

AUSTRALIAN NATURAL HISTORY



SESQUICENTENARY
SPECIAL ISSUE

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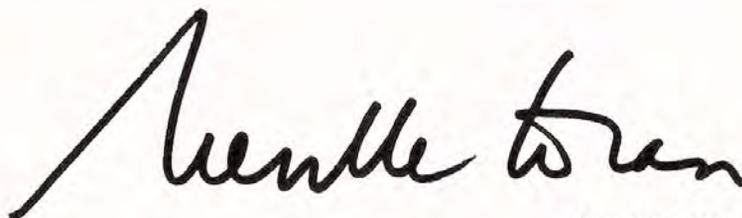
Ludwig Bechmann

150 YEARS

In March, 1827, the colonial authorities in New South Wales formally established the institution which was soon to be known as The Australian Museum. Since that time, The Australian Museum has grown to become one of the world's leading natural history museums, serving not only the community of Sydney and New South Wales, but that of the entire Pacific region.

In this special sesquicentenary issue of *Australian Natural History*, a group of distinguished scientists trace the development of the natural sciences in Australia, to which The Australian Museum has made significant contributions. The issue includes an appraisal by the Museum's Director, Dr. D.J.G. Griffin, of the changing role of the natural history museum and the many ways in which it can contribute to the scientific and educational life of the community.

It is with great pleasure that I offer anniversary congratulations to The Australian Museum and I am confident that it will continue to make outstanding contributions to a better understanding of the changing world in which we live.

A handwritten signature in black ink, reading "Neville Wran". The signature is written in a cursive style with a large, sweeping initial 'N'.

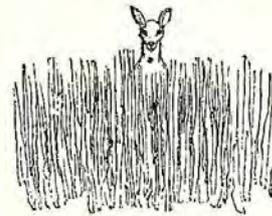
Neville Wran
Premier of New South Wales

AUSTRALIAN NATURAL HISTORY

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"When we had proceeded a few miles, the quick eye of the native distinguished the head of a kangaroo peeping at us over the long grass." From Mitchell's *Three Expeditions into the Interior of Eastern Australia*, Vol. 1, London, 1837.

COVER: *Border of the Mud Desert near Desolation Camp, March 9, 1861.* Water colour by Ludwig Becker, LaTrobe Collection, State Library of Victoria. (Photo: E. Rotherham)

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Map of the world by Ortelius, 1570. The three unknown islands, *Beach*, *Lucach* and *Maletur*, written of by Marco Polo, have become transposed into Ptolemy's *Terra Australis Ignota*.

About 350 BC, a Greek author, Theopompus, wrote a fascinating story in which "Selenus told Midas of certain islands named Europa, Asia and Libia, which the Ocean Sea circumscribes and compasses round about, and outside this world is a continent or parcel of dry land which in greatness is infinite and immeasurable ... with green meadows and pasture plots ... big and mighty beasts", and gigantic men who "in the same climate exceed the stature of us twice" and where there are "many and diverse cities, its laws and ordinances clean contrary to ours." This idea of a Utopia of the South was to play a profound part in the discovery of Australia some 2000 years later.

Aristotle (384-322 BC) and other Greek scientists had clearly recognized that the Earth was a sphere and Eratosthenes (c. 275-195 BC) actually measured the Earth's circumference. So it is not surprising to see Greek maps of the world drawn on parts of a sphere. They also recognized that there were well defined climatic zones in the northern hemisphere which exerted a strong control on the distribution of population. But travel was bounded by the tropics, and the south was unknown. Even the geography of Africa faded into speculation before the equator was reached. Carthaginian sailors had returned from Sierra Leone with stories of "wild men and women covered with hair called gorillas", there were scorching winds from the Sahara and thick fogs and dust on the African coast. The tropical region was clearly an eternal barrier to human travel.

However, the Greek feeling for symmetry suggested that in the southern part of the Earthly sphere there must also be a zone of temperate climate with a continent as great as the known world where, because "nature loves life", there must be populous nations, like and unlike those of the north.

Pomponius Mela, writing about 50 AD, suggested that the Nile might have its source in the unknown South land, and that it flowed by a subterranean channel beneath the Ocean Sea, coming to the surface in Africa. But about the people of the South says

Mela, "We know nothing, for between us and them there intervenes a burning zone which is impossible to cross", and Pliny echoed this idea that the tropic seas are "burnt and cremated by flames, scorched by the near sun".

European knowledge of Asia also stopped in the tropics with little known of India and Ceylon until the time of Claudius Ptolemy of Alexandria, about 150 AD. Ptolemy understood the need for accurate maps and was helped by the growing knowledge gathered by sailors and traders. It seems certain he had some knowledge of the Malay Peninsula and heard rumours of the string of islands beyond it (possibly compressed by talk into a single continental mass). While Mela had believed much of the unknown Earth consisted of water, Ptolemy postulated that the unknown was land. However the time was not ripe for Europeans to investigate this problem further.

The mediaeval world accepted the knowledge which had been gathered by the ancients but it was interested in other matters. For the next thousand years man was more concerned with the soul and his own surroundings. Furthermore Europe was threatened by waves of invading hordes from the north, east and south.

There were at times some theological difficulties with the idea of a populated antipodes cut off from Europe. How could the people be descended through Noah from Adam? Did they have a separate atonement? Fantastical ideas came into vogue—beyond China there were thought to be "tribes who had their feet turned backwards, with eight toes on each", others who had dogs' heads and talons for fingers and "barked for speech"; others had "feet so huge they could use them for shade against the sun". Perhaps Indicopleustes' map of the fifth century showing a watery southern hemisphere was a good tactical solution for the time!

However, by the time of Albertus Magnus and Roger Bacon in the thirteenth century, we find the scholars once again accepting the idea of a southern land inhabited by people similar to those in Europe. In

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TERRA AUSTRALIS INCOGNITA

BY D.F. BRANAGAN

the fifteenth century, Rainaud wrote of a Utopia in the South and of its "towns, castles and empires". "These unknown nations are called the Antipodes, like us they have plants and animals and fight great battles". Rainaud's ideas had some basis in fact and about that time traders were gradually penetrating the tropics. In 1455 a Venetian merchant, Alvise da Cà da Mosto, explored the Senegal coast where he noted that the brown people to the north were separated from the black people to the south by a large river which also separated 'the dry and arid land [the Sahara] from the fertile country of the blacks'. He expressed astonishment that the southern region, in the tropics, was endowed with a variety of natural resources and a vigorous population whereas, according to theory, it should be uninhabited on account of the great heat.

Australia is unique among the continents in that it was imagined centuries prior to its actual discovery. The theory of a great southern land balancing the northern continents persisted down through the centuries, the unknown continent gradually shrinking in size as the voyages of successive navigators pushed its boundaries further southward. Even with the discovery of Australia there still remained the enigma of Antarctica, which was not solved till well into the nineteenth century.

Following the rounding of the Cape of Good Hope and the discovery of America, the belief in a Great South Land ceased to be merely a speculation for scholars but was eagerly sought by adventurers, who hoped to find a new El Dorado.

It is interesting that most map makers up till the eighteenth century show a continuous land mass stretching across the base of their maps. However, despite the fact that some such maps show land where Australia is, there is little solid evidence that Australia was known to Europeans prior to 1606.

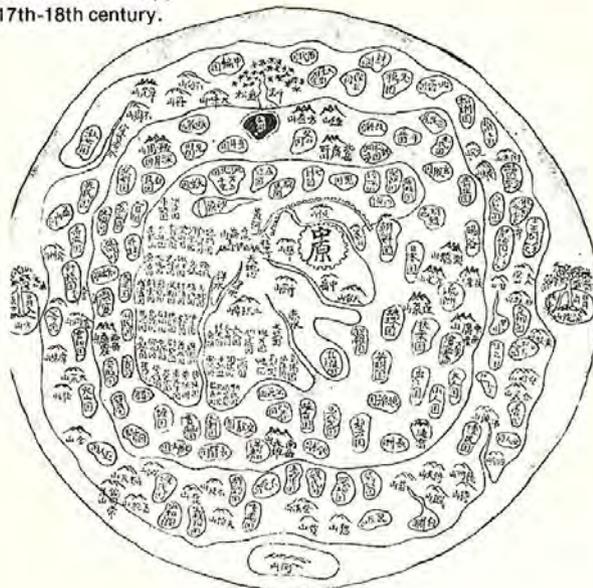
For nearly two hundred years after its discovery no inland features are shown on maps of Australia and there are many variations of the coastline.

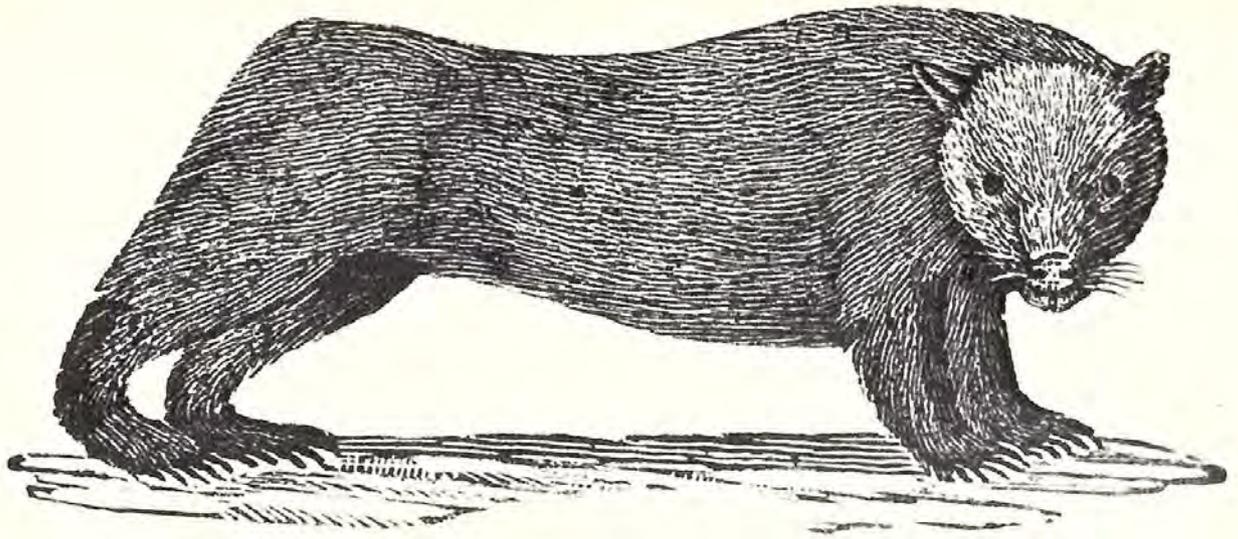
In the real search for Australia there were essentially three waves of European exploration: (i) the Spanish voyages in the sixteenth and seventeenth centuries, (ii) voyages by the Dutch in the seventeenth



Arabic zonal world map, copied from that of Idrisi of 1154, with curved parallels.

Korean world map, 17th-18th century.





'The Wombach' (wombat) from *A General History of Quadrupeds*, by T. Bewick, Newcastle-Upon-Tyne, 1800.

century and (iii) French and English expeditions in the late eighteenth century. The Spanish and Dutch voyages had essentially different purposes. While the Spanish adventurers were seeking gold and other precious goods, they earnestly combined this search with the hope of the peaceful conversion of infidels to Christianity. The Dutch expeditions, on the other hand, were essentially for practical purposes, designed to make their East Indies colonies more efficient and profitable.

There were of course several much earlier waves of invaders of the silent land. These were the colonising aborigines who first reached northern Australia 50,000 years or more ago. No doubt the curious fauna of Australia (and its flora too) was surprising to these people. Their legends and drawings tell us something of their interest in the various creatures they met, possibly even including the last of the giant marsupials which once roamed this land. But that is another story.

What impact did the Australian creatures make on the first Europeans who visited these shores? Did the reality live up to the centuries-old legends of Terra Australis?

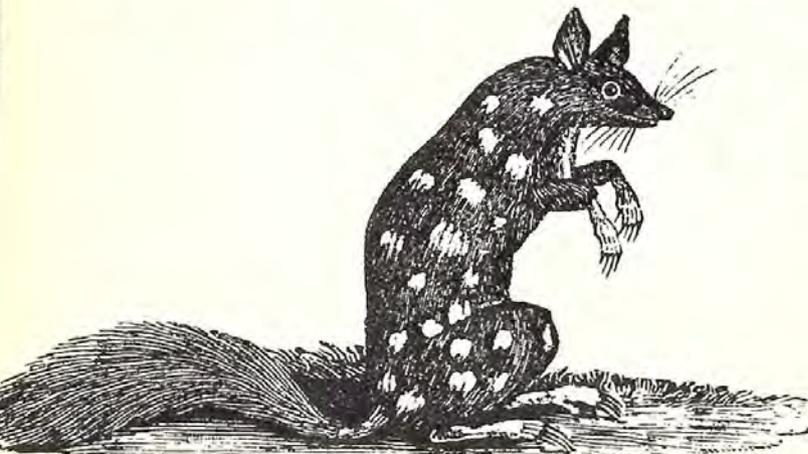
A map of 1593 shows a mythical land roughly in the

position of northeastern Australia. The interior of the country is embellished with pictures of a dragon, a lion, a serpent and a hunter armed with bow and arrow. On the nearby sea are several nondescript sea monsters. These creatures were far removed from the first truly Australian animals which were observed in the Gulf of Carpentaria by Luis Vaez de Torres and Diego Prado in September 1606. Appropriately enough, they saw white pigeons and troublesome flies! Prado wrote "we reached a flat island with good bottom where we anchored and found plenty of very large pigeons all white and trees of plums they call of Nicaragua. They have big stones and little flesh. The whole island was full of pumice stones and seems to have had a volcano in former times". The pigeon referred to is the Torres Strait Pigeon (*Myristicivora spilorrhoea*) which still flies in great flocks between the islands and the mainland. A little later they anchored between two islands to take in water; "so great was the number of flies they call cantharides that it seemed as if they wanted to eat the men up". G.P. Whitley thought that these first mentioned Australian insects were Bush Flies (*Musca vetustissima*) which worried many explorers and still harass us today.

However, despite these observations and those of Carstens, Tasman, Dampier and others, Coronelli's map of Australia published in 1696 shows deer and an elephant—the latter being ridden by its native keeper!

But more interesting creatures than mere deer and elephants had been found already. Francis Pelsaert, wrecked at Houtman's Abrolhos Islands off the coast of Western Australia in 1629 suffered as Torres and Prado had done from "such a host of flies, which came to sit in the mouth and the eyes, that they could not be beaten off" but, despite the discomfort, gave us the first description of Australian marsupials. "On these islands there are large number of cats, which are creatures of miraculous form, as big as a hare; the head is similar to that of a Civet cat, the fore-paws are very short, about a finger long. Where on there are five small nails, or small fingers, as an ape's

'The Spotted Oposum of New South Wales' (Eastern Native Cat) from *A General History of Quadrupeds*, by T. Bewick, Newcastle-Upon-Tyne, 1800.



forepaw, and the 2 hind legs are at least half an ell long [about 30cm] they run on the flat of the joint of the leg, so that they are not quick in running. The tail is very long, the same as a Meerkat [lemur]; if they are going to eat they sit on their hind legs and take the food in the forepaws and eat exactly the same as the squirrels or apes do.

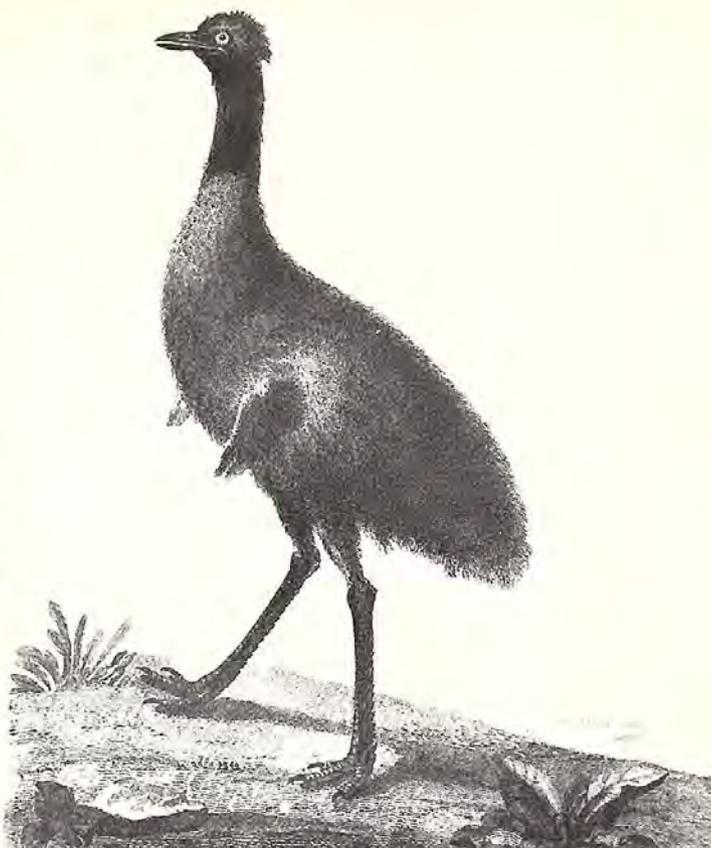
"Their generation or procreation is very Miraculous, Yea worthy to note; under the belly the females have a pouch into which one can put a hand, and in that she has her nipples, where have discovered that in there their Young Grow with the nipple in mouth, and have found lying in it [the pouch] some which were only as large as a bean, but found the limbs of the small beast to be entirely in proportion, so that it is certain that they grow there at the nipple of the mammal and draw the food out of it until they are big and can run. Even though when they are very big they still creep into the pouch when chased and the mother runs off with them!"

This is a very accurate description of the Dama Wallaby or pademelon (*Thylogale eugenii binoe*) which is still abundant on the Abrolhos Islands. However it began one myth which persisted for three hundred years—the idea that the young marsupials were born at the nipples. This description was made a century and a half before Cook and Banks saw a kangaroo.

Other exciting finds continued to be made during the seventeenth and early eighteenth centuries including the fabulous black swan, the dingo, the goanna, the dugong and the huge termite nests of northern Australia with many exotic smaller creatures. The newly discovered land was certainly proving a continent of interest to the scientifically-minded men of Europe, even if it offered little to attract the merchants.

Although we might have expected the old explorers to have populated Australia with fabulous beasts (and there are occasional such descriptive touches), in general their reports were factual and sober, and we can in many cases identify their species precisely.

The zoological records of Australia can be traced back over three hundred and sixty years, and nearly



one hundred different species were observed before Cook's voyage. Between 1606 and 1769 eight species of mammals, forty of birds, eight reptiles, twenty-three fishes, three insects, three crustaceans and twelve molluscs had been described, not to mention corals and sea-eggs.

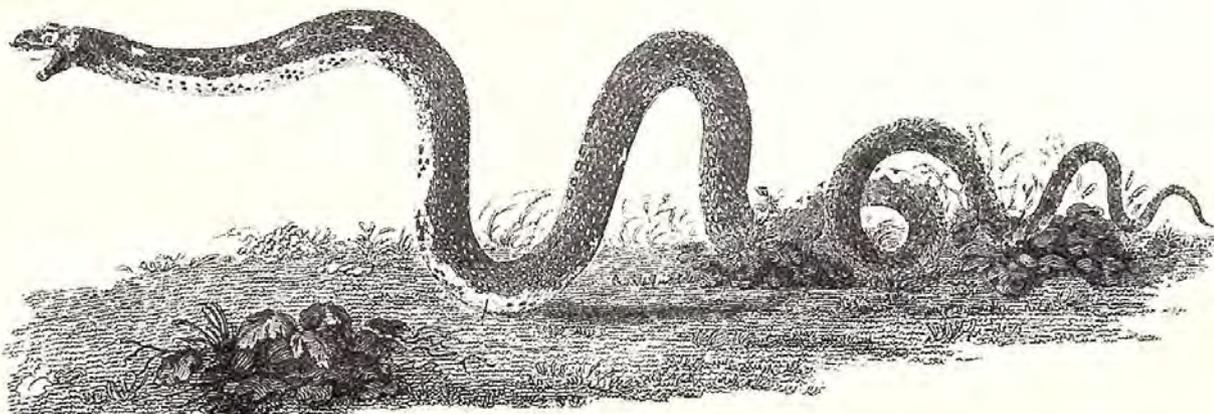
A coloured lithograph of a cassowary from *Journal of a Voyage to New South Wales*, by John White, London 1789.

Terra Australis Cognita indeed!

FURTHER READING

- Cameron, Ian *Antarctica, the Last Continent*; Cassell & Co, London, 1974.
 Parry, J.H. *The Discovery of the Sea*; The Dial Press, New York, 1974.
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 Whitley, Gilbert P. *More Early History of Australian Zoology*; Royal Zoological Society of New South Wales, 1975.
 Wood, G. Arnold *The Discovery of Australia* (Revised by J.C. Beaglehole, 1967); MacMillan of Australia, Melbourne, 1969.

Snake No. 5 (nondescript) a coloured lithograph from *Journal of a Voyage to New South Wales*, by John White, London, 1789.





A watercolour portrait of Captain James Cook. The back of this painting is signed 'RS 1813' and is from the Dance Group collection in the Mitchell Library, Sydney.

A 1789 engraving of Sir Joseph Banks, from the Mitchell Library, Sydney.



