g – 5 kg), ground-dwelling mammals recorded during the Expedition have almost entirely disappeared (19 out of 25 species). These declines occurred in waves from south to north and from east to west, beginning in the 1850s in inland south-eastern Australia and continuing until the 1940s and 1950s in the western deserts (Burbidge et al. 1988; Johnson 2006).

Establishment of livestock grazing in the Murrumbidgee region began in 1847, marking the beginning of the end of effective Aboriginal occupation of the land and the beginning of environmental changes induced by European pastoralism and, later, agriculture

(Allen 1983, White et al. 2003). By 1851 pastoral holdings extended along the entire length of the Murray River in north-western Victoria (Kenyon 1914-1915), though little is known about stocking rates and continuity of occupation.

Fortuitously, the Blandowski Expedition arrived just in time to record the pre-European mammal community before it collapsed in the face of changing land use. Three characteristics of the Blandowski Expedition were responsible for its success at documenting the mammal fauna;

1. the timing of the Expedition to be within 10 years of the occupation of land by European pastoralists and before the extirpation of many species – in few other cases was a scientific expedition on hand to document the declines as they were beginning,
2. the duration of its stay at Mondellimin (8-9 months) allowing time to collect rare and cryptic species, and
3. the utilisation of aboriginal people to collect specimens, thus benefiting from their superior knowledge of the mammals present and how best to capture them (for example see Fig. 4).

Thus, the results of the Expedition are worthy of examination for insights into the timing, nature and

causes of the decline of the small- to mid-sized mammalian fauna.

The specimens collected and the comments by Krefft on the changing status of some taxa (see Table 4), indicate that:

1. the mammal declines in north-western Victoria and south-western New South Wales involved about 38% of the total mammal fauna (23 taxa are considered to have declined significantly in the region (Table 3), total mammal fauna includes the 34 species recorded by the Expedition (Table 2) plus the 26 species now known from the region that were not recorded by the Expedition (Table 5)).
2. the declines began remarkably early – within 5-9 years of the first arrival of European squatters with their sheep, cattle and horses, and long before the development of intensive pastoralism, including the provision of artificial watering points away from the river floodplain, or the physical removal of vegetation to plant crops (Allen 1983; Bennett et al. 1989).
3. the declines were well underway before the arrival in the area of the European rabbit *Oryctolagus cuniculus* Linnaeus, 1758 (1870s) or red fox *Vulpes vulpes* Linnaeus, 1758 (1890s) (Allen 1983; Bennett et al. 1989).

In recent decades attention has focused on trying to explain the catastrophic levels of decline and extinction in the small- to medium-sized mammal communities of arid and semi-arid southern Australia (Burbidge & McKenzie 1989; Bennett et al. 1989; Dickman et al. 1993; Lunney 2001; Johnson 2006). The timing and geographic location of the Blandowski Expedition was ideal to document the beginning of this phenomenon. Indeed, Krefft (1866a) noted that five species had declined or disappeared completely from the southern side of the Murray River where occupation by pastoralists was most advanced (*Chaeropus ecaudatus*, *Macrotis lagotis*, *Bettongia lesueur*, *Leporillus apicalis* and greater stick-nest rat *L. conditor*). He even provided a possible cause of these declines for three species (*C. ecaudatus*, *B. lesueur*, *L. conditor*) – in each case stating that on the southern side of the Murray River they have ‘already retreated before the herds of sheep and cattle’, or words to that effect.

The postulated causes of these population declines (reviewed and discussed by Dickman et al. (1993) and Johnson (2006)) are: introduced predators (house cat *Felis catus* Linnaeus, 1758 and *Vulpes vulpes*), introduced stock, other introduced

herbivores (notably *Oryctolagus cuniculus*), clearing of vegetation (mostly the tree layer), human persecution (including mortality associated with rabbit control programs), changed fire regimes (as Aboriginal people ceased to lead their traditional lifestyles) resulting in loss of habitat complexity, and combinations of these six factors. Another suggestion is that some species were already in decline before European occupation of the region (without a cause being postulated). In any given area over the course of the waves of mammal decline, it is probable that several of these possible causes played a role, however, if conservation and potential re-introduction programmes are to succeed it is important to elucidate the initial trigger of the declines, and whether there was a succession of important triggers.