Strange objects have always excited the human imagination. Australian Aborigines collected tektites. A shell collection found at Pompeii included specimens from the Indo-Pacific region. Similarly, patterned shells from foreign shores enhanced the treasure chambers of noble families and the cabinets of wealthy citizens in Renaissance Europe. From these often bizarre accumulations, modern scientific collections have evolved. 'Cabinet' collections contained such curiosities as ancient coins, carved gems, bone fragments from 'sea monsters' and 'giants', jumbled together with items today catalogued as natural history specimens: desiccated fish, mummified crocodiles, narwhal tusks and skins of exotic animals. Collections became, in fact, a stimulus to thought, generating such works as Nehemiah Grew's descriptive *Musaeum regalis societatis* of 1681. From such beginnings, when the only natural objects included were those considered rare or fabulous, there was a gradual transition to the period when workers such as Linnaeus and Fabricius used collections to generate classifications.

Carl Linnaeus' first edition of *Species Plantarum* (1753) included only two specimens of Australian plants, collected fortuitously by William Dampier at Shark Bay in 1699. The first extensive natural history collections from the Pacific became known to European scientists as a result of the three voyages of James Cook (1768-71, 1772-75, 1776-80).

The journeys of Linnaeus in Lapland and Finland in 1732 and the field studies of the Swiss botanist Heller stimulated interest in the new science of plant collecting and classification. Linnaeus' disciples travelled farther afield: to the Russias, the Near East, India, China, South America and the Pacific. It was the generation of students emulating their master Linnaeus who established the fashion for scientific botanical exploration, which profoundly influenced the future course of Pacific exploration. Two pupils in fact accompanied Cook: Daniel Solander on the first voyage and Andreus Sparrman on the second. Another, the Danish entomologist J.C. Fabricius, who was visiting Edinburgh in 1767, travelled to London to meet Banks and Solander and took a great interest in the preparations for the Pacific voyage.

The popular modern belief that Joseph Banks was merely an amateur scientist, a wealthy dilettante, is far from accurate. His qualifications for inclusion in the *Endeavour* expedition are impressive. After matriculating, this seventeen-year-old grandson of a

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VOYAGES OF DISCOVERY

BY RICHARD BARWICK

wealthy and well-connected land owner originally enrolled at Oxford but, finding that the professor of botany did no active teaching, he engaged a private tutor from Cambridge. In addition to formal instruction from Israel Lyons (also an able astronomer), he acquired much practical and theoretical knowledge from Philip Miller, gardener at the Chelsea Physic Garden adjacent to the London home of Banks' mother. From Miller he certainly learnt the currently accepted methods of collecting exotic plants and the most successful techniques for transporting and propagating them in a new environment. Such skills were of great benefit when Banks later directed the Royal Botanic Gardens at Kew.

Banks also had previous expedition experience. Influenced, perhaps inspired, by the work of Linnaeus and his students, certainly advised by Daniel Solander whom he had met in 1765, the twenty-three-year-old Banks had equipped himself to undertake botanical and zoological collecting on a voyage to Labrador and Newfoundland aboard the naval vessel *Niger* in 1766. Dr. Averil Lysaght's excellent study suggests that Banks might possibly have met Cook for the first time at Chateau Bay, Newfoundland, in early October 1766. In a sense, both the naturalist and the naval surveyor completed their apprenticeships in Newfoundland.

Cook's voyages of exploration of course had some political aims, but the main scientific intent was astronomical observation. The Royal Society of London was eager to obtain observations in southern latitudes of the 1769 transit of Venus. The natural history studies of Banks' party were then considered of secondary importance. Beaglehole has commented that "Banks created the officially recognised and supported science on the British voyages, by simply breaking in at his own expense". Banks is known to have had an income of £6000 a year; Solander estimated that he spent as much as £10,000 on the first voyage alone.

Historians agree that Cook achieved all his objectives, delivering the scientists to Tahiti in good time and meticulously carrying out methodical surveys of the coasts of New Zealand and Australia. But the historical value of the scientific studies undertaken on the first voyage is more difficult to assess. The astronomical observations were not wholly satisfactory, although the final calculations stand up well, and the planned studies of the massive collections of natural history materials were never completed for publication.

Accommodation on the 97-foot (29.5m) converted collier *Endeavour* was certainly cramped, despite the

extension of cabin space. For this lengthy voyage she carried vast quantities of baggage, food and scientific equipment, plus a crew of seventy (nearly triple the normal number) and the 'supercargo' of eleven: five servants, the astronomer Charles Green, Joseph Banks, the botanists Daniel Solander and Herman Spöring, landscape painter Alexander Buchan, and the illustrator Sydney Parkinson, who died between Batavia and the Cape of Good Hope on the ghastly return journey.

The naturalist John Ellis, writing to Linnaeus a week before the *Endeavour* sailed in 1768, provides a contemporary account of the equipment carried: "...No people ever went to sea better fitted out for the purpose of Natural History, nor more elegantly. They have got a fine library on Natural History; they have all sorts of machines for catching and preserving insects; all kinds of nets, trawls and drags and hooks for coral fishing; they have even a curious contrivance of a telescope, by which, put into the water, you can see the bottom to a great depth, where it is clear. They have many cases of bottles with ground stoppers, of several sizes, to preserve animals in spirits. They have the several sorts of salts to surround the seeds; and wax, both beeswax and that of the *Myrica*; besides there are many people whose sole business it is to attend them for this very purpose."

The equipment was similar to that Banks had acquired for his *Niger* expedition, but on a greater scale. The *Niger* experience had also made Banks realize that artists must depict fresh specimens to record colours accurately. The specimens from his northern expedition had not been illustrated until his return: the plants by George Ehret (foremost botanical painter of the day), and some birds by Peter Paillou. Other birds, fishes and invertebrates had been painted by Sydney Parkinson, who had been introduced to Banks early in 1767. Parkinson's drawings of these birds are astonishingly accurate and lifelike, although the carcasses had been months in the spirit tub. In all, some two thousand Parkinson drawings survive (in the various departments of the British Museum), including about 1300 from the first Cook voyage.

Banks set new standards for scientific methods of collecting and recording. He experimented with paper and sand when pressing plants during the voyage, and took every opportunity ashore, as at Botany Bay and Endeavour River, to air and dry the specimens away from the damp of the ship. He found that "... our plants dry better in Paper Books than in Sand, with this precaution, that one person is intirely employed

in attending them who shifts them all once a day, exposes the Quires in which they are to the greatest heat of the sun and at night covers them most carefully ..."

The botanical and zoological materials from the Pacific voyages eclipsed all earlier study collections. The botanical collection from the first voyage alone included more than 1300 new species, classified in 110 new genera.

The well-prepared plant specimens were accompanied by detailed notes on the place of collection, the native name if ascertained, and even a suggestion for a suitable Linnaean category in the case of new species. Also available were the many pencil sketches or near-scale coloured wash drawings done by Parkinson when the plants were fresh. The new plants were extremely important scientifically: besides providing information for areas botanically unknown, they provide a record of the indigenous flora before introductions by European settlers.

The industrious Solander, who died in 1782, was engaged in many projects and spent much time helping the many scientists who visited Banks' herbarium and library. He completed an immense amount of work on the botanical materials, using his notes and the sketches of the botanical artists to compile catalogue descriptions, and had assisted Banks in supervising the engraving of 700 of the 800 plates for the intended volume. Under Solander's supervision artists laboured over many years to produce full-size coloured portraits based on the specimens and sketches. In 1785 Banks recorded that: "Nothing remains to be done except fully to work out the drawings still not finished and to record the synonyms from books which we did not have with us or which have come out since. All that is left is so little that it can be completed in two months, if only the engravers can come to put the finishing touches on it." The British Museum (Natural History) still possesses Solander's completed manuscripts, some marked for printing, yet none were published. The reasons for this are obscure. Stearns has suggested that Banks' apparent insistence on producing a prestigious

series of volumes "in keeping with the global character of the enterprise" in fact hindered publication of the eagerly-awaited botanical results, which might otherwise have been issued as parts in a less pretentious format. The nearly completed work descriptions, notes, field sketches, engravings and the specimens remained in Banks' house in Soho Square, available for inspection by other workers, but never were published for general reference. However, much of Solander's descriptive annotation was printed in the work of others: Linnaeus, Robert Brown, J.D. Hooker, Seeman and—unknowledged—by the less scrupulous Forsters.

The full wealth of the zoological specimens cannot now be determined since they were not catalogued or distributed in an orderly manner. Although no list exists of the animals brought back from the first voyage, Banks wrote with enthusiasm: "The number of natural productions discovered in this voyage is incredible; about one thousand species of plants that have not been described by any botanical author; five hundred fishes; as many birds; with insects, sea and land, innumerable." The Cook zoological specimens are of primary importance as 'type' material. 'Type specimens' are the objects upon which the original published description of a species is based. Most of the known Cook types are today in major museums and collections. The importance of the work of the artists of the expeditions is emphasised by the cases in which the actual specimens have long since perished and a drawing has become the 'type'.

The numbers of drawings made during the three voyages provide a clue to the extent of the zoological collections: 300 drawings (mostly fish) from the first voyage, 268 (139 of birds) from the second, and 115 (almost all birds) from the third voyage. Before his death interrupted the sorting and initial description, Solander was able to complete 27 manuscript volumes of diagnoses of the animal species for a projected new edition of *Systema Naturae*, and 512 pages of a manuscript describing animals found on the *Endeavour* voyage. Banks had less interest in this material and much of it was dispersed in an extraordinary manner. Dr. P.W.P. Whitehead, in a feat of modern scientific detection, has described what is known of the complicated dispersal of the Banks collection to scientists, private collections and museums, and the subsequent sales and transfers to public institutions and collectors throughout Europe. The scanty evidence available today supports the view that most if not all of the Banksian zoological collection was dispersed before Banks died. The many transactions, which even involved lotteries and auctions of collections, were rarely documented. Specimens were lost and labels were inevitably detached. Today the history and identity of many extant Cook zoological specimens cannot be certainly established.

Whitehead has commented that: "Poor preservation techniques and the loss of information about

The Waratah, *Telopea speciosissima* (formerly *Embothrium speciosissimum*), from a drawing by James Sowerby in Sir James E. Smith's *A Specimen of the Botany of New Holland*, 1793. These illustrations were produced from colour drawings sent from Sydney by John White to Thomas Wilson who passed them to Smith.



Photo: Richard Barwick



Photo: Heather McLennan/Australian Museum

specimens has resulted in nomenclatural problems of such complexity that zoologists have more than once regretted that the *Endeavour* was ever freed from the Great Barrier Reef". Yet he emphasises that the attendant problems are of little consequence compared to the overall stimulus that Captain Cook's three historic voyages gave to natural history. However some specimens, such as the shells, were of fashionable interest to both collectors and naturalists and, with some birds, insects and corals, were described in print by various authors in a piecemeal fashion. The great ornithologist John Latham (1740-1837) had access to the Banks collections and derived many bird descriptions from them for his *General synopsis of Birds* (1780-1785). Latham's much later second *Supplement* included descriptions and the vernacular names of Australian birds, some based on drawings done by artists of the first fleet—drawings which are now known as the 'Watling Drawings'.

The entomologist Johann Fabricius worked on the insect collections from Cook's voyages, making many visits to Banks from Denmark. Of the fifteen hundred new species he described in *Systema Entomologiae* (1775) some five hundred were Banksian specimens. Today, fifty drawers of insects from the Banks collection survive in the British Museum (Natural History).

Joseph Banks' interest and involvement in Australia continued throughout his life. He was an advisor to governments but never a member of government, preferring to use his influence backed up by his scientific knowledge and first-hand experience of the Pacific. His advocacy and involvement in the choice of Botany Bay for settlement was to extend to an unofficial role in support of successive governors—Phillip, Hunter, King and Bligh.

Banks' role as the scientific entrepreneur continued into the nineteenth century. In the late 1790s he had discussions with the Admiralty concerning an ex-

pedition to explore the interior of Australia. Governor Hunter supported the much more practical approach of a sea-based expedition that could take full advantage of the navigable rivers, bays and sounds. The revised plan led to the despatch of Mathew Flinders in HMS *Investigator* in 1801, accompanied by Robert Brown the botanist, the natural history artist Ferdinand Lucas Bauer, William Westall the landscape and figure painter, the gardener Peter Good, and John Allen a young miner charged with the responsibility "...to take specimens of all rocks and particularly of the contents of all mineral veins he meets with and bring them home."

The circumnavigation of Australia by Flinders between 1801 and 1804 resulted in the return of an immense collection. Banks recorded 38 cases of specimens in all, and Brown's plant specimens alone totalled 3900 species, and included 140 new genera and 1700 new species. Brown was also competent zoologically, for the number of zoological specimens exceeded three hundred and forty. To this record one must add the magnificent paintings made on the voyage, and in the years that followed, by Ferdinand Bauer.

The all pervading influence of Banks in the scientific study of the new colony was extended with his issue of clear instructions to ships' captains for collecting and preserving specimens. The systematic collection of Australian plants was begun in 1798 when Banks sent his own Kew-trained botanical collector George Caley. Caley explored progressively out from his depot at Parramatta enlisting the help of Aborigines. For ten years he despatched consignments of plants and animals to Kew. The continuing flow of sketches, paintings, botanical and zoological specimens laid the foundations of the scientific study of Australian natural history.

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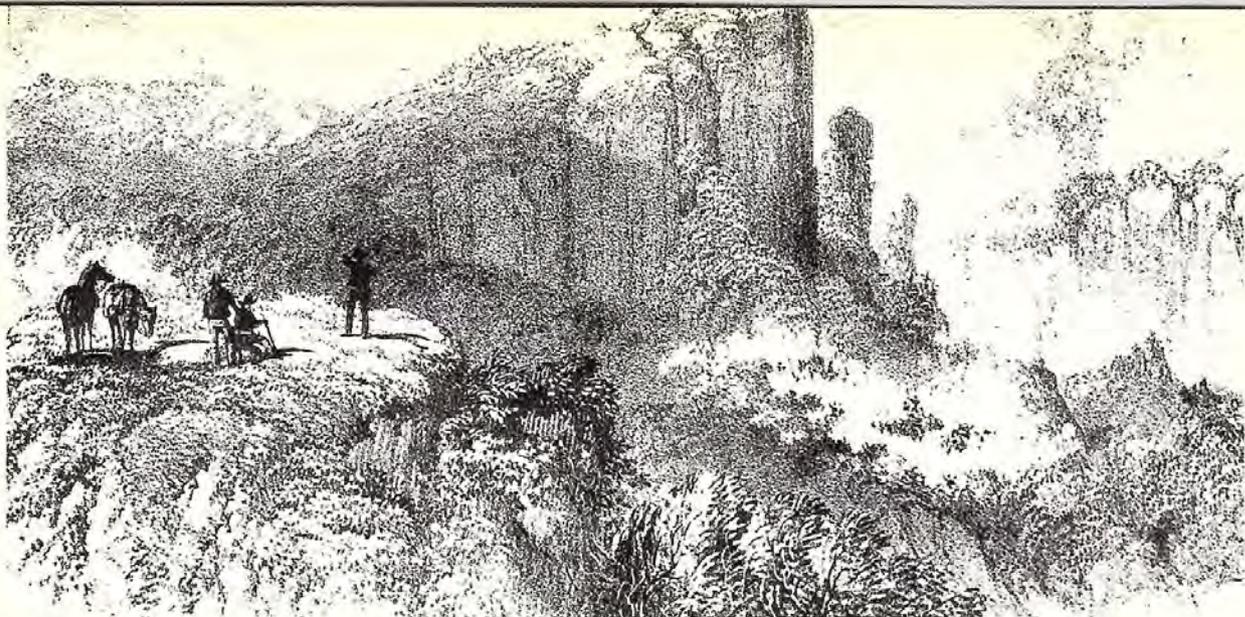
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Photo: E. Slater



A Rainbow lorikeet, *Trichoglossus haematodus*, described as the Blue-Bellied Parrot; a lithograph in Peter Brown's *Nouvelles Illustrations de Zoologie*, London, 1776.

The loggerhead turtle, *Caretta caretta*, an unfinished sketch by Johann Georg Forster (1754-1797) from Cook's second voyage. In the British Museum (Natural History), London.



"View of the Nundawar [Nandewar] Range where the party could not cross it."

Mitchell reached Maules River in the valley at the foot of this range on December 19, 1831, during his journey in search of the River Kindur, 1831-32. Engraving from a drawing by Mitchell, published in his *Three Expeditions into the Interior of Eastern Australia*. Vol. 1, London, 1837.

The first knowledge of Australian fauna and flora came from odd notes recorded by 17th century Dutch navigators. A more important observer was William Dampier, who in 1703 described some animals and figured a few birds and plants encountered on the west coast in 1699. His small collection of plants is still in existence. Much more information was recorded by Joseph Banks and other naturalists on board the *Endeavour* when James Cook discovered and mapped the east coast in 1770.

The settlement at Port Jackson in 1788 gave a new impetus to the study of the Australian fauna and flora. For the first time there were resident naturalists and artists such as George Caley and Thomas Watling, who sent specimens and drawings home to England where they were studied and their descriptions published. For sixty years following settlement, exploration and mapping of the coastline continued and naturalists on the ships added greatly to the knowledge of natural history. Among the more important voyages in this regard were those of Matthew Flinders in the *Investigator* (1801-03), Nicolis Baudin in the *Geographe* and *Naturaliste* (1801-03), Phillip Parker King in the *Mermaid*, and later the *Bathurst* (1818-22) and J.C. Wickham and J. Lort Stokes in the *Beagle* (1837-43).

Exploration of the interior of the continent began with the crossing of the Blue Mountains in 1813 and continued for the next seventy years before knowledge of the geography of the continent was virtually complete. Although most of the land explorers were interested in natural history and their journals usually contain many observations on animals and plants and are sometimes illustrated with unusual or colourful animals, particularly birds, it must be said at the outset that their contribution to zoology was only a modest one. The primary purpose of their labours was geographical discovery and they were particularly interested in land with agricultural or pastoral possibilities. There were peculiar difficulties in land

exploration. The leaders were continually preoccupied with problems of obtaining sufficient feed and water for men and animals, especially in arid regions, the health of men and animals, and the hostility of Aborigines; and there were limits to what could be carried on horses or even carts when these were available. Natural history specimens are fragile and need special preservative treatment. On his way home up the Murray River in 1829, Charles Sturt recorded in his journal, after shooting a specimen of the then undescribed smoker parrot (*Polytelis anthopeplus*), "It made a good addition to our scanty stock of subjects in natural history.... Our botanical specimens were as scanty as our zoological, indeed the expedition may, as regards these two particulars, almost be said to have been unproductive".

Plant study was well served from the earliest period of land exploration. The botanist Allan Cunningham was a member of John Oxley's expedition down the Lachlan River in 1817, the first major overland exploring expedition. Later Cunningham carried out explorations on his own, and on a trip in 1827 discovered the rich agricultural district, the Darling Downs. At a later period the distinguished Victorian botanist Baron Ferdinand von Müeller became an outstanding entrepreneur of exploration and corresponded with explorers such as Ernest Giles, urging them to collect for him. All received their reward by having plants named for them. Von Müeller was botanist on A.C. Gregory's North Australia Expedition of 1855-56.

Charles Sturt, one of the first major explorers, was a military officer who came to Sydney in 1827. He rapidly developed an interest in exploration of the interior, and between 1828 and 1846 led three important expeditions during which he discovered the Darling River, followed the Murrumbidgee River to its junction with the Lachlan River and then embarked on a twenty-five foot whale-boat down the Murrumbidgee to its junction with the Murray River and on to

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INVESTIGATING THE INTERIOR

BY J.H.CALABY

the sea. On his last expedition, 1844-46, he explored a large area of country in the general vicinity of what is now the meeting point of the states of Queensland, New South Wales and South Australia. The expedition suffered great hardship from extreme heat, lack of water, and scurvy from which one of the party died. Sturt's journals, particularly that of his last expedition, contain much information on natural history and are illustrated with coloured drawings of birds and mammals. The latter journal contains appendices with detailed observations on birds and mammals, a list of rock specimens, and descriptions of plants by Robert Brown. Sturt collected the type specimens of a quail-thrush, *Cinclosoma cinnamomeum*, and the remarkable house-building rat *Leporillus conditor* which he described and figured. On this expedition the draughtsman John McDouall Stuart, later to become a distinguished explorer in his own right, shot the first known specimen of the night parrot *Geopsittacus occidentalis*. Remarkably, John Gould, the leading authority on Australian birds, did not recognize it as distinct from the coastal ground parrot *Pezoporus wallicus*. He described the Night Parrot as a new genus and species from a specimen collected in Western Australia nine years later. Sturt's specimen which is still in good condition in the Merseyside County Museums, Liverpool, has only recently been brought to light. Most of Sturt's specimens of birds and mammals are in the British Museum (Natural History).

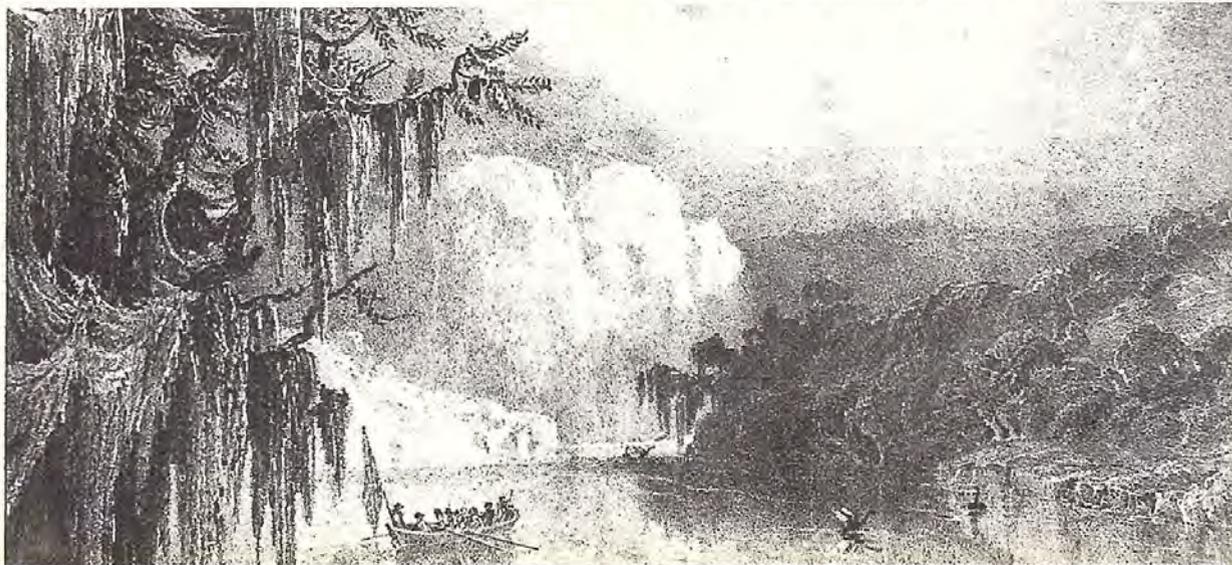
Between 1831 and 1846 the Surveyor-General of New South Wales, Major (later Sir) T.L. Mitchell carried out four expeditions during which he explored the upper tributaries and most of the course of the Darling River, the western and central parts of 'Australia Felix' (now Victoria), and the headwaters of the tributaries of Cooper Creek in what is now

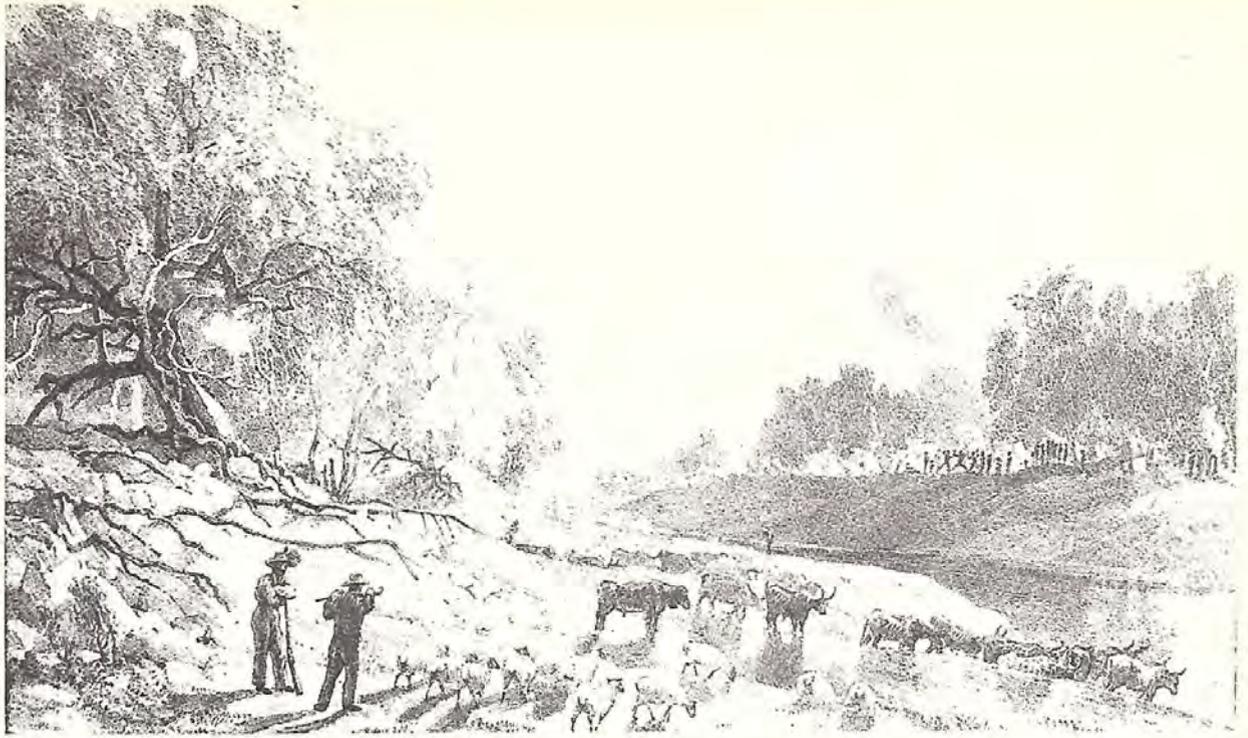
Queensland. On his last three expeditions he included natural history collectors among his men.

Mitchell's contribution to natural history was considerable. His published journals contain a great deal of information on the vegetation, animal life and geology of the country he passed through. The journals are illustrated with his own drawings of animals including one of the cockatoo *Cacatua leadbeateri* which is usually called the 'Major Mitchell'. Among well-known animals discovered by Mitchell were the eastern jerboa-marsupial (*Antechinomys laniger*), the pig-footed bandicoot (*Chaeropus ecaudatus*), Mitchell's hopping-mouse (*Notomys mitchellii*), the Bourke parrot (*Neophema bourkii*), the blue bonnet (*Psephotus haematogaster*), and the common freshwater catfish (*Tandanus tandanus*) and silver perch (*Bidyanus bidyanus*) of eastern Australia. Mitchell himself described and illustrated the fishes in his *Three Expeditions into the Interior of Eastern Australia ...* published in 1838. The new bandicoot and hopping-mouse were also illustrated by him in that work. His plant collections included numerous new species and many of these are described in footnotes in the published journals by the botanist Lindley.

Although he did not discover the limestone caves in the Wellington Valley nor the Pleistocene mammal fossil remains they contain, Mitchell took a great interest in the fossils and collected them for scientific study. The first species to be brought to scientific notice were described by Richard Owen in a letter published in Mitchell's *Three Expeditions ...* and they are illustrated in Mitchell's drawings. The new species described were the first of the giant herbivorous marsupials *Diprotodon optatum*, the large Pleistocene form of the Tasmanian devil *Sarcophilus*

The River Glenelg, discovered by Mitchell and his party on July 31, during his expedition to the Rivers Darling and Murray in 1836, "Black swans being numerous, we shot several; and found their eggs, which we thought a luxury, among the bullrushes at the waters edge."





The Darling River, *lanarius*, and two giant kangaroos *Sthenurus atlas* and *Macropus titan*. A fossil wombat was described and named for Mitchell but it has since been shown that it does not differ from the existing common wombat. Another giant marsupial herbivore sent to Owen by Mitchell at a later date was named *Nototherium mitchelli*. Mitchell gave Charles Darwin an australite, of natural glass of meteoric origin, which was found in the general region of the Darling River in 1835. The first recorded australite, Darwin described it in a paper published in 1844. Mitchell's bird and mammal specimens were given to the Australian and the British Museums, and his fossil mammals went to the Hunterian Museum of the Royal College of Surgeons. They were destroyed by bombing in the second world war.

The first major explorer in Western Australia was Lieutenant (later Sir) George Grey who led expeditions in the Kimberleys and on the central western coast in 1837-39. Grey was a keen and knowledgeable naturalist and his published journals contain much of interest on natural history. He brought back few specimens however and the only new vertebrate he collected was the type specimen of the northern rock-wallaby, *Petrogale brachyotis*. He was also very interested in Aboriginal culture and recorded vocabularies of native languages, and was the first to describe the well-known Wandjina rock paintings of the Kimberleys. After his explorations, Grey was acting Government Resident at King George's Sound and from 1841-45 was Governor of South Australia. In Western and South Australia Grey collected a large number of specimens of birds, mammals and other animals which went to the British Museum and from which Gould, J.E. Gray and others described quite a number of new species. Among the new animals was

the toolache wallaby which G.R. Waterhouse described as *Macropus greyi*.

After the establishment in 1838 of a military settlement at Port Essington on the north coast of the Cobourg Peninsula, Northern Territory, it was discussed in official circles that an expedition be sent to link the new settlement with New South Wales by an overland route. Before finality was reached, the idea was usurped by Ludwig Leichhardt who led a private expedition from the Darling Downs to Port Essington in 1844-45. His expedition was probably the most successful ever undertaken if success is measured by the amount of economically valuable pastoral country brought to light. Although he has many detractors, his letters and journals show him to have been a talented and knowledgeable naturalist. Leichhardt was accompanied by John Gilbert who was employed by John Gould and was a most able collector. Unfortunately Gilbert was killed by Aborigines near the base of Cape York Peninsula. Later, Leichhardt was forced to abandon his geological and plant collections but hung on to Gilbert's bird collection which was sent to Gould and from which Gould described several new species. He also described a new hare-wallaby



The Surveyor John Forrest and his party encounter spinifex desert during the 1874 expedition from the Murchison River, Western Australia to Port Augusta, South Australia.



taken on the expedition as *Lagorchestes leichardti* (now reduced to a subspecies of the spectacled hare-wallaby *L. conspicillatus*). The type specimens are now in The Australian Museum.

After Mitchell's and Leichhardt's expeditions, much country remained to be explored, particularly in the central and western desert regions and in northern Australia. Knowledge of these areas was gradually filled in by such distinguished explorers as John McDouall Stuart, the Gregory brothers, Ernest Giles, John Forrest, David W. Carnegie, and others. With occasional exceptions these later expeditions did not add a great deal to zoological knowledge. J.R. Eisey the surgeon on A.C. Gregory's North Australian Expedition of 1855-56 made a fine collection of natural history specimens from which Gould described several new species of birds. In 1847 Thomas Wall, who collected for The Australian Museum, accompanied E.B.C. Kennedy on his expedition to Cooper Creek where, among other things, he collected the type specimen of the long-haired rat (*Rattus villosissimus*). He was naturalist on Kennedy's ill-fated Cape York expedition of 1848 where he collected the first specimen of the cassowary (*Casuarius casuarius*) to be recorded in Australia. He died while

on this expedition. The naturalist on Stuart's expedition that successfully crossed the continent from south to north was F.G. Waterhouse, Curator of the South Australian Museum. Most of his collections were lost but of those brought home the most notable was the type specimen of the beautiful Alexandra parrot (*Polytelis alexandrae*). The most elaborately prepared expedition ever to be mounted was the Victoria Exploring Expedition (Burke and Wills) of 1860-61, but it was a failure in regard to natural history as with most other aspects. The official naturalist was Ludwig Becker, and the medical officer Herman Beckler also collected plants. Neither of them got beyond New South Wales and Becker died of scurvy during the expedition. Becker was a talented naturalist. All that remains of his work is the collection of nicely executed drawings he made of reptiles, birds, insects and other animals while on the expedition. Becker's drawings are in the La Trobe Library in Melbourne and Beckler's plant collections are preserved in the National Herbarium of Victoria.

As mentioned previously, the contribution to Australian zoology of the overland explorers was only a modest one. Much more was accomplished by skilled naturalists and collectors such as John Gould, John Gilbert, Gerard Krefft and others who worked in the settled country or on its fringes and who went out specifically to study natural history and collect specimens systematically. At a later period many of the gaps in knowledge were filled in by well-organized scientific expeditions such as the Horn Scientific Expedition to Central Australia in 1894, and by visiting naturalists such as Carl Lumholtz (1880-83), Knut Dahl (1894-96) and others. Biological exploration is a continuing activity however and even today, much remains to be done.

The Crater of Mount Napier or Murrōa (V.I. Mitchell reached the summit on September 4, 1836 during his expedition to the Darling and Murray in 1836. "Trees and bushes grew everywhere luxuriantly, except where the sharp rocks shot up almost perpendicularly." From *Three Expeditions into the Interior of Eastern Australia*. Vol. 2. London, 1837.



THE GENTLEMAN SCIENTIST

BY PETER STANBURY



Alexander Macleay, a portrait in oil, Mitchell Library, Sydney.

Going going gone! This magnificent cabinet specimen of *Scarabalus festivus* sold to Mr Macleay. My congratulations, Sir; you have made the purchase of the day.

The auctioneer's familiar prattle rang out in the eighteenth century saleroom as it does today. But there is a difference in the fashionable objects sold. Today the fads include antiques and wine; in the late eighteenth century and early nineteenth century, natural history specimens were extremely popular. Collecting scientific specimens was then a gentleman's pastime; a gentleman could learn in his lifetime most of what there was to know about science.

Alexander Macleay (1767-1848) was the first of three members of the Macleay family to be interested in natural history. In 1794, Alexander was elected a fellow of the Linnean Society, which had been founded six years before. He was then 27. His interest in entomology probably started earlier. There are in The Macleay Museum at the University of Sydney many insects collected before the 1790s, although some of them, as suggested above, were bought rather than captured alive by Macleay.

Before he left England for Australia in 1825, Macleay purchased specimens from the collections of Edward Donovan, General Thomas Davies, Dru Drury, John Francillon (who had specimens collected by Surgeon General White of the first fleet), Sir Ashton Lever (who had insects presented to him by Captain James Cook) and Thomas Marsham. Sir Stamford Raffles, the founder of Singapore, gave Alexander Macleay many specimens from his travels. Macleay's collection of insects is of enormous historical importance and was considered the best in England. The Linnean Society's obituary notice of Alexander Macleay said, "Mr Macleay devoted himself almost exclusively to the study of insects, of which he had formed, previous to his quitting England, the finest and most extensive collection then existing in the

possession of a private individual". The phrase "almost exclusively" refers to the fact that Macleay also had a small collection of birds, a considerable number of which were from New South Wales. These he donated to the Linnean Society before coming to Australia.

Many of the birds and insects were described in contemporary zoological literature such as Leach's *Zoological Miscellany*, 1814-17; *The Naturalists Repository*, 1823-25 and the *Zoological Journal*, 1825-6. It is curious that Macleay left others to describe his specimens, himself merely collecting. However, his son, William Sharp Macleay, described a number of Macleay specimens in the *Horae Entomologicae*, 1819-21.

When Alexander Macleay sailed to Australia in the middle of 1825, arriving here in January 1826, the Linnean Society rendered in their minutes "the high estimation which is held ... on account of twenty-seven years of unremitting and unrequited labour devoted to the interests of science".

Once in Australia, Alexander's official duties as Colonial Secretary apparently left him little time to collect specimens himself. Nevertheless, he arranged for a number of collections of birds, insects, fruits and seeds to be sent to the Linnean and Zoological Societies in London. Apart from official duties, Macleay was engaged on two other projects which were to have considerable scientific importance to the colony. The first was the foundation of what is now known as The Australian Museum but which, in 1827, was called The Colonial Museum or The Sydney Museum; and the second, the laying out of a garden and the building of a house on 54 acres at Elizabeth Bay. Although the origins of The Australian Museum are poorly recorded, it is known that it was started in 1827, and Alexander Macleay was one of the founders. The Elizabeth Bay property was promised in 1826, Macleay started work on it in 1827, and it was actually granted in 1828 by Governor Darling. The house

PETER STANBURY, Curator of The Macleay Museum and Director of News and Public Relations for the University of Sydney, was editor of *100 Years of Australian Scientific Exploration* (1975), published to commemorate the centenary of Sir William Macleay's scientific voyage to New Guinea.



William Sharp Macleay, son of Alexander Macleay.

was built in 1835-1838. It was designed by John Verge, and was restored by the State Government in 1976.

Macleay's wife, Eliza (after whom it is presumed Elizabeth Bay was named) wrote to their son, William Sharp Macleay, in 1827, "We have not been here a year and a-half, and during that time, I think he [Alexander] has not been absent from Sydney above ten days; the very little recreation that he has consists of his going out before breakfast or after five o'clock, to a place called Elizabeth Bay, of which he has got a grant of between fifty and sixty acres, where he is making a garden".

Macleay's prowess in horticulture was sufficient to have been noted by the eminent botanist Robert Brown, who wrote in one of his articles that Macleay's "merits as a general naturalist, a profound entomologist, and a practical botanist are well known".

Not only did Macleay lay out a typically European garden (which was mentioned in J.C. London's influential English *Gardening Encyclopaedia* as an example of a notable antipodean effort; but he also grew many native plants, and sent bulbs, roots and cuttings to Kew. Sir Joseph Hooker visited the Elizabeth Bay gardens in 1841 and noted in his diary, "A long visit to Macleay's gardens proved it to be a botanist's paradise ... My surprise was unbounded at the ... number and rarity of the plants".

William Sharp Macleay, Alexander's eldest son, was born in 1792, but did not come to Australia until 1839, being occupied from 1825-1836 in a variety of jobs including a judicial appointment administering matters arising out of the abolition of the slave trade in Cuba. Like his father, William Sharp's interest in general zoology and entomology was strong. He published several important pre-Darwinian papers among a list of twenty-six publications between 1819 and 1847.

From Cuba he wrote to Kirby (author of *Introduction to Entomology*), "This is a good place for Wading Birds, Lizards, Butterflies and Sphinges, but apparently nothing else. I live in the country ... I take great pleasure in cultivating Orchideae, particularly those which are parasitical on trees."

When William Sharp returned to England in 1836, he was elected to the Council of the Linnean Society, the Zoological Society, and the British Association for the Advancement of Science. He met Darwin and encouraged him to publish the zoological results of the voyage of the *Beagle*. Darwin wrote to Jenyns, "Mr. Macleay has taken a great deal of interest in the subject, and maintains that such a publication is very desirable because it keeps together a series of observations made respecting animals inhabiting the same part of the world, and allows any future traveller taking them with him".

The English weather did not suit William Sharp after his long sojourn in the tropics, so he decided to visit his parents in Australia for three or four years. Two of William Sharp's cousins, William and John—young men whose delicate health necessitated a change from their native Scotland—were advised by their uncle, Alexander, to try Australia, and to take the opportunity of coming out with William Sharp. The three arrived in Sydney in March 1839, in the same year as the Rev. W.B. Clarke, the noted geologist, and John Gould, the painter of wildlife.

Soon after his arrival in Australia, William Sharp Macleay was working closely with his father on the garden at Elizabeth Bay.

They also undertook horticultural experiments on 15,000 acres at Brownlow Hill, near Camden; growing for sale oranges, apples, loquats, pears, plums, cherries, figs, mulberries, melons, raspberries, strawberries and gooseberries. Brownlow Hill was managed by two of Macleay's other sons, George and James, and frequent exchanges of plants were made with William Macarthur of Camden.

William Sharp Macleay became interested in fish soon after his arrival, delighting in the opportunities available in Sydney Harbour, and in the fact that fishermen used to land their catch on the bay at the bottom of the Macleay's garden.

He furnished Gould with a description of a nest-building rat, and described a marsupial mouse, *Ante-*



William Macleay, *chinius stuartii*. He was regarded as the local authority on natural history, especially after his father's death in 1848. He pointed out that a skull exhibited at the Colonial Museum as that of a Bunyip was a malformed horse foetus similar to one he had found floating in the Hawkesbury in 1841. Macleay's specimen can be seen today in The Macleay Museum at the University of Sydney.

W.S. Macleay met and advised the scientists of various exploring ships including the *Beagle* and the *Rattlesnake*. For twenty-one years or more he worked actively for The Australian Museum. He was on the Committee from 1841-1853, and was a Trustee from then until 1862, when he resigned because of ill health. He described himself at this time in a letter to a friend as "ugly, lanky, thin, scraggy and toothless, although the unmaterial part of me remains the same". He died in 1865.

George Macleay, William Sharpe's brother and manager of the Brownlow Hill property, was also on the Committee and was later a Trustee of The Australian Museum. He was a member of Sturt's expedition down the Murrumbidgee in 1829, on which he collected insects for his father; but he was not a dedicated zoologist. When Alexander died in 1848, Elizabeth Bay House and its contents passed to William Sharp, and when he died it is notable that although the house and most of the contents went to George, the Macleay natural history collections passed to George's cousin, William, who had come to Australia with William Sharp.

On the voyage to Australia in the *Royal George*, young William Macleay met James Macarthur. James was the fourth son of John Macarthur, who introduced merino sheep into Australia and founded the Australian wool-trade. James and William Macarthur (the fifth son) had managed their estate at Camden for many years. It is probable that William Macleay picked up many hints about rural industry from James Macarthur; at any rate, soon after arriving in Sydney, William took himself off to the Lower Murrumbidgee where George Macleay had a

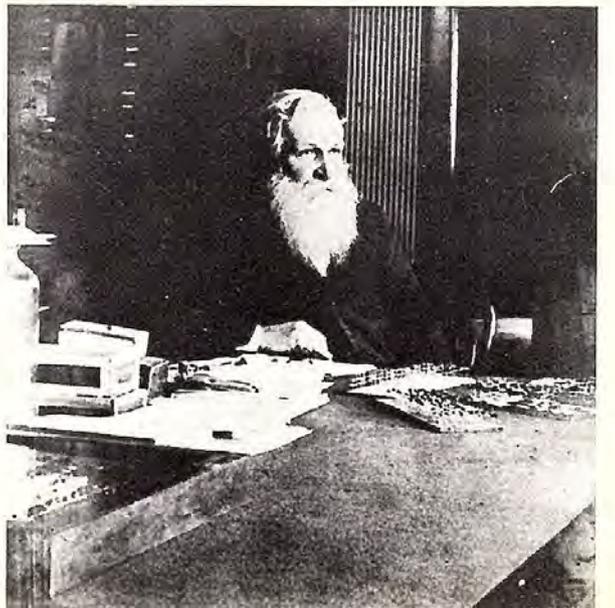
station called "Toganmain", granted him by the Government to recompense him for his honorary services to Sturt. William soon decided to try for himself as a squatter and settled on an adjacent track of land called 'Kerarbory', (later Kerarbury). William Macleay spent fifteen years there from 1839 to 1855, when he was elected to Parliament as a member for the Lachlan and Lower Darling. When William's cousin and neighbour, George, went to England in 1859, William succeeded George as member for the Murrumbidgee.