The area covered by the Blandowski Expedition lies close to the south-eastern distributional limits of the species that underwent the most drastic declines, being on the south-eastern edge of Australia’s arid zone. This could suggest that the habitat in this area may have been sub-optimal for arid-adapted species and that they may have occurred at low population densities even before the arrival of Europeans, and were therefore particularly susceptible to environmental change. One potential means of assessing the relative abundance of species at the time of the Expedition is to compare the number of specimens collected (Table 2) with the subsequent fate of the taxon in the region (Table 3). This comparison indicates that many of the species that declined the most (Table 3) were amongst the most frequently collected, for example, *Leporillus apicalis* (96 specimens), *Onychogalea fraenata* (66), *Isodon sp* (62), *Bettongia lesueur* (43), eastern hare wallaby *Lagorchestes leporides* (41), and woylie *Bettongia penicillata* (28). Whilst acknowledging the biases in museum collecting, these data strongly suggest that some of the taxa that underwent rapid population declines in this region were at least locally common at the time of the Expedition.

A major difficulty in explaining the observed declines is the timing of their beginning in south-eastern Australia relative to the imposition of the threatening processes listed above (Allen 1983; Dickman et al. 1993). In all cases where information about the timing of the first declines is available, it is apparent that they began before the invasion of the area by rabbits or foxes. In most cases the declines were also noted to begin within a few years of occupation of the area by European pastoralists, before livestock numbers peaked and before artificial wa-

Table 5. Mammal species that were not recorded during the Blandowski Expedition's stay at Mondellimin but, based on present day distributions and habitat preferences, could be expected to have occurred in the area covered by the Expedition at that time (sources: Marlow 1958; Wakefield 1966b; Menkhorst 1996a; Robinson et al. 2000a; Val et al. 2001; Bennett et al. 2006). Taxonomy and nomenclature follow Menkhorst and Knight (2004).

Scientific name	Common name
Subclass Marsupialia	
Family Dasyuridae	
<i>Ningaui yvonneae</i> Kitchener, Stoddart & Henry, 1983	Mallee ningau
<i>Planigale gilesi</i> Aitken, 1972	Gile's planigale
<i>Planigale tenuirostris</i> Troughton, 1928	Narrow-nosed planigale
<i>Sminthopsis macroura</i> (Gould, 1845)	Stripe-faced dunnart
Family Burramyidae	
<i>Cercartetus concinnus</i> (Gould, 1845)	Western pygmy possum
<i>Cercartetus lepidus</i> (Thomas, 1888)	Little pygmy possum
Family Acrobatidae	
<i>Acrobates pygmaeus</i> (Shaw, 1794)	Feathertail glider
Family Macropodidae	
<i>Macropus robustus</i> Gould, 1841	Euro
Subclass Eutheria	
Family Emballonuridae	
<i>Saccolaimus flaviventris</i> (Peters, 1867)	Yellow-bellied sheathtail bat
Family Molossidae	
<i>Mormopterus sp.</i>	Southern freetail bat
<i>Mormopterus sp.</i>	Inland freetail bat
<i>Mormopterus sp.</i>	Eastern freetail bat
<i>Tadarida australis</i> (Gray, 1838)	White-striped freetail bat
Family Vespertilionidae	
<i>Chalinolobus gouldii</i> (Gray, 1841)	Gould's wattled bat
<i>Chalinolobus picatus</i> (Gould, 1852)	Little pied bat
<i>Myotis macropus</i> (Gould, 1855)	Southern myotis
<i>Nyctophilus gouldi</i> Tomes, 1858	Gould's long-eared bat
<i>Nyctophilus timoriensis</i> (Geoffroy, 1806)	Greater long-eared bat
<i>Scotorepens balstoni</i> (Thomas, 1906)	Inland broad-nosed bat
<i>Scotorepens greyii</i> (Gray, 1843)	Little broad-nosed bat
<i>Vespadelus baverstocki</i> Kitchener, Jones & Caputi, 1987	Inland forest bat
<i>Vespadelus regulus</i> (Thomas, 1906)	Southern forest bat
<i>Vespadelus darlingtoni</i> (Allan, 1933)	Large forest bat
<i>Vespadelus vulturinus</i> (Thomas, 1914)	Little forest bat
Family Muridae	
<i>Pseudomys apodemoides</i> Finlayson, 1932	Silky mouse
<i>Pseudomys australis</i> Gray, 1832	Plains mouse

tering points allowed livestock to be grazed far from surface water, thereby limiting the immediate ecological damage caused by livestock (reduction in field layer vegetation, erosion of topsoil) to the better-watered country. This situation persisted until the

late 1870s in the Murray-Darling region when a series of waterworks trusts were established to construct bores, channels and dams (White et al. 2003).