Upon becoming a member of Parliament, William Macleay had to spend more and more time in Sydney and would have often stayed in Elizabeth Bay House and been encouraged to inspect the insect collections. So well did old William Sharp explain his hobby that he infected William, with enormous enthusiasm. When William Sharp resigned from the board of The Australian Museum in 1862, William decided to form the Entomological Society of New South Wales with approval and support from William Sharp. The Society was inaugurated on 7 April, 1862. Although the Society only lasted for seven years, many papers of importance were published. The Entomological Society was of importance because it stimulated the first regional studies of insects in New South Wales.

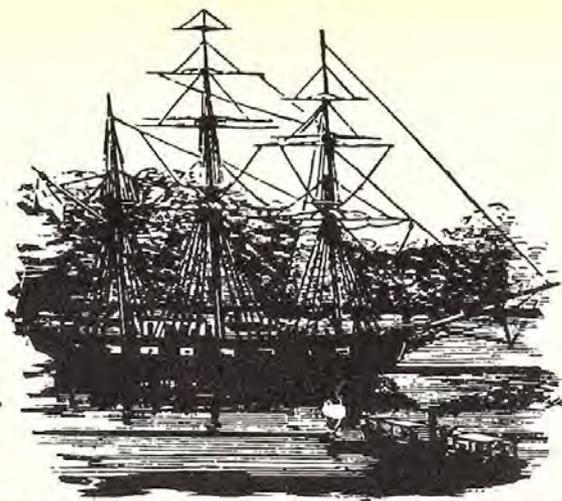
William decided that his own collecting efforts were insufficient, and so he started to employ collectors. One such was a former gardener, George Masters, who collected insects in an amateur way, and who often went to The Australian Museum to check scientific names. Finding specimens misnamed, Masters pointed the mistakes out to the Curator, Krefft, who introduced him to William Macleay. Macleay employed Masters as a part-time collector until June, 1864, when he was employed on a full-time basis by The Australian Museum.

Other important Macleay collectors were W.S. Wall (after retiring from the Curatorship of The Australian Museum on 31 December, 1858, who collected around Rockhampton in Queensland; E. Damel, who collected at King George Sound, WA (1861), Port Denison, WA (1866), and Fiji (1862); and A. Howitt, who collected around Melbourne (1863).

One of the most scientifically important periods of William Macleay's life was just before and just after his retirement from Parliament on 28 November, 1874. On 6 February of that year, he appointed Masters Curator of



George Masters, seated at the large desk/insect cabinet which is now in the Curators Office, Macleay Museum.



The Macleay Museum, a position he held till the end of his life. On 28 March the University of Sydney announced that it had accepted Macleay's offer to bequeath the Museum and its library. On 29 October, 1874 Macleay was involved in the formation of a society for natural history called the Linnean Society of New South Wales.

In the latter part of 1874, an idea crept into Macleay's mind and, after his retirement from politics, assumed great importance. The idea was to buy a ship and make a scientific voyage to collect specimens for his museum. In April and June, Sydney had been visited by the scientific exploratory vessel, HMS *Challenger*, and Macleay and scientists had made frequent calls on one another's establishments. These visits, coupled with Macleay's readings of other voyages, inspired him to try one for himself.

In December 1874, Macleay started to read the advertisements of ships for sale, and went to look at some. In January 1875, Charles Edwards, an old sea captain, offered to help find a ship. Edwards had sailed in the Torres Straits off New Guinea, which was the place Macleay wanted to explore.

Macleay saw the ship he wanted on 20 February, 1875 and bought her on the 27th. The *Chevert*, an old French Navy ship, was suitably converted as quickly as possible, and the expedition sailed through Sydney Harbour heads on 18 May, 1875.

The *Chevert* returned to Australia in September after a curious voyage on which the Captain lost his self-confidence to take the ship where Macleay wanted; fever and sickness took its toll of most of the crew (one of them dying); Macleay became delirious; cases of scientific specimens broke loose during a gale; the ship was grounded several times; an Italian naturalist D'Albertis, living in New Guinea, grew very hostile, abusing Macleay for his generosity to the natives, and shots were fired. The first mate took command on the return leg of the voyage, at one stage being on his feet for three days and nights.

Nevertheless, from a scientific point of view the expedition was a success and on 26 January, 1876 Macleay was able to write in his diary:

"My Museum has been much added to. The Collections made during the voyage of the *Chevert* have been now almost all removed from the original packages. The mammals and birds have been mostly named and catalogued. The insects have been carefully laid out. The

reptiles and fishes have been bottled, or, when too large, packed away in tanks. The crustacea have been dried, and so have the Echinodermata. To some extent, myriads of small things have been bottled, and the shells have been catalogued. To get through all this work, I have had and still have, three assistants, Messrs. Masters, Brazier, and Spalding, fully employed. I have had besides large collections of birds, &c., from other places; 800 birds from London, a number from San Francisco, and a good collection from Fiji, besides various purchases and donations. The collection is so extensive that I find I have no room in the house, even with the library, for the whole of it. I have, therefore, commenced a building on one of my leased allotments of land in the garden, to be used as a Museum. It is to be 115 feet x 36 x 9, constructed chiefly of iron."

The move to the new museum building started on 25 May, 1876. New cabinets were built and by the end of the year most of the specimens were stored or displayed to Macleay's satisfaction.

For the next few years Macleay continued to collect assiduously. The International Exhibition held in Sydney in 1879 attracted many visitors, both from interstate and overseas. Many of the scientifically minded visited Macleay and his museum at Elizabeth Bay House.

Macleay was also busy at this time with the correction of proofs and generally overseeing the Proceedings of the Linnean Society of New South Wales. In 1881 he completed an important catalogue of 1,133 Australian fishes. In 1882 he gave the Linnean Society of New South Wales over 600 scientific books.

There were considerable discussions between Macleay and the University of Sydney at this time about the transfer of The Macleay Museum. The University, though it wanted the Museum, had no suitable place to house it. Eventually, the government of the day provided £16,000 for the erection of a suitable building solely for the housing of the Museum. The specimens were transferred to the new fireproof, brick and iron building in 1888, and the Museum opened to the public in 1890.

William Macleay was knighted in 1889. He died in 1891 after a carriage accident at the gates of Government House. It is an odd coincidence that the first Curator of The Macleay Museum, George Masters, was also killed in a carriage accident on his way to Government House in 1912.

The era of the Macleays, that of the gentleman scientist, was over.

The *Chevert*, built for the French Navy at Rochefort in 1862-63. Macleay bought her on February 27, 1875.

A pencil sketch by Conrad Martens of Elizabeth Bay Sydney, house of Alexander Macleay. In the Tasmanian Museum and Art Gallery, Hobart.



EARLY GEOLOGY: STUDIES AND SET

BY R.O.CHALMERS

The earliest geological observations in New South Wales were strictly utilitarian. Captain James Cook commented on an outcrop of sandstone near where Sans Souci now stands, in prophetic vein, saying it was "sandy and very proper for building". Soon after the foundation of the colony in 1788, Governor Arthur Phillip organized the quarrying of shale on Brickfield Hill for brick making. A good quality clay was sent to Sir Joseph Banks who passed it on to Josiah Wedgwood who examined and mistakenly thought it contained a new chemical element which he called *Sydenia*. Coal was discovered in 1797 at Coalcliff on the South Coast and in cliffs at Newcastle. Limestone was found west of the Blue Mountains by 1815. (See *Australian Natural History* 18:6, 190-195, 1975).

Official appointments of men of practical rather than scientific training were made. In 1803, A.W.H. Humphrey was appointed His Majesty's Mineralogist in the colony but spent more time in Tasmania than in New South Wales. John Busby, officially appointed Civil Engineer and Mineral Surveyor, arrived in Sydney in 1823 and supervised coal mining in Newcastle. He also provided Sydney with a water supply from the Lachlan Swamps (now in Centennial Park).

Naturalists accompanying early maritime expeditions made their contributions. Robert Brown, the great botanist, also had the job of geological collector with Flinders on the *Investigator* in 1801-1802. He collected fossil plants from the Hunter District and marine fossils from Hobart which were described overseas. His mineral collection was presented to the British Museum by the Lords of the Admiralty.

The mineralogists, Louis Depuch and Charles Bailly were members of the scientific staff on Baudin's 'Voyage of Discovery' (1800-1803). Bailly published a collection of minerals collected in Western Australia, Tasmania and in Sydney and surroundings. In Sydney they mention "schistes bitumineux" (more likely black shales) containing fossil plants. During his administration of northern Tasmania (1804-1808) Colonel William Paterson collected rocks and minerals from

Port Dalrymple. These are now in the Queen Victoria Museum, Launceston. Von Buch in 1814 examined Bailly's collections in Paris and described Tasmanian rocks and minerals. The great native-born marine surveyor, Phillip Parker King, son of the third governor of New South Wales, collected rocks and minerals between 1818 and 1822, including varieties of cryptocrystalline silica in Western Australia, granite from Lizard Island and, closer to Sydney, serpentine and magnesite from Port Macquarie. King's collections were presented to the Geological Society in London. Rocks and minerals were collected in Sydney and surroundings by later French maritime expeditions, those of Duperrey in *La Coquille* in 1824 and Bougainville in 1825.

Early land explorers did not overlook geology. Ensign Barallier in 1802 collected granite and fossils on the Kowmung River. Oxley, in 1817 on his expedition to the Macquarie River and thence to Port Macquarie via the Liverpool Plains, had with him a mineralogist, W. Parr, whose specimens were referred to in 1821 by Buckland in London. Activity increased in other quarters in the 1820s. Commissioner Bigge who reported adversely on Macquarie's administration brought with him from London, as secretary, his brother-in-law T.H. Scott who, on his return to London in 1824, published a "Sketch of the Geology of New South Wales". In which he commented on the coal measures.

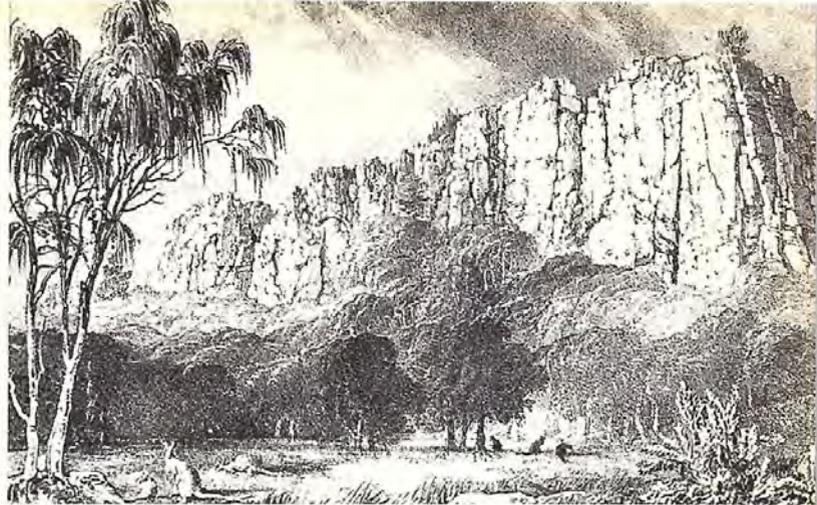
In 1821 a group of prominent citizens in Sydney, interested in intellectual pursuits, founded a short-lived Philosophical Society of Australia. Alexander Berry, a wealthy merchant and landowner and timber getter in the Shoalhaven River region, contributed a paper, "The Geology of the Coast Line between Newcastle and Bateman's Bay". His observations were sound, the first prepared and presented in Australia, even if they were published in London.

In 1831 or 1832, a turbulent character, described by some as eccentric, arrived in Sydney. This was John Lhotsky, born in Poland of Czech parentage and in possession of a medical degree from Bavaria. He

"Part of New South Wales from the Summit of Jellore."

From Mitchell's field book, sketched during his expedition to the Darling and Murray Rivers in 1836. In *Three Expeditions into the Interior of Eastern Australia*, Vol. 2, London, 1837.





applied for a position as naturalist in the Colonial Museum (now The Australian Museum) established in 1827 and, although he was reputed to have extensive geological experience, Governor Bourke and Alexander Macleay turned him down. He had premises in Elizabeth Street known as the Australian Philosophical Repository, the specimens in which were much admired for their scientific arrangement. He offered eight thousand specimens of plants, zoological specimens, rocks and minerals for sale. For three months in 1834 he travelled in southern New South Wales. He wrote an incomplete account entitled "Journey from Sydney to the Australian Alps" in which, among describing some of the geological features he saw, he mentioned having made extensive collections. He went to Hobart at the end of 1834 and collected rocks, fossils and minerals around Hobart. Governor Franklin refused his offer to sell his collections which he hoped would form the nucleus of a Colonial Museum. Lhotsky sailed for England in 1838. Duplicates of his New South Wales specimens had been offered for sale at auction by the Berlin Museum in 1837. It is quite clear that the interest overseas in acquiring Australian specimens motivated Lhotsky, and after him Strzelecki, to sell specimens overseas as a source of income to further their serious geological work.

The two famous British explorers in the 1830s and 1840s, Sir Thomas Mitchell and Charles Sturt, were keen, competent geological observers. About 1830, Mitchell had visited Wellington Caves several times and collected fossil vertebrate bones from the cave earth. He published a general description. In 1838 in Mitchell's *Three Expeditions into the Interior of Eastern Australia*, Sir Richard Owen, then a young man, described the largest bones as those of a large extinct marsupial, *Diprotodon*. Mitchell was a benefactor and Trustee of The Australian Museum. In 1852, he presented specimens collected during his surveys of the goldfields beyond Bathurst. Sturt made geological observations and listed rocks and minerals collected in his journal of the expedition to the centre of Australia (1844-1846).

In 1839, the 41-year-old Rev. W.B. Clarke (1798-1878) arrived in Sydney, having applied for a position as Chaplain. In England, both his health and salary were poor. In quick succession he was Rector in the parishes of Castle Hill, Dural and Campbelltown then finally St. Leonards where he remained until retire-

ment. He had studied geology at Cambridge under Professor the Reverend Adam Sedgwick. Clarke was the first trained geologist to stay and work permanently in Australia.

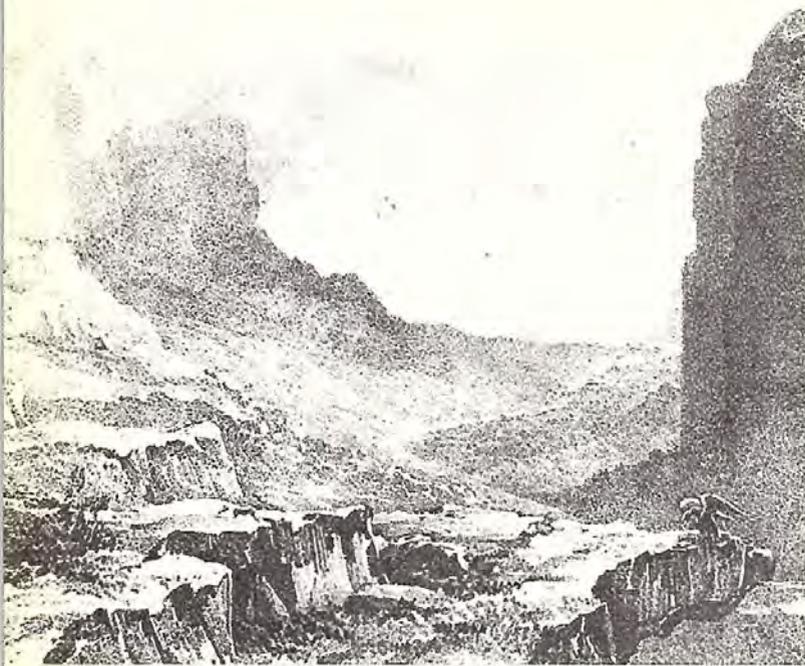
The combination of geology and theology was not uncommon at this period. The Rev. C.P.N. Wilton, Chaplain of Newcastle from 1831 to 1833, described the burning mountain at Wingen where a coal seam is still burning at depth, and wrote on the general geology of the region of the Hunter and Goulburn Rivers and the Newcastle District.

Almost immediately after settling into his ministry, Clarke started on geological work. Initially he studied the coal measures and associated sediments both of freshwater and marine origin in the Sydney Basin. He collected fossils wherever possible. These he sent to Sedgwick in Cambridge where they were described by the young Frederick McCoy. The opposing views of Clarke and McCoy as to the age of the plant fossils were never reconciled, but Clarke was right.

In 1836, Darwin visited Australia and mistakenly attributed the deep valleys and perpendicular sandstone cliffs of the Blue Mountains to marine erosion. The two men never met but kept up a correspondence for many years. Interestingly enough, Clarke was quite open-minded about Darwin's theory of evolution and described to Darwin geological work he did in later years, suggesting that it might provide evidence in support of the theory. Clarke took two eminent visiting geologists to the Illawarra to examine the succession of sediments and coal measures. They were J.D. Dana in 1839 and J.B. Jukes in 1845. Dana also accompanied Clarke to the Kiama 'Blowhole' and to Toongabbie where they observed the columnar structure of the fine grained upper zone of the Prospect intrusion. Dana later published his theories on the age of the coal measures which in part substantiated Clarke's views. In 1850, Jukes published an important review of Australian geology in which he acknowledged his indebtedness to Clarke. Polish born Strzelecki arrived in Sydney about the same time as Clarke. He was in Australia only four years but explored the coastal and highland regions of

The Western extremity of Mount Arapiles, (Vic.) ascended by Mitchell on July 20 during his expedition to the Rivers Darling and Murray in 1836. "On the steep slopes grew pines, casuarinae, and a variety of shrubs...". From *Three Expeditions into the Interior of Eastern Australia*, Vol. 2, London, 1837.

OLIVER CHALMERS, Research Associate and former Curator of Minerals at the Australian Museum, has recently finished writing a history of the Museum's Departments of Palaeontology and Mineralogy, which entailed research into the history of early geology in Australia. He is currently carrying out research on tektites.



"...stupendous perpendicular cliffs, at the foot of which the silvery line of the Grose, at a depth of 3000 feet below, meanders through a green valley..."

Mitchell reached the Grose Valley in NSW on April 1 during his 'Expedition sent to explore the course of the River Darling in 1835'. From *Three Expeditions into the Interior of Eastern Australia*, Vol 1. London, 1838.

The 'Burning Mountain' near Wingen, NSW, from an engraving in *Dumont d'Urville's Voyage auter du monde*. According to the Neptunian theory, Volcanic phenomena were attributed to such local seams. The artist has drawn the distant hill as a volcanic cone. In fact, it consists of a tertiary basalt cap resting on Triassic and Permian sediments.

New South Wales, Gippsland and part of Tasmania. In 1845, he published in London his "Physical Description of New South Wales and Van Diemen's Land". In this he gave descriptions of many rock types and geological interpretations including a realization that the great accumulation of sediments in the Sydney-Newcastle district formed a basin-like structure. Strzelecki obviously had considerable geological knowledge.

In 1839, Strzelecki discovered gold at Hartley and Wellington but on official instructions kept quiet about it. Clarke in 1841 also discovered gold in Winburndale Rivulet which joins the Macquarie River north of Bathurst. Other finds of gold were made at this period and specimens sent to Clarke. When, in 1844, he reported these finds to Governor Gipps and showed him a specimen of gold, the Governor made his oft quoted remark, "Put it away Mr Clarke or we shall all have our throats cut." (On a quick flashback to 1823, Assistant Surveyor James McBrien was working on the Fish River near where Tarana is now situated. He wrote in his field book, "At this place I found numerous particles of gold in the sand in the hills convenient to the river".)

Here one might mention Clarke's long-standing association with The Australian Museum, so named in 1836. In 1840 he was elected a committee member and a year later was appointed Curator and Secretary. In the first catalogue published by George Bennett, the second Curator, fossils and minerals are listed. It is clear that The Australian Museum was intended to be a repository for geological specimens as well as zoological and ethnological material. There is little record of activity at the Museum during Clarke's term in charge and in 1845 he resigned. The main reason was probably that the Legislative Council,

because of the economic depression of the period, decided to abolish the position of Curator and Secretary and, while this never came about, there was an atmosphere of uncertainty. He continued on as a committee member and later on was an elective Trustee for a long period. Clarke wasn't inactive at this time. He was in the field a lot and also had his church duties to perform. Apparently, he exchanged parishes with whoever the parson was in the areas where he was doing his geological work. German-born Leichhardt arrived in Sydney in 1842. He wrote two geological papers, both published in Germany. The first described coal-bearing strata at Newcastle. The second, "Notes on the Geology of New South Wales and Queensland made in 1842 and 1843", was translated in the Australian Almanac of 1867 and 1868, with an introduction by Clarke, who paid tribute to Leichhardt's geological ability.

On his travels through the Darling Downs, Leichhardt had seen the bones of a pachyderm (actually *Diprotodon*) in Isaac's Creek. In 1847, *Diprotodon* bones were sent to The Australian Museum from the Darling Downs by a Mr. Turner. The Curator, W.S. Wall, Clarke and Leichhardt "arranged and settled them". Casts were made but the original skull, which Clarke stated to be very well preserved, ended up in the British Museum.

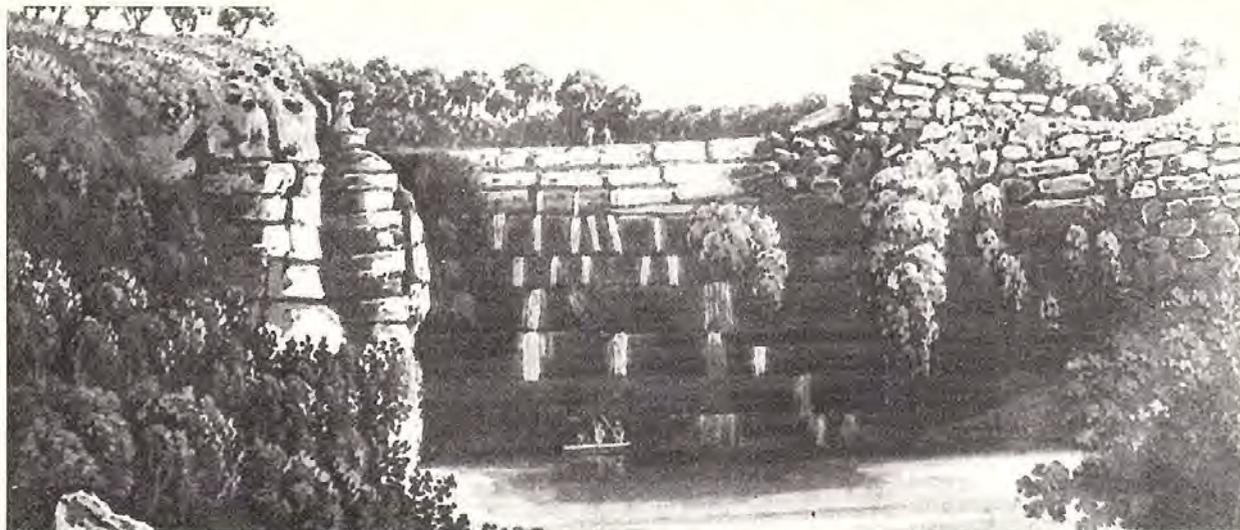
The discovery of copper and lead deposits in South Australia and gold in Western Victoria in 1849 stimulated Governor-General Fitzroy in New South Wales to ask the British Government to send out an "efficient geologist". Samuel Stutchbury (1798-1859) was appointed and reached Sydney at the end of 1850. He had been Curator of the Bristol Museum for 19 years. He was doing field work in the Bathurst district when Hargraves discovered gold at Ophir and was immediately instructed to look for gold. In June 1851, he discovered the first important goldfield in New South Wales on the Turon River, of which Sofala became the main centre. At the request of the Committee of The Australian Museum, Stutchbury sent several consignments of specimens to the Museum. The New South Wales Government was more keen than ever to expand mineral exploration and in 1851, only three months after Stutchbury's arrival, they commissioned Clarke to "ascertain the probability of the existence of gold in various parts of the colony". He first went to the Southern Highlands



and was away nine months. He found time to conduct a service for forty gold miners under a wattle tree at Araluen. In 1860 he published "Researches in the Southern Goldfields of NSW". He continued his assignment for the Government in the Northern Highlands in 1852. He inspected the gold diggings at Hanging Rock near Nundle and recorded the first Australian occurrence of sapphire in Tilbuster Creek, near Armidale. He got as far as the Severn River and returned to Sydney after having been away seven months.

Meanwhile, Stutchbury worked his way through the Warrumbungle and Nandewar Ranges in New South Wales, crossed into Queensland, and passed west of the Glasshouses to Maryborough, finally ending up at

Melbourne in 1854. The Geological Survey of Victoria started in 1852 under the direction of Selwyn, one of the outstanding geologists of the time. It was staffed by the best geologists available and first-class work was done until 1869 when, on the grounds of economy, the Victorian Government disbanded it. This has a familiar ring today. Selwyn went to head the Geological Survey of Canada. The staff scattered. Robert Etheridge returned to the Geological Survey of Scotland and the British Museum. In 1887, he came to Sydney as palaeontologist to The Australian Museum and the Geological Survey of New South Wales, which had been established in 1874. Although the University of Sydney was established in 1850, four years earlier than the University of Melbourne, Thomson, the first



Port Curtis where Gladstone now stands. 1851 and 1852 were very wet years and both Clarke and Stutchbury suffered extreme discomfort, mainly camping out and doing most of their travelling on horseback. Stutchbury was treated in a niggardly way by the New South Wales Government and had to draw on his own private means. Clarke wasn't overpaid either. Stutchbury returned to Sydney in 1855 in "dilapidated" health. He produced many valuable geological reports accompanied by maps and diagrams. His reports, however, were buried away in Parliamentary papers and it was many years before his ability as a geologist and his services to New South Wales were recognized.

I can find no record of what, if any, association Clarke had with Stutchbury. He resented Stutchbury's appointment because he would have liked the official position himself. Once he referred to Stutchbury as a "mere Museum curator", a rather slighting remark considering he was himself concerned for many years with the management of The Australian Museum.

We were then on the threshold of a great upsurge in geological development in Australia. McCoy, already mentioned, was the Foundation Professor of Natural History in the newly established University of

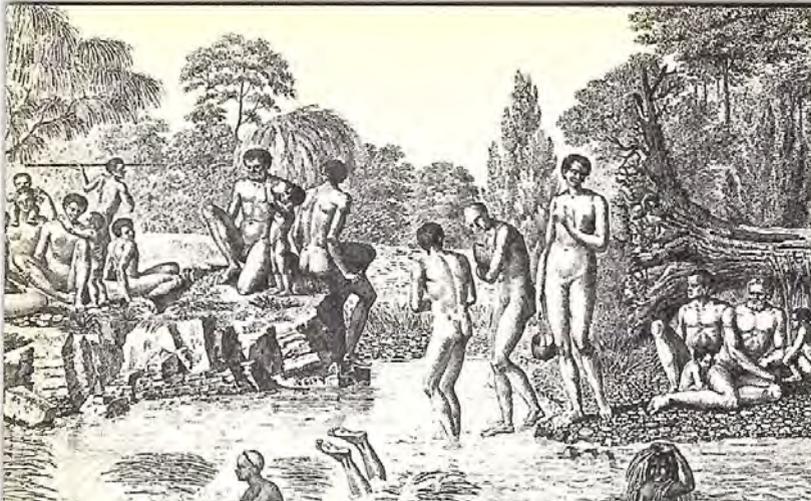
Professor of Geology and Mineralogy, was not appointed until 1866. Ten years earlier, Clarke had been offered the chair, but what his reaction was is not known.

Clarke, the complete and somewhat abrasive individualist, kept on working in a private capacity in geology, still coupled with his clerical duties. His publications in all number about a hundred. He continued to send large collections of fossils to overseas authorities who published valuable descriptions. Some of these collections were returned to Australia and a great scientific tragedy took place when these, together with Clarke's own large private collection that had been bought by the New South Wales Government, were destroyed in the Garden Palace fire of 1882. Clarke certainly earned his title of "Father of Australian Geology". His most notable attribute was undoubtedly his ability as a field geologist and he laid down the broad outlines of the geology of New South Wales for later generations of geologists to build upon.

FURTHER READING

- Jervis, James "Rev. W.B. Clarke M.A., F.R.S., F.G.S., F.R.G.S., The Father of Australian Geology"; *J. Roy. Aust. Hist. Soc.*, 30(6), 345-458, 1944.
 Vallance, T.G. "Origin of Australian Geology"; Pres. Address, *Proc. Linn. Soc. NSW*, 100 (1), 13-43, 1975.

'View of the Cascade of Prince Regents River' WA, from *An Account of some Geological Specimens from the Coasts of Australia* by William Henry Fitton, London, 1816. In the Mitchell Library, Sydney.



A copper engraving from *Atlas pour servir à la Relation du Voyage à la recherche de la Perouse* by Labillardiere, Paris, 1811, showing an Aboriginal group illustrated in the classical Greek style.

Highly unfavourable reports on the Aboriginal inhabitants of the Great South Land were given by the early Dutch, Spanish and English voyagers, with few exceptions. They were described as cruel, barbarous, licentious, wretched creatures, and in William Dampier's famous phrase, "the miserablest people on Earth". Captain Cook in 1777 and Governor Phillip in 1788 were more perceptive in their opinions of the race but writers in the greater part of the nineteenth century condemned the Aborigines for their lack of religion, rules of society and other standards of civilisation, and regarded them as a survival from ancient times that the country could well do without. The conflicts bordering the penal colony in the Sydney region in the first twenty-five years of settlement developed into progressive warfare with massacres and other barbarous methods of racial genocide in most of eastern and other parts of Australia after the Blue Mountains were crossed in 1813. During the following eight or so decades land-seeking pastoralists and farmers spread their flocks and crops over the land, and miners thronged to the goldfields. The remnants of the tribes were placed on reserves in the care of protectors or lived on the pastoral stations and the fringes of country towns.

Such a relationship between the Aborigines and whites did not stimulate the latter's interest in the former's culture to any major degree. Dampier's account of the Roebuck Bay natives in 1697 was the most detailed description for a century, just as those of the First Fleet writers in the 1790s about the Sydney Aborigines were the fullest contributions for another half century. Nevertheless, some useful information was published in the first half of the nineteenth century by explorers on land and sea, and by settlers, travellers, protectors and missionaries, who described their hunting, fishing, material culture, warfare, art and physical characteristics. Many lists of Aboriginal words and their meanings were compiled, and Captain Flinders drew attention to the great variety of languages he met with during his voyage around Australia in 1802-3. From the 1840s on, more and more general accounts of Aboriginal life

were published, including those of W. Buckley's thirty years' exile among the Geelong blacks and of J. Murrell's seventeen years among north Queensland Aborigines.

Their racial origin had become an intriguing problem. Cook and other early navigators distinguished the Aborigines as a separate race from the New Guinea people; they were identified as Ethiopic Negroids by Barron Field in 1825 and as Malaysians by C. Dawson in 1831. The romantic notion that the Australians were Negroes whose ancestors had been blown across the Indian Ocean from Africa was added by H. Hull in 1846. Cook, in 1777, thought the Tasmanians were neither Negroid nor Australian, and his surgeon Anderson linked them with the latter because they had no canoes and he thought their home island was part of the mainland. As early as 1792 the French navigator M. Labillardiere considered that they resembled the New Caledonians and Dawson that they had sailed down the east coast of Australia to their island and afterwards abandoned the use of canoes. Others, like P. Cunningham in 1827, believed they were an older stock which had occupied the mainland prior to the Aborigines.

Pictorial illustrations of the Aborigines varied greatly. They were caricatured by Dampier, and by J. Arago and others who were motivated by their mode of wearing European clothing and their general behaviour in the Sydney settlement. Some artists, as in J. Hunter's volume of 1793 and others depicted them in the classical Greek physique. There are, however, excellent naturalistic representations of them by T. Watling, the convict artist who arrived at Port Jackson in 1789, by the artists on Peron's voyage of 1800-04, and later by G.F. Angas of the South Australian Aborigines in the 1840s; J. Glover painted a valuable series of pictures of the Tasmanians in the previous decade.

The furore in academic and religious circles the world over caused by the publication of Charles Darwin's *Origin of Species* in 1859 and *The Descent of Man* in 1871 aroused considerable scientific interest in the Aborigines. The concept of the noble savage

FRED McCARTHY was Curator of Anthropology at the Australian Museum until 1964, when he was appointed Principal of the newly founded Australian Institute of Aboriginal Studies. He began an active retirement in 1972 and has carried on with research programmes concerning various aspects of Australian Aboriginal culture.

HABITING THE GREAT SOUTH LAND

BY FREDERICK McCARTHY

had long since been destroyed; now the divine creation of man was threatened by this new theory of evolution. Here in Australia was a living example of primeval man preserving, so it appeared, the earliest stages of Man's social and religious institutions, study of which should be made before it became too late, before their anticipated extinction became a reality, though missionaries and bigots viewed their pagan customs with abhorrence.

Such was the intellectual and philosophical climate in which anthropology was born in Australia in the second half of the nineteenth century, when a pioneering period of great significance began. Evolutionism was now in vogue and evidence to support it was sought in all aspects of Aboriginal culture in the 1870s and later decades. Such influential scholars as E.B. Tylor sought data for the first stage of his savagery-to-civilisation theory, L.H. Morgan for his promiscuous group marriage and consanguine family claims, Sir J. Frazer for his work on magic and religion, and G.H. Pitt-Rivers for his ideas on the development of weapons.

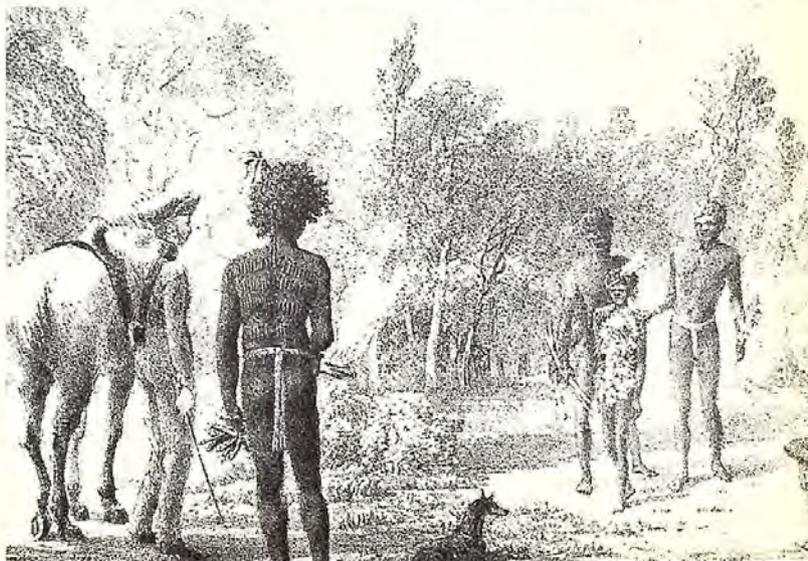
The Aborigines were by now firmly established as a separate Australoid race, and T. Huxley linked them with the Veddas of Ceylon in 1863, although he believed the Tasmanians were Negritos from New Caledonia. He drew attention to the similarities between Australian and Neanderthal skulls, with whom they were classified by French anthropologists in the 1880s. Physical anthropologists in this period believed the Aborigines to be an ancient race surviving from early prehistoric times, and O. Schoetensack even proposed that man had originated in Australia. On the other hand, in the early 1900s, J.W. Gregory and other scientists claimed them to be recent arrivals in Australia.

It was, however, in the field of social anthropology that the most decisive advances in the understanding of Aboriginal culture were made. Prompted by Tylor and Morgan in particular, L. Fison and A.W. Howitt concentrated their research upon the complicated moiety, section and clan system of Aboriginal social organisation, and upon religion and initiation ceremonies in an effort to prove or disprove the evolutionary theories prevailing about primitive societies. These two men laid the foundation of social

anthropology in Australia, but they acquired their information mainly by correspondence and questionnaires, and by questioning detribalized Aborigines. The results of their work were crystallized in two important books, *Kamilaroi and Kurnai* in 1880 and *The Native Tribes of South-East Australia* in 1904. Contemporary writers of the period like E. Curr, W.B. Smyth, Rev. G. Taplin and T. Worsnop followed the same methods of research, while R.H. Mathews published some two hundred papers about social organisation, rock art, languages, religion and initiation ceremonies in Eastern Australia, and he witnessed the last performances of many of these rituals. The studies by the missionaries, the Rev. W. Ridley on the Kamilaroi language on the northern tableland and Rev. L. Threlkeld on the Awabakal language of Lake Macquarie, both in New South Wales, constituted the fullest contributions yet made in Aboriginal linguistics.

In the last few decades of the nineteenth century it had become clear that the Aborigines had developed a disciplined society and religion, maintained by a system of ethics and traditional rules of behaviour with recognized punishments for non-compliance. The decisive step, that of prolonged research in a functioning Aboriginal tribe, had yet to be taken. It was achieved by Sir W.B. Spencer who came to Australia as Professor of Zoology at the University of Melbourne though he had also studied anthropology at Oxford. He visited Central Australia as zoologist with the Horn Scientific Expedition in 1894 when he met F.J. Gillen, his famous associate of later years.

Mitchell's first meeting with the chief of the Bogan tribe on May 2 during his expedition sent to explore the course of the River Darling in 1835; from *Three Expeditions into the Interior of Eastern Australia*.



"... the native name among the Portland Bay tribe for these huts is *miam miam*." From *South Australia Illustrated*, by George French Angas, London, 1846.

They worked together on the Aranda and neighbouring tribes in 1896 and 1901, and their first two books, *The Native Tribes of Central Australia* in 1899 and *The Northern Tribes of Central Australia* in 1904, made a tremendous impact on anthropological theory in the fields of social organisation, religion and magic. In them is given a thrilling account of the complex interrelationships of kinship, clans with their totems, increase rituals and Tjuringa symbols, and of the Dreamtime, a field of religious activity and devotion hitherto considered to be beyond the mental and intellectual capacity of the Aborigines. Others who made important contributions to knowledge of Aboriginal life at the turn of the century, based essentially upon research with the people themselves, were W.E. Roth in northern Queensland, Rev. J. Mathew in southeastern Queensland, and Rev. C. Strehlow in Central Australia.

Aboriginal customs were by now firmly established in the theoretical framework of anthropology. Spencer, like Fison and Howitt, kept in close touch with Tylor and Frazer in England. In accordance with the former's appraisal of primitive societies, Spencer believed that Aboriginal culture had developed upon an independent and local evolutionary basis. Reaction to this general proposition arose in both Europe and England. Kulturkreise followers in Vienna claimed that cultures all over the world emanated from small groups of primitive man whose customs spread to other groups and survived only in marginal and remote places like Australia, where they identified Tasmanian as the oldest, through Old Australian and Totemic strata levels of culture. In England, Grafton Elliot-Smith and W.J. Perry advanced a theory of the spread throughout the world of Egyptian civilisation 3000 to 4000 years ago by the seekers of precious metals, the Children of the Sun, and they included the boomerang as evidence from Australia. However, the diffusionist theories of these two schools of thought

'Natives of New South Wales as seen in the streets of Sydney', from Augustus Earle's *Australia Scrap-book*, London, 1830.



failed to survive although both independent invention and diffusion have both influenced the development of Aboriginal culture. After A. Radcliffe-Brown's research work in northwestern Australia in 1911, his functional method of studying social institutions and their interrelationships in a community was followed for many decades by Australian anthropologists.

The part played by the museums in anthropology in the nineteenth century was limited by a number of factors—the black wars and their destruction of Aboriginal culture, the establishment of the State museums with an emphasis on natural history from twenty to fifty years after the founding of the capital cities, and their inadequate premises, staffs and funds. The Australian Museum began functioning as the Colonial Museum in 1827, the Tasmanian Museum in 1844, National Museum of Victoria in 1854, Queensland Museum in 1855, South Australian Museum in 1862 and the Western Australian Museum in the 1880s. Each of these museums occupied makeshift premises, moving from one to another to provide space for their expanding collections until the first wing of their permanent building was erected. The early curators were zoologists or palaeontologists who were in charge of the anthropological collections. Golden opportunities to secure the latter material was lost, an example of which was a valuable collection of Melanesian and Polynesian specimens offered for sale in Sydney at "moderate prices" in 1812, but the acquisition of Pacific islands artefacts was neglected for many years. All that is in existence from the Sydney area comprises a few spears and bags, a shield, boomerang, fishing line and shell hooks, stone and bone implements, and there are very few Aboriginal artefacts, apart from stone tools, known from the vicinity of our capital cities.

The museums did little field collecting until the last few decades of the century owing to the high costs of transporting collections from remote places and the lack of anthropologists on their staffs. Sir W. Macleay's collectors obtained native specimens in



the Torres Strait islands, New Guinea and Melanesia which are now in the Macleay Museum. Fortunately many private collections were either donated to or purchased by the museums and, by the 1860s, The Australian Museum, the National Museum of Victoria and the South Australian Museum possessed very good anthropological collections, including skulls, from Australia and the Melanesian islands, notable deficiencies being Tasmanian and Polynesian material. The Australian Museum suffered a grievous loss when a large part of its anthropological collection was destroyed in the Garden Palace fire in 1882.

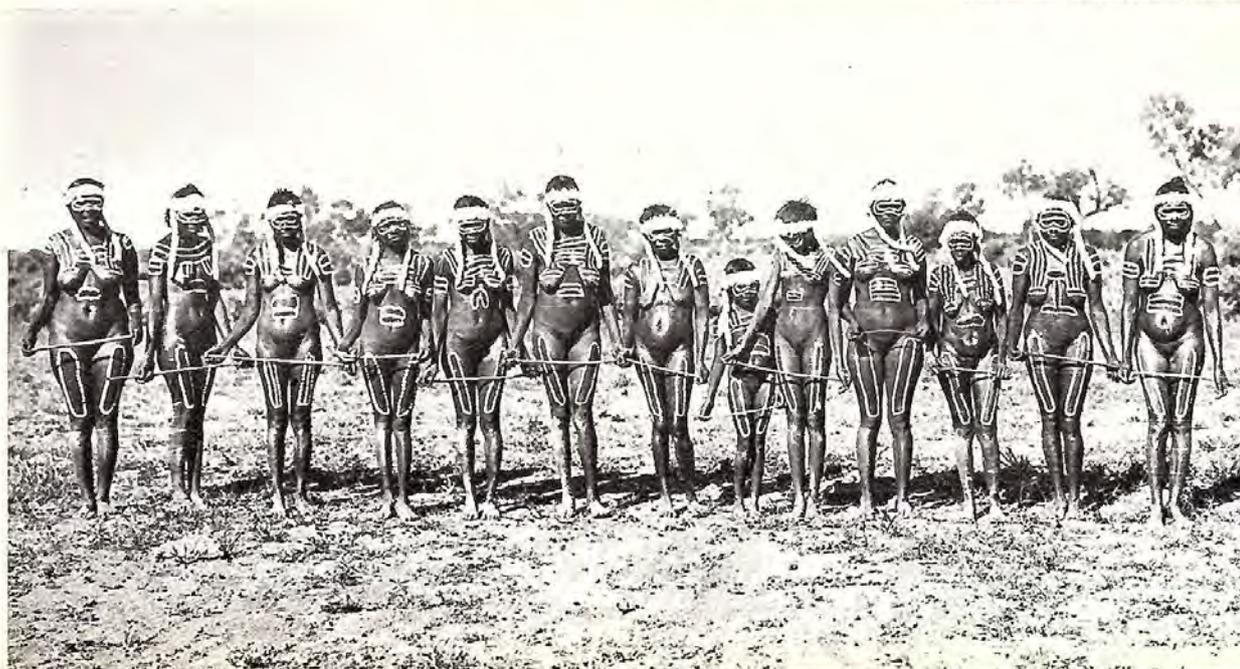
In the late 1880s three great men, all of whom served as directors and worked untiringly to expand the anthropological collections, appeared on the scene. They were R.W. Etheridge, Jr. in Sydney from 1887-1920, Sir E. Stirling in Adelaide from 1889-95, and Sir. W.B. Spencer in Melbourne from 1899-1925. They acquired specimens from the Americas, Africa and Asia by exchange with museums in those regions, purchased high quality collections displayed at international exhibitions held in Australia, and collected in Australia themselves.