Allen (1983) argued that changes to the fire/grazing/fuel regime following the breakdown of the tradi-

tional aboriginal lifestyle are likely to have been the primary cause. In particular, he argues that the cessation of frequent, small-scale burns lit by the indigenous people would have resulted in reduced heterogeneity in floristic composition and structure, and a build up of fuel loads leading to less frequent but more intense and broad-scale fires, further reducing heterogeneity. Allen (1983) postulates that this effect resulted in the replacement of a floristically rich mosaic of grass, herb and scrub patches with a more uniform sward of pioneer grasses and herbs, which was subsequently invaded by woody shrubs and *Calitris* scrub, reducing the diversity and continuity of food for terrestrial herbivorous mammals. The quality of shelter provided by these altered vegetation communities may also have disadvantaged mammals that sheltered on the ground, including most bandicoots and smaller (<6 kg) macropodoids (except *Macrotis lagotis* and *Bettongia lesueur* which construct burrows and warrens respectively). While this vegetation mosaic hypothesis seems plausible, it struggles to account for the rapidity of the mammal declines. It does not allow for a time lag of some years that would seem to be required before a fine-scale vegetation mosaic induced by aboriginal burning could be converted to a coarse mosaic induced by vegetation succession or extensive wildfires. It also assumes that Aboriginal people applied a fine-scale fire regime in this part of Australia, but there is scant information about actual Aboriginal fire regimes in the region (White et al. 2003) and little evidence of the broad-scale application of any particular burning regime.

The rapid onset of the declines would seem to rule out all the postulated causes except predation by the feral house cat (Dickman et al. 1993; Johnson 2006). Dickman et al. (1993) argued that predation by feral house cats may have been a significant factor in the decline of up to ten mammal species in western New South Wales, claiming that feral cats were 'almost certainly present in western New South Wales in the early nineteenth century'.

Johnson (2006) also places great importance on the role of feral house cats, arguing convincingly that they are highly effective predators of medium-sized, active, ground-dwelling mammals, particularly in open habitats such as those in arid and semi-arid environments. Johnson (2006) provides a theoretical model for the development of hyper-predation by cats in association with high populations of introduced prey – rabbits and rodents, but this model only applies in the presence of cats and abundant prey species which undergo wide population fluctuations.

In support of the cat predation hypothesis is the suite of species which declined earliest in semi-arid south-eastern Australia. These were the larger rodents (e.g. *Conilurus albipes* (200 g), *Leporillus apicalis* (150 g), *L. conditor* (200–450 g)), bandicoots (*Chaeropus ecaudatus* (200 g), *Perameles bougainville* (200–250 g), *Isodon sp* (300 g)) and small macropodoids (*Bettongia penicillata* (to 1.6 kg), *B. lesueur* (to 1.6 kg), *Lagorchestes leporides* (weight not recorded)). Each of these species would have been ideal prey for cats which can hunt day and night, can stalk animals in surface nests, or sit and wait for animals to emerge from burrows or stick-nests, and can handle mammals weighing up to 1.6 kg (Johnson 2006).

However, Dickman et al. (1993) provide no firm evidence for their assumption that cats were present in western New South Wales in the early nineteenth century, and Abbott (2002), in an exhaustive review, found no records of their presence in western New South Wales before the 1880s – the first was at Tongo Station, where they were deliberately introduced in large numbers to control rabbits, that is, their deliberate introduction came after rabbits, not before. Abbott (2002) also concluded that where cats were present there is little reason to assume a dramatic impact on native mammals.

Tellingly, the records of the Blandowski Expedition provide no evidence that feral house cats were present in the lower Murray-Darling region in 1857. Had they been, it seems unlikely that Krefft would not have learned of them from his Aboriginal informants, or that he would not have commented on their presence, particularly when speculating on likely causes of the declines of small and medium-sized mammals.