The study of prehistory was neglected for a century after settlement in 1788. In the middle of the nineteenth century, as D.J. Mulvaney has pointed out, Genesis was the basic document of prehistory with its time scale of 4004 years, and there was little incentive to study the prehistory of a race whose culture was believed to have become simpler rather than more advanced since its ancestors had arrived in Australia. Even though Governor Phillip had an earth mound containing a cremation dug out in 1788, the next records of excavations are those of P. Macpherson in oven mounds in Victoria in 1884 and of Etheridge in rock shelters at Dee Why and North Harbour in Sydney a few years later. A small number of minor excavations were made in coastal middens in New South Wales during the following decade, but it was not until 1929, when the South Australian Museum excavated successive cultural layers at Devon Downs on the lower Murray River, that the possibilities of Australian prehistory were realized.

In other aspects of prehistory in Australia, heaps and alignments of stones made by the Aborigines had been noted by explorers as early as the 1840s, and research on their meaning and function began in 1911 with Radcliffe-Brown's study of Talu heaps in north-western Australia. Rock engravings were seen by Governor Phillip and others in the first years of settlement, and both engravings and paintings were reported in Queensland and Western Australia by 1840. Sir G. Grey believed Malayan artists of a superior race who had once lived in the Kimberley region had done the remarkable cave paintings he discovered in 1838, and his romantic reproductions of the anthropomorphic figures led other writers to claim Hindu, Persian, Druidical and other affinities for them. This attitude, which refuses to credit the Aborigines with an imaginative artistic ability, has persisted into recent times, and its adherents even claimed that the thousands of rock engravings in the rugged sandstone plateau in the Sydney-Hawkesbury region were made by Spanish or Melanesian visitors!

"Altogether the decorations of the women shown in the photograph must have represented several hundred rabbits." A Women's Corroboree, Arunta Tribe, from *The Northern Tribes of Central Australia* by Baldwin Spencer and F.J. Gillen, London, 1904.

Sir Baldwin Spencer/Photo courtesy of Nat. Mus. Vic. Council



A RICH AND UNFAMILIAR FLORA

BY L.A.S. JOHNSON

Although the Aborigines, in accordance with the needs of their way of life, had a considerable practical knowledge of Australian plants, European man's effective acquaintance with our flora began in a period during which science, in the modern sense, was in its vigorous youth. The 18th Century spirit of discovery and enquiry was in full force in 1770 when Joseph Banks and Daniel Solander, with their artist colleague Sydney Parkinson, descended with delighted enthusiasm on the rich and highly unfamiliar flora of eastern Australia. Solander's great fellow-countryman Linnaeus had already laid a new foundation for botanical classification and actively encouraged exploration and collecting in remote parts of the world. Banks himself continued to provide a stimulus and encouragement in these directions for many years to come. Robert Brown's zeal and ability in his work in Australia and at home, as the protégé and employee of Banks, together with the explorations and studies of other British and continental (especially French) botanists, built rapidly and extensively on this foundation. No other continent has been so well prepared, by historical timing, for the developments arising from its first botanical exploration and subsequent discoveries.

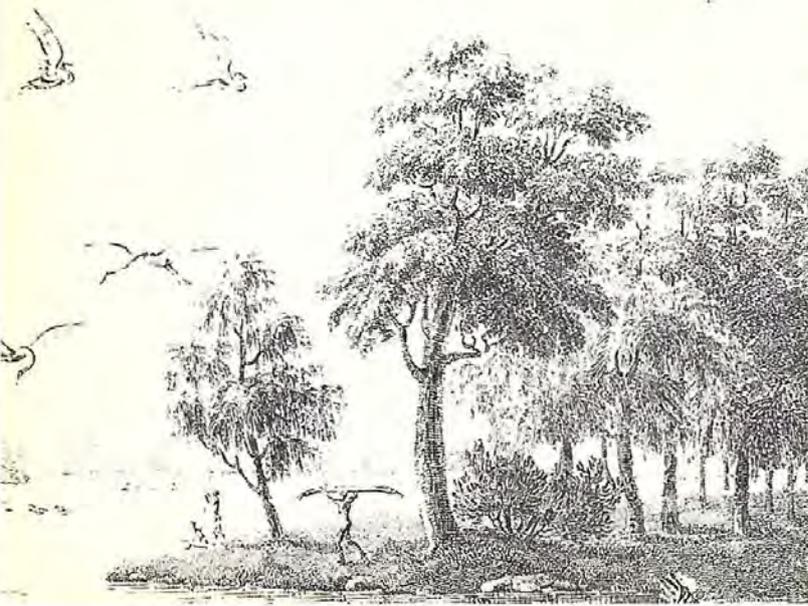
Colonial settlement led to local activity and to the exploration of the interior, with considerable official attention to gathering knowledge of the 'vegetable productions' of the country. Meanwhile in Europe, despite its wars and political upheavals, general scientific understanding developed, accompanied by comprehensive and increasingly penetrating studies of the flora of the world. Thus it was possible, roughly a century after Cook's first voyage, for George

Bentham to produce his seven-volume *Flora Australiensis* (1863-1878). Despite the great accretion of information and understanding during the succeeding century, the *Flora Australiensis* still gives a useful overall picture of the vascular plants (ferns, gymnosperms and flowering plants) of Australia and remains the only work purporting to be comprehensive in this field.

Europeans had visited the shores of Australia long before Cook, and the Dutch had given it the singularly inappropriate name of New Holland, which was to survive well into the 19th Century. Asians, especially Malays, had, of course visited the northern coasts and had some influence on the local aborigines as well as almost certainly introducing a few species to the flora. These early voyagers took little interest in the natural history and, being practical men living in hard times and operating at the limits of the known world, were chiefly impressed with the barrenness of the land. Nevertheless a few plant specimens found their way to Europe. The Englishman William Dampier visited the northwest coast at Cygnet Bay in 1688 on a buccaneering voyage. He returned more respectfully in HMS *Roebuck* to the west and north west in 1699. His collection of a score or so specimens, now at Oxford, included the spectacular Desert Pea *Clianthus formosus* (formerly *C. dampieri*). Less well known is a plant sketchily described in 1768 by the Dutch botanist N.L. Burman under the name *Polypodium spinulosum* and supposedly originating from Java. From Burman's illustration it is clear that this neither belongs to the fern genus *Polypodium* nor originates from Java. Rather it is a species of *Synaphea*, a Proteaceous genus confined to the southwestern corner of Western Australia, and indeed is common near Perth. Clearly specimens of this must have been brought to Java by one of the early Dutch navigators.

The collections made on Cook's first voyage were of a vastly different order of size and significance. Joseph Banks, young, enthusiastic, wealthy and with a passion for botany (and at times for other pleasures!) sailed with Cook on the *Endeavour* in 1768-1771 as leader of a scientific party of eight (of whom four returned). Foremost of Banks' companions was Daniel Carl Solander, a Swede ten years his senior, trained and favoured by Linnaeus and a highly skilled and experienced botanist. Together they collected several thousand specimens, referable to over 900 species (virtually all new to science), chiefly at Botany Bay and the Endeavour River but

"The tree, underneath which are two natives, is a *Casuarina*, all the others are *Eucalyptus*".
Detail from François Peron's Atlas, *Voyage de Découvertes aux Terres Australes*, Paris, 1824.



also at other landing points on the Queensland coast, especially Bustard Bay and Thirsty Sound. Banks was collector and organiser; Solander named the material and described the species.

Unfortunately the descriptions were not published for over a century, by which time almost all the species had been described by others and, in great part, from other collections. Likewise, the remarkably fine illustrations by Sydney Parkinson (who died on the latter part of the voyage) remained unpublished, though Banks employed artists to complete and supplement the drawings and engravers to make the copperplates while Solander-supervised this work and began the final preparation of his descriptions. Despite the abandonment of this great labour before publication, it was by no means in vain since Banks made his collections and library available to other serious workers, and many authors, including the younger Linnaeus, Gaertner, the Forsters (Johann Reinhold and his son Georg). Above all, Robert Brown made good use of them, as did J.D. Hooker and Bentham in later days.

David Nelson, a Kew gardener, was collector on Cook's third voyage and, with William Anderson, Surgeon, botanised at Adventure Bay in southern Tasmania. It is an historical accident that the most famous and economically important of Australian genera, *Eucalyptus*, has as its type species *E. obliqua*, the Messmate, collected by Nelson and Anderson and described by the French botanist L'Heritier de la Brutelle on a visit to England. Other eucalypts had of course been found earlier by Banks and Solander, and indeed by Dutch botanists in Timor, but these were not described.

From 1788 onwards, scientific collection and study of the Australian flora was partly in the hands of at least temporary residents. Some pursued botany as a sideline, for example, Surgeon-General John White, who sent home collections and coloured drawings from Port Jackson which were described by Sir James Smith and figured by James Sowerby. White, with Assistant Surgeon Denis Conisden, took a practical interest in vegetable products also, such as *Eucalyptus* oils and grass-tree gum. Colonel William Paterson, Lieutenant-Governor of New South Wales (1800-1810) collected plants and seeds in the Port Jackson and



Hunter River districts and in northern Tasmania.

Others had occupations more specifically concerned with plants, for instance David Burton, 'the public gardener' at Parramatta, made valuable collections before his accidental death while duck-shooting on the banks of the Nepean in 1792. Better known is George Caley, sent out and paid by Banks. He explored the Blue Mountains (naming Mt. Banks after his patron) and other then outlying parts of the Botany Bay colony. Caley was a discerning naturalist and discovered natural hybridisation between species of *Eucalyptus*, now known to be a widespread phenomenon, the critical study of which has contributed much to an understanding of variation, evolution and natural classification in this complex group.

Voyagers continued to make shorter visits to our shores and some brought botanists or naturalists whose collections were described by themselves or by colleagues on their return to Europe. Among such was Archibald Menzies who collected at King Georges Sound when that magnificent harbour (the site of

"... The trunk of an aged gum-tree or *Eucalyptus*, on the banks of one of the water holes of the River Gawler: the marks in the bark are incisions or cuts made by the natives with their climbing sticks..." A coloured lithograph from *South Australia Illustrated*, by George French Angas, London, 1846.

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The climbing apple-berry, *Billardiera scandens*, from *A Specimen of the Botany of New Holland* Vol. 1, by James Edward Smith, London, 1793.

Albany) was discovered by Captain George Vancouver on the early stages of his voyage to northwest America. Australians may also be reminded of this voyage through their familiarity with the imported softwood timber known as 'oregon'. This comes from the Douglas Fir, *Pseudotsuga taxifolia*, once known as *P. menziesii*.

Some well-known eastern Australian plants, for example the genus *Angophora*, were described by the Spanish botanist Antonio Cavanilles from specimens collected by Luis Née on a brief visit to Port Jackson. More numerous were the French amongst whom pride of place goes to Jacques-Julien Houttou de La Billardière (who in the years after the French Revolution prudently called himself simply 'le citoyen Labillardière'), described as an active, versatile and devoted naturalist, though aloof, independent and possessed of a sharp tongue. The substantial collection made during his participation in Bruny d'Entrecasteaux' expedition (1791-1794) in *La Recherche* and *L'Espérance* in search of their compatriot La Perouse, was sent to England as a prize of war while Labillardière was imprisoned with other republicans by the Dutch in Java. Sir Joseph Banks prevailed on the British authorities to return the specimens to Paris and it is recorded that, despite the opportunity and

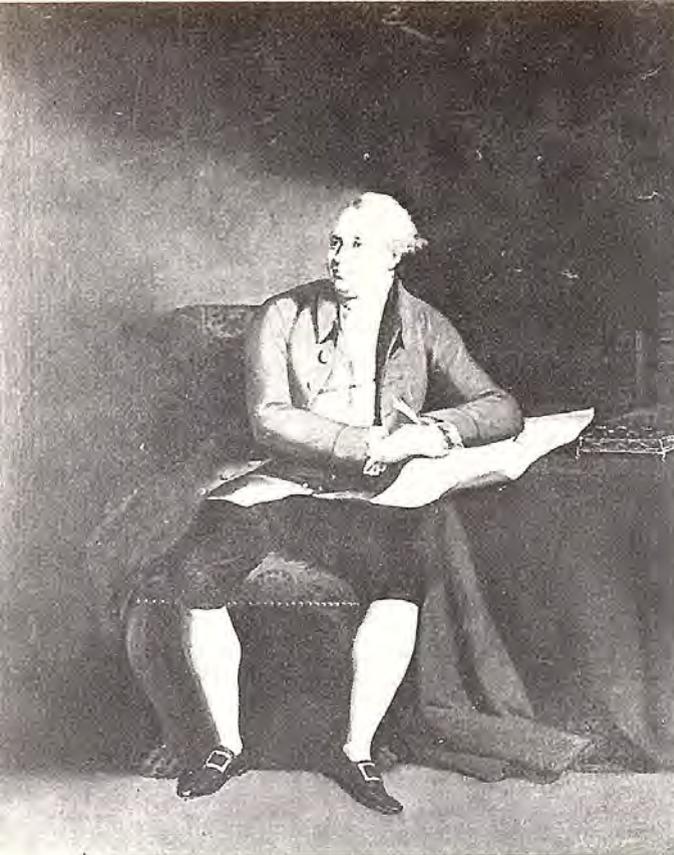
Portrait of Botanist Robert Brown, an 1837 lithograph from the painting by Pickersgill. In the Mitchell Library, Sydney.

great temptation, he honourably refrained from looking at them. Labillardière published descriptions of many genera and species from Tasmania and the south coast of Western Australia. L.T. Leschenault de la Tour, Botanist, and Anselme Riedlé, Head Gardener on Baudin's expedition of 1800-1804, are commemorated by the handsome Western Australian genus *Leschenaultia* and *Macrozamia riedlei*, a cycad prominent in the bush near Perth.

The efforts of these worthy men made known about 1500 Australian species (out of a total vascular plant flora of perhaps 20,000) but less than 400 of these were actually described by 1805. In 1814, Robert Brown estimated that material of 4200 species was available to him. The greater part of this remarkable increase resulted from his own efforts in the years 1801-1805, during which he collected 3900 species, most of them 'new'. Virtually anywhere in the coastal districts of Australia one can pick up dozens of species whose names bear 'R.Br.' as the indication of original authorship. Brown's contribution was due to a combination of talent and industry, in which he was second to none, with opportunity, which he had in much greater measure than earlier field botanists. Later collectors, even though able to reach inland regions inaccessible to Brown, seldom had such an untapped source of riches open to them.

Robert Brown, born in 1773 in Scotland, landed at King Georges Sound on 8 December, 1801, as naturalist aboard HMS *Investigator* under the captaincy of the equally young Matthew Flinders. He had been appointed by Sir Joseph Banks and was accompanied by Ferdinand Bauer, Botanical Draughtsman. The *Investigator* explored the southern, eastern and northern coasts and Brown subsequently spent considerable time in the regions accessible from Port Jackson, Hobart Town and Port Dalrymple in northern Tasmania. He began his descriptions from fresh material as soon as it was





Portrait of Dr. Daniel Solander, from the Linnean Society, London.

the time to the new chapter that began with Ferdinand Mueller and the effective beginning of indigenous botanical institutions marked by his appointment as Government Botanist of Victoria in 1852. Gaudichaud (on Freycinet's voyage), Sieber, Fraser, Lhotsky, Bidwill and Sir Thomas Mitchell in New South Wales; Gunn, Milligan, Lawrence, Backhouse, Verreaux, Archer and Oldfield in Tasmania; Leichhardt, MacGillivray and Gilbert in the east and north; Fraser again, Baxter, Hügel, Drummond Preiss and Oldfield in the Swan River Colony—these are only some of those who strove, often under great hardships, to advance knowledge of Australian plants. In Europe their specimens were eagerly seized upon by both specialist and generalist botanists, while 'New Holland plants' were, for a time, great horticultural favourites in the conservatories.

Understanding of the evolution of the Australian flora was not to begin until much later and today still has a long way to go, but that classic of biogeography, Joseph Dalton Hooker's *Introductory Essay to the Flora of Tasmania*, was the culmination in the theoretical field of those early years, as was Bentham's *Flora Australiensis* in the domain of practical taxonomy. Unlike his more conservative colleague and collaborator Bentham, Hooker was a rapid convert to the evolutionary theories of Darwin and Wallace. His *Introductory Essay* appeared in the same year as *The Origin of Species*—1859—the beginning of a new era indeed.

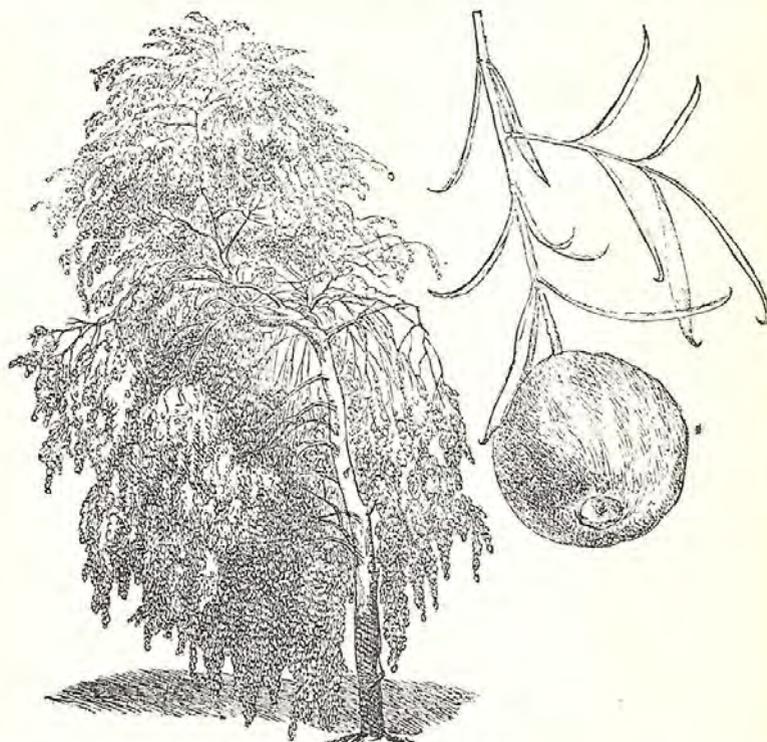
ACKNOWLEDGEMENT: I am most grateful to my colleague Don McGillivray for help in compiling the material for this article.

"May 27—In the scrub adjoining our camp, we found a new and remarkably beautiful shrub . . ." From Mitchell's *Three Expeditions into the Interior of Eastern Australia*, 'Expedition to the rivers Darling and Murray, in the year 1836.'

collected and completed his work on return to England. In 1810 appeared his great though highly condensed work, *Prodromus Florae Novae Hollandiae*. The edition was small and sales minuscule—the end of the Napoleonic War was an unfavourable period for such ventures—but the *Prodromus* was soon established as what would today be called a 'benchmark' publication in botanical science. Brown was not a prolific author and in later life was reserved and austere, but his knowledge and, perhaps more importantly, his insight into morphology and natural relationships among plants led to his being dubbed *facile princeps botanicorum*—'easily the prince of botanists'.

In the new era which began with the rapidly accelerating penetration of country away from the coasts, the number of known species was doubled by mid-century. A large proportion of these were not found in the arid interior but within 200-300km from the coast, from mountains, slopes, plains, sandplains, savannas and valleys, in all quarters of the continent and in Tasmania.

The name of Allan Cunningham, botanist-explorer, is pre-eminent in this period. Another protégé of Banks, Cunningham, sailed with Captain Phillip Parker King on three voyages in the *Mermaid* and one in the *Bathurst*, collecting on most of the coasts of Australia between 1818 and 1821. Before this he had accompanied Oxley on the exploration of the Lachlan and Macquarie Rivers, and later he journeyed widely in New South Wales and what later became Queensland. He died in Sydney in 1839. Cunningham was the last of the 'continent-wide' botanist-collectors of the years before 1850. Overlapping with him were many who worked intensively in particular regions, bridging



Eucalypta Murrayana (mibi).



J.H. Calaby

'Pest Control in Tasmania at the Turn of the Century'
Two freshly dead thylacines with red-bellied pademelons, *Thylogale billardierii* (small) and Bennett's wallabies, *Macropus rufogriseus* (large).

The invasion by man of a new region leads to changes, often profound ones, in the vegetation and fauna; much of the indigenous fauna usually declines in range and abundance and exotic species are established and at least some become dominant over the native ones. These results of intervention by man however, merely represent the acceleration of natural processes. Extinction is the common lot of all organisms and all forms of life tend to disperse or migrate, even between continental areas, as a result of geological and climatic changes, given sufficiently long periods of time.

Evidence for the extinction and replacement of faunas is provided by fossils. In Australia for example, the Miocene epoch that began about thirty million years ago was cool and moist, and at that time some of the characteristic animals were large marsupial herbivores of the family Diprotodontidae, and several genera and species of giant flightless birds (Dromornithidae) and flamingoes (Phoenicopteridae). During the succeeding Pliocene epoch, ten to one

million years ago, the climate became warmer and drier, and this was followed by the Pleistocene epoch from one million to ten thousand years ago which was a time of climatic instability. Cool moist periods with glaciation on the higher parts of the southeastern mainland and Tasmania alternated with warm dry intervals. The Diprotodontidae continued as a diverse family through the Pliocene and into the Pleistocene but the last of them disappeared soon after the arrival of Aboriginal man. The dromornithids and flamingoes declined after the Miocene and only one species of each survived to the Pleistocene, becoming extinct apparently before the arrival of man.

The earliest fossil remains of rodents in Australia are Pliocene in age. Their ancestors must have arrived on floating vegetation from Southeast Asia, the centre of origin of the family Muridae to which they belong. Australia has never been connected by land to Asia and natural introductions are still going on. In recent decades at least two birds have become established in Australia as breeding species; the sarus crane (*Grus antigone*) of Southeast Asia, and the southern black-backed gull (*Larus dominicanus*), the common gull of most parts of the temperate and subantarctic Southern Hemisphere.

The Australian continent has suffered two invasions by man; the ancestors of the Aborigines arrived over 30,000 years ago and Europeans settled less than two hundred years ago. The first Aborigines introduced no other organisms than their own parasites but Aboriginal immigrants at a later period brought the dingo with them. There is no general agreement on the effect of the long occupation of the Aborigines on the fauna and flora. It is believed by some authorities that the Aborigines had a drastic effect because their exuberant use of fire caused fundamental changes in the vegetation which in turn affected the abundance and distribution of animals and led to the extinction of the giant Pleistocene fauna. The dingo is often blamed for eliminating the Thylacine (*Thylacinus cynocephalus*) and Tasmanian devil (*Sarcophilus harrisii*) from mainland Australia by competing for food and perhaps direct predation, and this may well be the case.

European settlement began at Sydney Cove in 1788 and a profound alteration of the face of Australia followed. Within a century large areas had been depopulated of Aborigines, including the entire Aboriginal population of Tasmania with their distinc-

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CHANGING THE FACE OF A CONTINENT

BY J.H.CALABY

tive culture. Large expanses of forest had been cleared and replaced by crops of plants from the Northern Hemisphere, and huge and increasing numbers of sheep, cattle and horses were established in large parts of the continent. In addition, the rabbit and other vertebrate pests were spreading rapidly and large numbers of weeds were growing from seeds or plants imported accidentally with seeds of crop plants or stock feed, or as garden plants. Other accidental introductions were the insect pests of the plants, parasites of domestic and other animals, European earthworms and molluscs that came in soil or among plants—the list is endless.

The result of this onslaught on the Australian environment was a general decline in the native fauna and the extinction of some species. It is surprising that not more native species disappeared. At the present time sixteen species—two birds, seven marsupials and seven rodents are believed to be extinct.

ANIMALS BELIEVED EXTINCT

last authentic record

Night Parrot <i>Geopsittacus occidentalis</i>	1912
Paradise Parrot <i>Psephotus pulcherrimus</i>	1922
Thylacine <i>Thylacinus cynocephalus</i>	1933
Pig-footed Bandicoot <i>Chaeropus ecaudatus</i>	1927
Broad-faced Rat-kangaroo <i>Potorous platyops</i>	ca 1875
Desert Rat-kangaroo <i>Caloprymnus campestris</i>	1935
Brown Hare-wallaby <i>Lagorchestes leporides</i>	ca 1890
Desert Hare-wallaby <i>Lagorchestes asomatus</i>	1932
Toolache Wallaby <i>Macropus greyi</i>	1927
Fields Mouse <i>Pseudomys fieldi</i>	1895
White-footed Tree-rat <i>Conilurus albipes</i>	1840s
White-tipped Rabbit-rat <i>Leporillus apicalis</i>	1933
Darling Downs Hopping-mouse <i>Notomys mordax</i>	1840s
Large-eared Hopping-mouse <i>Notomys macrotis</i>	1840s
Long-tailed Hopping-mouse <i>Notomys longicaudatus</i>	1901
Large Desert Hopping-mouse <i>Notomys amplius</i>	1896

Five of the lost mammals are known from inadequate museum material. *Notomys macrotis* is represented by two damaged specimens from Western Australia that closely resemble *Notomys cervinus*, a well-known species living in semi-arid eastern Australia. It is probable that these two forms are only subspecifically distinct from one another. *Notomys mordax* is known from a single damaged skull, *Pseudomys fieldi* from a single damaged specimen with a badly fragmented skull, *Lagorchestes asomatus* from a single skull, and *Notomys amplius* from two specimens. The specimens representing these four species may yet prove to be aberrant examples of other well-known species.

The birds have fared better than the mammals since European occupation of Australia and the only ones

that have certainly disappeared are the emus of Tasmania, King and Kangaroo Islands. The emus of King and Kangaroo Islands were small and distinctive but they are usually considered to be subspecies of the mainland form.

Deliberate persecution was the main cause of the disappearance of only two species, the thylacine and the toolache wallaby. At the beginning of European settlement in Tasmania the thylacine was fairly common in woodland and drier forest and heath country. It quickly earned a reputation as a sheep killer and a bounty was paid for its destruction by stock owners. Eventually the bounty payment was taken over by the Government which continued to offer it long after scalps were no longer presented for payment. The toolache wallaby formerly occupied grasslands in a fairly limited area of southeastern South Australia and probably the adjacent part of Victoria. Landholders paid a bounty for its scalp and it was killed in large numbers for its beautiful pelt. Because of its speed it was coursed with dogs as a sport. As a result of this persecution it rapidly declined and the last known animal died in captivity in 1927.

There is evidence that some of the lost animals, e.g. *Potorous platyops* and *Conilurus albipes*, were declining at the time of European occupation as a result of climatic changes but it is clear that the majority have become victims of habitat alteration caused by introduced stock and rabbits and other factors. For example, the brown hare-wallaby lived on the plains of western New South Wales and eastern South Australia and was apparently quite common. Its habitat was largely destroyed by a combination of overstocking by sheep, rabbits and drought in the 1880s and 1890s and it has not been seen since that time. The desert rat-kangaroo has had an intriguing history. It was described in 1843 from an unknown locality in South Australia and was not heard of again until 1931 when a specimen was collected in stony desert country in the Lake Eyre region. Other specimens were taken in the same area in the next year or two but there has been no further record since 1935.

In spite of this gloomy catalogue of losses, it is possible that some or even all of the supposedly extinct species may yet reappear. Occasional sightings of the two parrots and the thylacine have been claimed to the present day. Nine other animals have been written off as extinct in the past but have reappeared after long intervals.



The white-footed tree rat, *Conilurus albipes* (formerly *Hapalotis albipes*), from *The Mammals of Australia*, Vol. 3, by John Gould, London, 1863.

ANIMALS FORMERLY BELIEVED EXTINCT BUT WHICH HAVE REAPPEARED

	last record	rediscovery
Western Swamp Tortoise		
<i>Pseudemydura umbrina</i>	1839	1953
Noisy Scrub-bird		
<i>Antrichornis clamosus</i>	1889	1961
Dibbler		
<i>Antechinus apicalis</i>	ca1884	1967
Large Desert Marsupial-mouse		
<i>Sminthopsis psammophila</i>	1894	1969
Mountain Pigmy-possum	ca 15,000 BP	
<i>Burramys parvus</i>	Pleistocene	1966
Leadbeater's Possum		
<i>Gymnobelideus leadbeateri</i>	1909	1961
Parma Wallaby		
<i>Macropus parma</i>	1932	1966
New Holland Mouse		
<i>Pseudomys novaehollandiae</i>	ca1887	1967
Large Eastern Native-mouse		
<i>Pseudomys oralis</i>	ca1847	1969

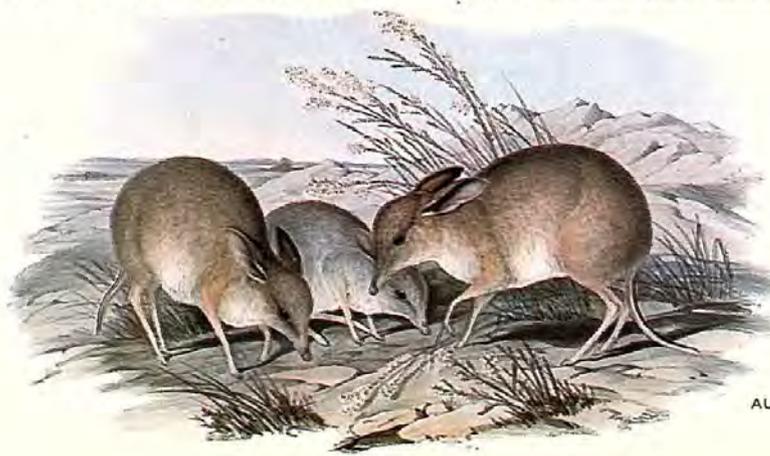
The mountain pigmy-possum was known only from fossil bones first collected in 1894 until 1966, when it was discovered living on a mountaintop in eastern Victoria.

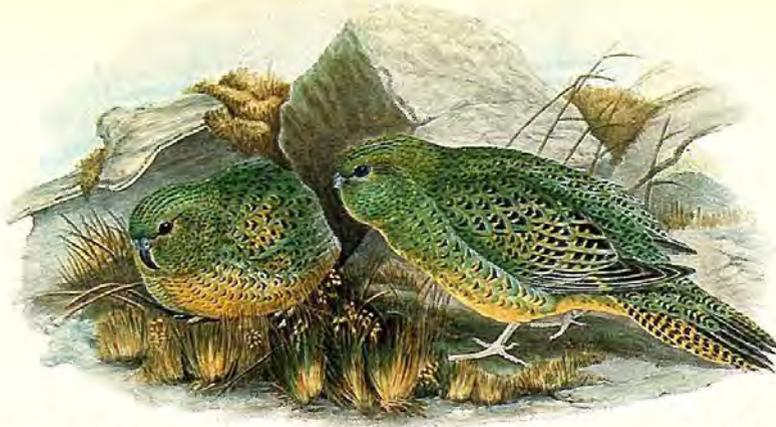
A large number of species of introduced vertebrates—24 mammals, 24 birds, 12 fishes, a toad and perhaps two reptiles—have become established in the wild since European occupation. All of the common livestock; horses, cattle, sheep, goats, pigs, domestic rabbits, fowl, geese, turkeys and ducks were landed at Sydney Cove from the First Fleet. Within a year the colony's small group of cattle escaped; they were discovered some years later about 60km from the settle-

ment and in the meantime had built up to a sizeable herd. These were the first feral livestock in Australia.

All of the common domestic mammals, except perhaps the sheep, are now established as large feral populations over extensive areas of Australia. Camels and donkeys were introduced in large numbers as draught animals in the more arid and tropical parts of Australia. After motor transport became common in the 1920s and 1930s the donkey and camel teams were abandoned and their descendants now roam the interior and tropics in large herds. Early military settlements on Melville Island and the Cobourg Peninsula in what is now the Northern Territory were the source of further feral animals. Pigs, European cattle, Timor ponies, water buffalo (*Bubalus bubalis*) and Bali cattle (*Bos javanicus*) escaped or were released when the settlements were abandoned. Most of these animals came from Timor and other Indonesian islands. The buffalo now occurs in large numbers in all of the river floodplains; in the northwestern part of the Northern Territory. Bali cattle are a domestic form of the wild banteng, a very attractive forest ox of Java, Borneo, and parts of the Southeast Asian mainland. They have not spread beyond the Cobourg Peninsula. In general, feral livestock are an important cause of habitat deterioration and no doubt this has had an adverse effect on native wildlife.

Early in the European settlement period wealthy





The Night Parrot, *Geopsittacus occidentalis*, from the supplement to John Gould's *The Birds of Australia*, London, 1857-1869.

landholders turned their thoughts to importing exotic game, especially deer, and various species were brought to New South Wales, Victoria and Tasmania. In the 1860s and later, these efforts at naturalization were formalized in the creation of Acclimatization Societies, the most active one being in Victoria. The people involved in these organisations were the wealthy members of society—the landed gentry, leading natural scientists and city businessmen. A most enthusiastic acclimatizer in New South Wales was Dr. George Bennett who was closely associated with The Australian Museum in its early years and was its first Secretary. Virtually all of the acclimatizers were British- or European-born who saw little charm in the native flora and fauna and wished to make the countryside as much like home as possible.

Among the successful introductions of the Victorian Acclimatization Society are several species of deer, songbirds such as the skylark (*Alauda arvensis*), the European hare (*Lepus europaeus*), the spotted turtle-dove (*Streptopelia chinensis*), the song thrush (*Turdus ericetorum*), the blackbird (*Turdus merula*), the house sparrow (*Passer domesticus*), the starling (*Sturnus vulgaris*) and the Indian myna (*Acridotheres tristis*). The reason given for the importation of the last three was control of horticultural and garden insect pests! The greatest disaster to the native flora and fauna and the livestock industries was the introduction to Victoria of wild rabbits by the wealthy landholder Thomas Austin in 1859. Within fifty years they

had overrun virtually all of Australia south of the tropic.

Other introductions that have probably had serious detrimental effects on native fauna are the European fox (*Vulpes vulpes*), the feral cat (*Felis catus*) and the cane toad (*Bufo marinus*). The fox was introduced by wealthy Victorian landholders for hunting purposes, and cats kept as domestic pets have taken to the bush since the earliest days of settlement. The cane toad was introduced in the 1930s to the sugarcane growing districts of Queensland in a misguided attempt to control insect pests of cane.

A few vertebrate species were accidentally introduced. Chief among these are the two pest rats (*Rattus rattus* and *Rattus norvegicus*) and the house mouse (*Mus musculus*). Two geckos, *Hemidactylus frenatus* and *Lepidodactylus lugubris*, found in association with buildings in various inhabited regions of tropical Australia, were almost certainly introduced in ships' cargoes. In recent times, aviary and aquarium escapees have added to the tally of introduced species.

The introduction to Australia of European man and his animal dependents and camp followers has been an almost unrelieved disaster for the native fauna. Although much has been accomplished, we still have a long way to go before we can say that we are doing our best to control the introduced fauna and rehabilitate the native.

The toolache wallaby, *Macropus greyi* formerly *Halmaturus greyi* from *The Mammals of Australia*, Vol. 2, by John Gould, London, 1836.



REFLECTIONS IN LITERATURE

BY LEONIE KRAMER



The fuschia-heath, *Epacris longiflora*, from "Remarks on the Flora of the Blue Mountains", by Rev. W. Woolls, in *The Railway Guide of New South Wales* (for the use of *Tourists, excursionists and others*), Sydney, 1886. In the Mitchell Library, Sydney.

The Australian Museum has recently been advertising its two Geyptian mummies, to attract attention to its many other exhibits of interest. Exactly 125 years ago, in November 1851, two Peruvian Mummies were displayed at the Royal Hotel, and the *Sydney Morning Herald* was advertising a lecture by Dr. Aaron on "these singular and interesting relics of mortality." It was hoped that they could be purchased by the Museum (which they may subsequently have been); and their presence inspired a quite astonishingly bad poem which begins "Who wast thou, Mummy?" and, which, after a series of speculations and questions which the relic obstinately fails to answer, finally arrives at the conclusion attributed to it in spite of its uncooperative silence, that it was "safe above with God."

I mention this because it is only one of many examples of the reflection in verse and prose of the first hundred years of The Australian Museum's history. It was, of course, a period in which people quite naturally turned to verse to record events which now would be the subject of a news item or a documentary programme. Trustees of the Museum, and many other people not directly associated with it expressed their interest in its activities in articles, lectures, poems, even sermons. When, for example, Caroline Louisa Atkinson died, the Rev. William Woolls, in unveiling a tablet to her memory, spoke of her contribution to natural history, and of "the plant *Atkinsonia* on yonder mountains" which, he said, "will be a lasting memorial of her talents and goodness". Woolls was known also for his 'Lectures on the Vegetable Kingdom', and his essay 'The Progress of Botanical Discovery in Australia' remains an intensely interesting account of the work of explorers from Dampier to W.B. Clarke. In 1892 he wrote a poem in memory of R.D. FitzGerald, grandfather of the present poet, in which he refers to FitzGerald's work on orchids in verse more sincere than praise-worthy:

Oh! yes, he loved to speak of all
His orchids ever bright,
And show their parts, however small,
By microscopic might.

Seventy years later Douglas Stewart redeemed

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Woolf's poetic sins in his fine poem 'Sarcochilus Fitzgeraldi':

Here's a word for you, Robert D. FitzGerald:
 I met your grandfather living under a stone,
 Changed to a small green orchid; where the knobbed
 Dripping red cliff-face towered and the creek fell
 down
 Through bracken and wattle, rock-fall and wilderness
 To the chasm where the lyrebird sang; yes, there he
 stood,
 Safe on the very brink of bushfire and flood,
 Sarcochilus fitzgeraldi, no less!

The subjects taken up in prose and verse in this period cover all the main aspects of the museum's activities—ethnology and antiquities, explorers and naturalists, Australian natural history, and curiosities, such as the lungfish.

In 1869 a living lungfish (*Ceratodus forsteri*) was found in the Burnett River in Queensland. Gerard Krefft, Curator of The Australian Museum, who first described it, named it after William Forster, man of letters and politician. On his trip abroad of 1871-2 John Smith, Professor of Chemistry at the University of Sydney and a member of the first Board of Trustees of the Museum (1853) took a specimen of the lungfish to Harvard University Museum—"the best possible letter of introduction", as he put it. *Ceratodus forsteri* had already been introduced (in 1870) to the New South Wales public in poetic form. The Reverend William Clarke—'Prince of Australian Geologists' as Woolf called him—wrote his poem in order to imprint the history of the fish "on the memory of such as do not disdain any legitimate means of conveying information respecting any portion of the most complete and interesting of the exhibitions which have taken place in New South Wales". In 1843, so the poem relates, some teeth of *Ceratodus* were found. But only



now, Clarke announces, has the actual fish been identified, and with a swift classical flourish he continues:

An engraving from *An Illustrated Poem, ORARA* by Henry Kendall, Victoria, 1881.

Lucullus ate Muraena rare,
 In Rome the daintiest dish,
 And squatters on the Burnett dined
 On geologic fish.

Then he goes on to the serious business of scientific description:

"What is *Ceratodus*?" You ask -
 "Mud-eel" may some reply;
 But 'tis no Eel, as anyone
 Can easily espy.
 The creature partly reptile is,
 And partly fish besides,
 And has some queer affinities
 With tailless Batrachides.†

Yet though great difficulties seem
 Its status to environ,
 It is, without the slightest doubt,
 Related to a siren.‡

*Lepido-Siren †Anourous batrachia ‡Owen (*Vertebrates*) 1, 3185
 The uses of verse have certainly diminished in the last hundred years.





'South Arm, From the Springs' from *Our Island Home, a Tasmanian Sketchbook* by Louisa Meredith, London, 1879. In the Mitchell Library, Sydney.

In 1877 Krefft published *Nature in Australia*, 'A Popular Journal for the Discussions of Questions on Natural History.' Again verse is put to didactic purposes, this time to teach young people. Away with the "bulky crabbed book", the specimens displayed out of the reach of children, says Krefft. Instead he offers an improved display with good pictures and plain English. This last objective at least is realized in his verse:

There now remains to notice yet
The Bats of the placental set:
We them divide first in fruit eaters,
And then in numerous insect feeders.
The flying fox or Vampire Bat
On luscious fruits alone gets fat;
The species number five at least,
Which range along the coast northeast,
Well known in Sydney, yet we learn
They seldom stray down to Melbourne,
So all fruit growers, South and West
Can easy-minded go to rest.

'Molecular Evolution' in verse presents no difficulties to Krefft either.

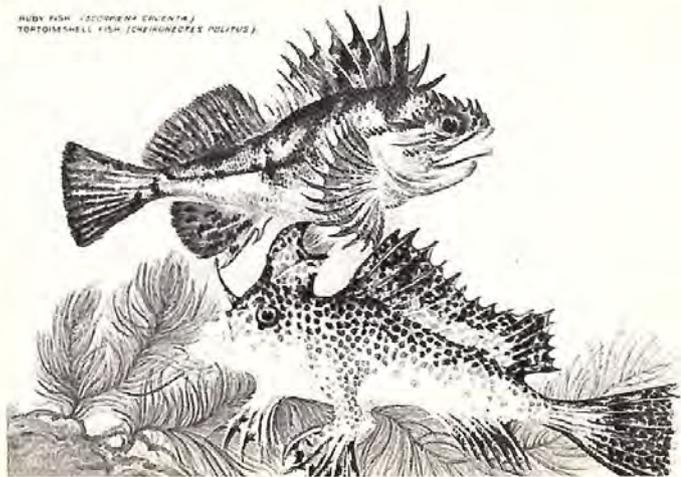
One of Woolf's students was J.H. Maiden, Government Botanist and director of the Botanic Gardens. In 1902 Maiden published an article on 'Our Poets and our Flora'. In it he expresses his disappointment at "the meagre references by the occupants of our poet's corner to the Australian vegetation." Maiden's complaint is interesting, since it conflicts with the

much more common view that Australian literature has been far too preoccupied with local colour, and that the sign of literary maturity is to take the local environment for granted, not to describe it in detail.

Maiden regarded this alleged neglect as a sign of the Australian's indifference to his natural world. "The allusions by our poets to the vegetation are, as a rule, only passing ones..." and, he adds, Australian poetry is frequently about "something horsey. Or some practical joke, or some facet of endurance or of skill in some pastoral pursuit..." But he is able to find some honourable exceptions to his rule—Kendall, Harpur, Victor Daley and Brunton Stephens writing about gum trees, and Thomas Walker and Sheridan Moore about their habit of shedding bark. Maiden's catalogue might have been graced by the admission of a prose description from Ellen Clacy's *A Lady's Visit to the Diggings* (1852) of "the majestic iron bark, *Eucalypti*, the trunks of which are fluted with the exquisite regularity of a Doric column."