Therefore, the somewhat ironic result is that the fortuitous timing of the Blandowski Expedition to coincide with the beginnings of the mammalian community collapse in the Murray-Darling region has not delivered the insights that one might have hoped. It has alerted us to what has been lost, but has not thrown much light on the initial causes of the declines. The timing issue remains the most serious problem with the current hypotheses for explaining the almost complete loss of the small- to medium-sized mammal fauna across most of low rainfall southern Australia. In particular, the findings of the Blandowski Expedition provide no support for the cat predation hypothesis, but neither do they directly discount it.

Perhaps Krefft was correct in ascribing the declines to the ecological damage set in train by grazing of livestock (as persuasively argued by Lunney (2001)

for later decades in western New South Wales). Presumably, grazing pressure would have been concentrated initially in the most productive patches within the landscape, the riverine floodplains. Concentration of livestock on the limited floodplain areas within watering distance of the rivers would have exacerbated ecological damage even in the absence of great numbers of livestock. It is likely that the vulnerable native mammal species were also reliant upon these resource-rich patches, especially during dry periods (Morton 1990). If so, it seems plausible that the native mammals were unable to survive the changes to vegetation communities and soil caused by concentrations of livestock. What does seem surprising, however, is the rapidity of changes to field layer vegetation, topsoil and primary productivity that is necessary to explain the observed declines – significant and widespread effects within 5–10 years of the arrival of European pastoralists and their livestock. However, we should not underestimate the rapid increase in stocking rates – Curr (1883) provides detailed observations of changes to vegetation structure and floristics that took place in the vicinity of Mt Hope (west of Gunbower) in 1851, within a few years of European occupation – the rapid replacement of saltbush shrubland and succulent herbfield with grassland and weeds. ‘With this class of vegetation [saltbush shrubland probably dominated by *Atriplex mummularia* (Lindl., 1848) or *Chenopodium nitrariceum* (F. Muell., 1858) (White et al. 2003)] great changes have occurred and at Mt Hope (as in country generally in which it grew), stocking has almost entirely destroyed it. The pig’s face [probably *Disphyma crassifolium* (Linnaeus, 1753)], once general in that country, has also disappeared, a luxuriant growth of grass having taken its place. The same might be said of cotton bush and other plants.’

Kreffit (n.d.a), whilst in the same area (the Patho Plains) in January 1857, refers to ‘thousands of cattle’ coming to drink at a creek ‘and every blade of grass had been trampled down along the banks of this creek’.

POSTSCRIPT

The implausible fate of Wilhelm Blandowski upon his return to Melbourne is well told by Paszkowski (1967, 1969), Allen (2001, 2006) and Humphries (2003). Threatened with legal action by the Victorian Government over the ownership of the Expedition notebooks and illustrations (Allen 2006), Blandowski

sailed from Melbourne on 17 March 1859 for Hamburg and his native Silesia, a sad ending to what could have been a brilliant zoological career in the new and wealthy colony of Victoria. The loss of many of the expedition notebooks, specimens and illustrations during this unfortunate episode is also a great loss to Victoria’s limited historical zoological heritage. Thankfully, many of Krefft’s historically important and beautiful illustrations from the Expedition have survived in the Blandowski Collection, Museum für Naturkunde, Humboldt Universität, Berlin, and a selection are reproduced here for the first time.

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NOTES

1. After many decades of uncertainty, it is now generally agreed, based on investigations by members of the Merbein Historical Society (H. Allen pers. com.) (see also Peake n.d.), that the locality of Mondellimin is the site now known as Chaffey Landing, Merbein, Victoria, some 16.5 km east of the confluence of the Murray and Darling Rivers.
2. In his relations with the indigenous people, and recognition of their deep knowledge of the natural world and ability to survive in it, Blandowski was far ahead of some of his contemporaries. For example, three years after the Blandowski Expedition returned to Melbourne Robert O’Hara Burke led the second (and last) major Expedition sponsored by the Philosophical Institute and the Victorian Government, with disastrous results – Burke’s sense of superiority over aboriginal people led him and Wills to starve to death at Coopers Creek, an area where aboriginal people had lived for thousands of years, rather than accept their help or learn from their example (Murgatroyd 2002). In his report to the Philosophical Institute, Blandowski (1857) exhibits a considerable interest in the customs of the indigenous people and expresses considerable concern about the ‘extermination’ of the communities along the lower Murray River.

3. Unfortunately, Krefft's unpublished diary covers only the first three months of the outward journey (to Lake Boga, reached in early March 1857) and was probably completed, or written entirely, after about September 1857 (Wakefield 1966a).

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