But there were other poetic efforts Maiden could have mentioned. Perhaps the best known is Barron Field's 'Botany-Bay Flowers' (1819), in which he describes *Epacris grandiflora* "the sole plant that never ceased to bloom." But he chiefly celebrates the 'Australian "fringed violet"' which replaces *Epacris grandiflora* in his affections. Louisa Meredith in 'The Gigantic Lily', (1844) describes *Doryanthes excelsa*, the Gynea Lily. Douglas Sladen writes 'To the Fallen Gum-Tree on Mt. Baw-Baw', (1882) pointing out in a footnote that it measured 480 feet, and, where the top had been broken off, had a diameter of 2 feet. Emilie Manning wrote 'The Buddawong's Crown' (1877), a parable about a zamia palm dying in the embraces of a bird's-nest fern. And her poem 'From the Clyde to Braidwood', of the same period, is full of references to the changing vegetation—swamp-oaks, wattle, eucalyptus, ferns, zamia-palms, clematis, jasmine, kennedyia, immortelle, epacris, sassafras, myrtle, kurrajong, lavender, musk-plant, bigonia, asplenium, 'creeping-lion's-foot'—no mean score for a poem of 137 lines. Though there may be doubt about the precise plants she refers to in some cases, there is no doubting her attentiveness to detail. An even more scientifically-minded poet published in the *Sydney Morning Herald* in 1860 a poem 'On Some Mosses, Ferns and Moss Insects Seen Through a Microscope of High Power'.

RUBY FISH (*SCORPENA ORIENTALIS*)
TOPSHHELL FISH (*CONIROHNETES POLIUS*)





Nor are birds and animals neglected. Barron Field's 'The Kangaroo' is deservedly notorious. But there are others. John Dunmore Lang wrote 'The Coral Insect' (1826). John Boyle O'Reilly earned a different kind of notoriety by writing about scentless flowers, fruitless trees - in short, a land "all perfumeless and mute". But he also versified a Western Australian bushman's tale 'The Dukite Snake' (c.1870s), the message being that if you kill one you must search for a second one or it

will follow your track like Death or Fate,
And kill you as sure as you killed its mate!

James Thomas in 'To a Water Wagtail' and 'To a Silver-Eye' offers sharp observations which are not, unfortunately, matched by the quality of the verse. Alfred Allen attempts an ambitious verse description of 'The "More Pork" Bird'. But the best known of all is deservedly Kendall's 'Bell Birds', though its ornithological accuracy was recently called into question by James McAuley.

In prose of the period, as one would expect, even more detailed information is to be found. In early fiction, much space is given to the documentation of the landscape, and it seems curious that critics should have been somewhat scornful of these genuine efforts to bring the details of the Australian natural world into our literature. It is true that later writers have, perhaps, made their descriptive scenes more relevant to their literary intentions. But in novelists such as Caroline Atkinson and William Howitt the specific descriptions of the natural world are strengths rather than weaknesses. In the work of Henry Kingsley, who was intensely interested in the botany and geology of Australia, the accurate references to plants and geological forms are of exceptional value. (Though I know of no direct evidence of their meeting, it seems very likely that he was acquainted with Baron Von Muller.) In an essay published in 1883 George Knox complained that Australian poets had so far failed to recognise the special beauties of native flowers, and he refers to the waratah, the blandfordia, the dendrobium and epacris. He sees in these flowers metaphorical possibilities. The rock-lily, rising from bare rock and flowering in spite of the buffeting of sea winds resembles "the genius which resists all the hostile influences of place and circumstances, and dazzles the world with some unlooked for achievement." Knox would be better pleased with some modern poets and novelists who have continued to chart the Australian natural world, so that there is now a substantial and valuable literary record of many of its features. Their purposes have been interpretive and reflective, as Knox would wish, rather than didactic, but if the quality of their work surpasses

that of their nineteenth century predecessors, it also owes something to their pioneering efforts.

When in 1927 The Australian Museum celebrated its centenary, the *Sydney Morning Herald* reported that it "has always been short of funds and short of room". The article goes on to say "Infinity of riches in a little room may be very pretty as a phrase, but as a description of a museum it should be singularly inappropriate." I think we would all say 'Amen' to that, and agree with the writer who (in 1828) sustained his very enlightened and practical suggestions for the Museum with the faith that "the establishment of an Institution of this nature could show that Australia is not occupied by a handful of felons or a few poor needy adventurers, anxious only for the accumulation of wealth, but that the seeds of a great Nation are sown and are even now beginning to fructify." It is easy to be patronising about the literary enthusiasms and gaucheries of the nineteenth century poets who attempted to familiarize their readers with the still strange flora and fauna of Australia, often in verse of excruciating clumsiness. But their desire to share their discoveries was another manifestation of that passion for knowledge and education which is so remarkable a feature of the period, and which enabled the Museum to be established so early in the life of the colony.

Some of the ferns illustrated in 'Remarks on the Flora of the Blue Mountains', by Rev. W. Woolls in *The Railway Guide of New South Wales (for the use of Tourists, excursionists and others)*, Sydney, 1886. In the Mitchell Library, Sydney.

A coloured lithograph of *Sarcochilus fitzgeraldi*, from *Australian Orchids*, Vol. 1, Part 3, by R. D. Fitzgerald, Sydney, 1877. In the Mitchell Library, Sydney.





Museums throughout the world are being paid a lot more attention these days. Very many more people are visiting them and finding that they are not as dull as when they were there last. The rather rigid and conservative approach of many museums is giving way to innovation; new approaches are being adopted to ways of meeting traditional responsibilities.

It is universally accepted that museums began as sanctuaries dedicated to the 'muses' (Greek goddesses—inspirers of poetry, song, dance, etc). Later the word came to apply to academies for philosophical and scientific speculation, buildings inhabited by scholars, with space for the display of objects and for the performing arts—dance, drama, music. Quite a few museums have recently resumed such performances.

Museums are considered by professionals to exist to perform three functions: to collect (and to maintain and conserve their collections), to conduct research (related to those collections), and to educate. It is usually believed that their success is measured primarily in relation to their performance in the first of these functions—the quality of the collections. An organisation that simply conducts research, even though it may be in the same disciplines as would be undertaken in a museum, is not accepted as a museum any more than is an organisation which simply puts on exhibits.

Although the habit of collecting simple things—stamps, cigarette cards, pretty stones, shells from the beach—is common to most people, certain types of collections have, in the past, tended to be identified with the upper class. Money to acquire art pieces or rare minerals or antique furniture, and knowledge of such items, has been the property of a few people. A notice issued in September 1773 by Sir Ashton Lever, who owned a natural history museum at Alkington in England, demonstrates the frequent isolation of those running museums from the 'common people':

"This is to inform the Publick that being tired out with the insolence of the common People, who I have hitherto indulged with a sight of my museum, I am now come to the resolution of refusing admittance to the lower class except they come provided with a ticket from some Gentleman or Lady of my acquaintance. And I hereby authorize every friend of mine to give a ticket to any orderly Man to bring in eleven Persons, besides himself whose behaviour he must be

answerable for, according to the directions he will receive before they are admitted. They will not be admitted during the time of Gentlemen and Ladies being in the Museum. If it happens to be inconvenient when they bring their ticket, they must submit to go away and come back another time, admittance in the morning only from eight o'clock till twelve."

The value of museums as places of education was recognised from the eighteenth century, the time of the industrial revolution. Displays of pottery, silverware, even simple machinery, were considered to set an example to the new class of artisan. From that time to the present the scientific side of museums has performed two roles. Firstly, as organisations active in basic research, science museums (including natural history museums) have made contributions to understanding science. Natural history museums have participated in biological surveys and environmental impact assessments, and their collections have been used in exercises such as the determination of previous levels of heavy metals in animal tissues, or the study of the occurrence of structural abnormalities in relation to pollution. Museums have also investigated past history—for instance, Dutch discoverers in Western Australia or European settlement in South Australia. As a second role, science museums have conveyed the complexity of knowledge in an authoritative form, sometimes in a manner (perhaps unconscious) which perpetuates the mystery of science—science is good, society should support it, scientific knowledge must be acquired by the populace so that sensible decisions can be made. Science Centres, growing at a phenomenal rate in North America, are developments from this approach.

The more conservative and traditional approach of museums is exemplified by the attitude of the Metropolitan Museum of Art to the developing interest in modern art in New York in the early twentieth century. The Metropolitan, which had for years purchased many pieces on the recommendation of the Society of American Artists, obtained few items in the 1920s and 1930s representing American art of the time. A letter to the press in 1927 stated, "so far as one can judge ... American art might have ceased in 1913". The founding of the Museum of Modern Art in 1929 and of the Whitney Museum of American Art in 1930, both of which concentrate on contemporary art, was at least indirectly a result of the refusal of The Metropolitan to

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MUSEUMS AND CHANGING CONCEPTS

BY D. J. G. GRIFFIN

consider accepting collections of such art even as gifts.

Many museums in recent times continued to display Aboriginal artefacts sacred to certain tribes long after the offense that this would give to Aborigines was realised. North American museums displayed Indian artefacts beyond the time the Indians expressed the wish to have those items returned to them. Such actions have, in the past, been typical of museums which have collected items from other cultures. As a result, items of immense importance to particular cultures are located in museums in other countries and are no longer accessible to many people who appreciate the importance of those items. The holding by the British Museum of treasures from Greece, the Indian sub-continent, Egypt and many other countries is an example. The point might be made in defence of these actions that governments have, in the past, not been particularly concerned with retaining cultural items within their own countries, or could not guarantee the preservation of the items. Museums of other countries have found it easy to collect and indeed were of the view that their collecting would result in the preservation of important items which would otherwise be lost to the world.

Museum trustees and administrators are coming to realise that such approaches as these are today unacceptable. Many museums have now adopted policies, in accordance with the 1970 UNESCO Convention, on the means of prohibiting and preventing the illegal export, import and transfer of ownership of cultural property. Such policies require museum authorities to desist from accepting cultural items from another country without explicit permission of the Government of that country; authorities in different countries are to co-operate in preventing persons or organisations trading illegally in cultural material.

In Australia in the last decade the increasing interest in the nation's history (or at least that part of it concerning the period from 1788 when the First Fleet arrived) has been accompanied by an extraordinary growth in the number of 'folk museums'—museums established by local historical societies mostly displaying items found in and representative of the history of that area. There are now well over a thousand such museums in Australia. The number of people visiting these establishments is huge. This growth in local museums in Australia has been accompanied by the development of 'Museums of Living History' or 'Open Air Museums'—Sovereign Hill (Ballarat), Swan Hill, Lachlan Vintage Village

(Forbes), Old Sydney Town (Gosford). These enterprises attempt to provide for the visitor a sense of returning to the past and a heightened awareness of the nature of human existence over a hundred years ago. Whilst such operations have been criticised on a number of counts—lack of authenticity of the reconstructions, excessive concentration on entertainment—it is fair to say that they might not have developed had existing major museums made a greater attempt to deal effectively with European history in Australia. Perhaps the existing museums were hamstrung by concern for the well-being of their collections at the expense of the use of them for public exhibition and education. As the Report of the Committee of Inquiry on Museums and National Collections had observed, "anyone who fifteen years ago predicted that huge numbers of people would gladly pay large admission fees to look at museums outside the capital cities would have been treated as insane". Such museums do play a vital role as they contribute not only to knowledge but also to people's pride in their origins and background.

Museums are now coming to be seen as places where a people's material culture can be preserved and viewed by those to whom these items are most significant. In a number of areas in Australia the local Aborigines have been given grants to develop museums. Here artefacts of importance in the 'education' of the young men into their religious and cultural heritage and into the myths and legends of the tribe will be placed. Increasing Westernisation has meant that the hiding places where such items were previously kept and to which the young men of the tribe were taken, exist no longer. This is little different from the considerations which are leading to the sending to Australia of items representing the cultures of countries in Europe to which, after the many years of Government assisted migration, so many Australians now trace their origins. To allow people of Italian or Greek or Spanish descent to view these items reinforces a positive attitude to the importance of their culture as something in its own right, in which they have every justification for pride, rather than as something they must dismiss or submerge in the adoption of their new country. Looking to the future does not require exclusion of the past.

Developments such as Open Air Museums, Science Centres and many of the developments of local or community museums in North America suggest that perhaps the museum is moving away from being simply a collection-based institution. But simply

Frontispiece from *Museum Wormianum*, shows the interior of the first museum in Copenhagen. This must have been typical of a museum of the seventeenth century.

making available more items from a greater range of cultures and of a wider variety of forms does not necessarily enhance the museum experience. Hordes of people, each with a set time to see each exhibit are a typical sight outside museums. Thousands of people now wait for hours in a queue to see the exhibition of Chinese sculpture and artefacts at the Art Gallery of New South Wales. Roy Strong of the Victoria and Albert Museum calls such huge exhibits sensationalism not education; museums have become show business!

At a seminar on neighbourhood museums in Brooklyn, New York, in November 1969, the divorce between museums and the communities they might serve emerged in strident tones. Among the views expressed were: Museums in a community should be manned by people in that neighbourhood because they are aware of their own needs. People are getting tired of other people planning for them. If a museum is supported by members of a community they are going to be more interested in the success of that museum. Cultural institutions can be integral parts of their communities by harnessing the energies and views of the local people.

Many museums are responding to these feelings. The setting up of the Anacostia Neighbourhood Museum in south-west Washington D.C. in 1967—where black art, local history, urban problems, black history and workshops for area residents are featured—is an example. The staging of 'Rites of Passage' by the Philadelphia Museum of Art in January 1976 comprised a sequence of collaborative exhibitions created by members of five diverse cultural groups from distinct locations in the city. The concept was based on the understanding that significant cultural and aesthetic traditions exist in a city's neighbourhoods. These examples have been taken from the USA because the 'museum scene' there is particularly active and often innovative, although not all of their problems and solutions can be applied to Australia.

In Sydney, however, moves by residents of Woolloomooloo to form a neighbourhood museum parallel these events. Local people feel strongly that this early settled area in Sydney is vitally important, that its history and development in the urban environment must be portrayed.

The Australian Museum has recently attempted to involve local children by putting on programs, publicised locally, in which children are involved in a wide range of activities. These have included microscopic examination of minerals and insects; casting fossils in plaster; tagging and releasing butterflies in conjunction with the Museum's insect migration studies making pots by several methods and reassembling broken ones as would an archaeologist; modeling animals in papier mache and clay; and a variety of Aboriginal, Pacific and Asian crafts such as string-making, mask-carving (using polyurethane foam), shadow puppet-making, batik and woodblock

printing. Children and parents are responsible jointly with museum staff in evaluating the success of these programs. Such activities have provided an insight into nature and exposed the richness of other cultures extremely effectively.

There is one cautionary note. Such developments, if they are to succeed, must be done well. The exhibits must be done with style. They must involve people from all parts of a community, those with great skills as well as those with ideas.

There is a further point. In the United States, national identity has always been a strongly pursued objective. Recognition of the importance of the contribution of artists, of the development of cultural pursuits, has received recognition from the earliest times, not least by financial support from Government to artists, writers, musicians, etc. during the depression years of the 1930s. Such recognition has materialised recently in the passage through the US Legislature of the Museum Services Bill. The testimony of over thirty witnesses at the public hearings on the bill detailed their institutions' struggle to survive under mounting pressures of larger crowds, inflationary costs, crumbling buildings and deteriorating collections. The *Washington Post*, *Newsweek* and the *New York Times* covered the proceedings with the *Post* running supporting editorial. Leading members of the Legislature including Senators Hubert Humphrey, Edward Kennedy and Walter Mondale supported the bill.

In Australia, a most constructive report on the future of museums has been followed by little public discussion and, perhaps due to the current economic situation, little concerted Government action.

Museums are coming to be recognised as places unique in many ways. Their special contribution to the increase of knowledge about the environment, science and the humanities is both essential and relevant; their level of scholarship is high. Museums are in contact with large numbers of people with very diverse views. They have the capacity, through their general independence of large controlling organisations, to respond to changing community attitudes very quickly indeed—much more so than the structures of the formal education system. If people in the community become fully aware of these features of museums and of what museums are doing now (rather than what they used to do), there is no doubt that much more support will be given to them, enabling them to do much more for the community of which they are a part.

FURTHER READING

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Pigott, P.H. *et al*, *Museums in Australia 1975*; Australian Government Publishing Service, Canberra, 1975.
Tomkins, C. *Merchants and Masterpieces: The Story of the Metropolitan Museum of Art*; Longman, London and Harlow, 1970.



Gregory Millen/Australian Museum

A class enjoys a natural history lesson using a school loan travel case from The Australian Museum.

Catch '76 perform during the official launching of The Australian Museum's concert series, 'Music at the Museum'.



Gregory Millen/Australian Museum



A team of scientists from The Australian Museum's Department of Environmental Studies sample fauna from the estuary of the Hawkesbury River.

Children study insects during a session of The Australian Museum's 'Drop-in After School' programme.



Heather McLennan/Australian Museum

Re-enactment of a typical scene from the life of the colony at Old Sydney Town, Gosford, NSW.



Gregory Millen/Australian Museum

The Australian Museum's temporary exhibition, 'Life in India and the Himalayas', including Air-India's 'Sringar' costume collection, was much appreciated by Sydney's Indian community as well as by visitors from other ethnic backgrounds.

Residents of the Holroyd municipality and a Museum scientist inspect The Australian Museum's travelling exhibit, 'Man, A Peculiar Primate', the first of a planned series of such exhibits which will tour Sydney's outer suburbs.



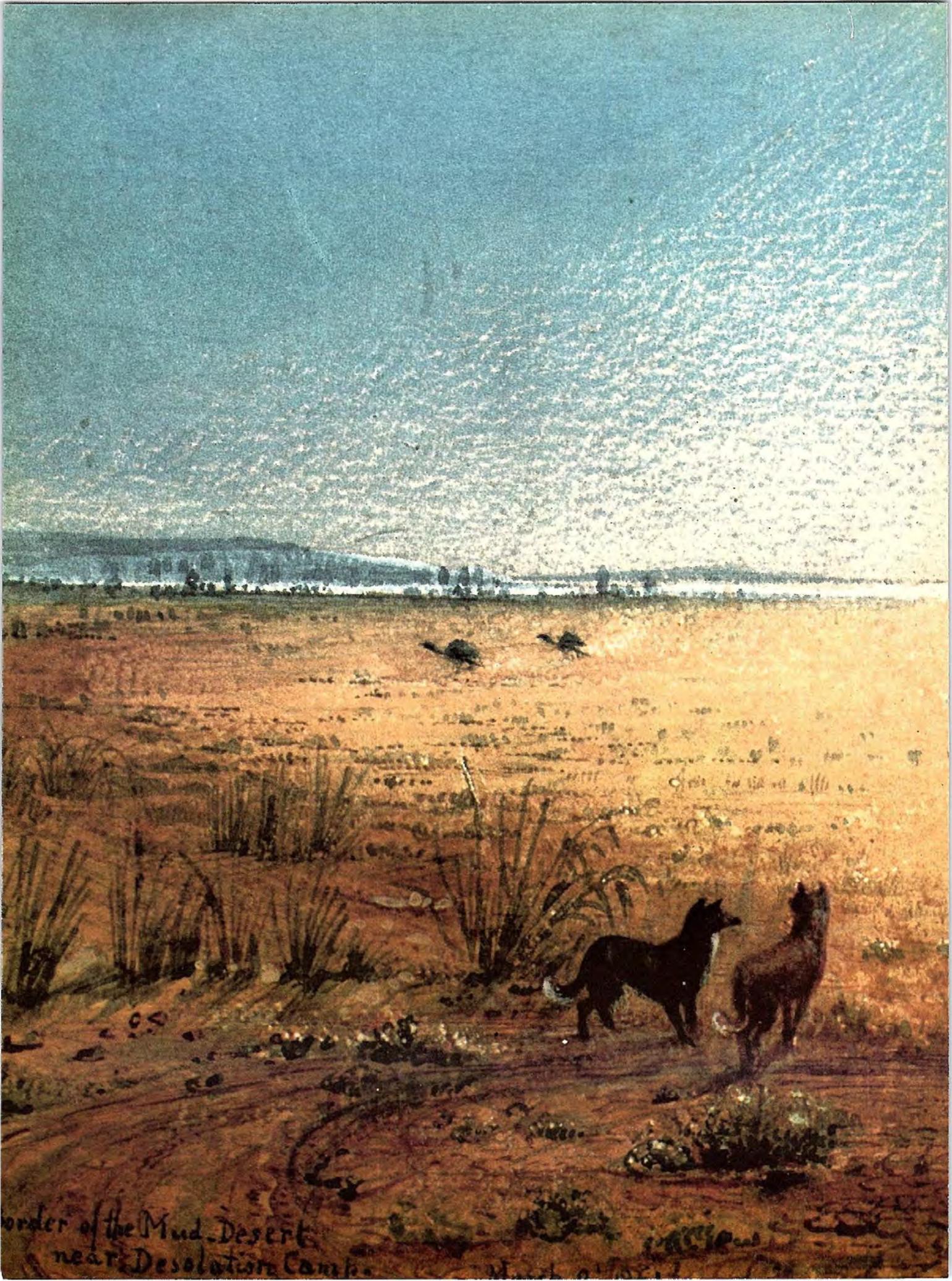
Gregory Millen/Australian Museum



Visitors to the Art Gallery of New South Wales wait to view the 'Modern Masters' exhibition, held from 10 April to 11 May, 1975.



K. Dundas/Art Gallery of New South Wales



border of the Mud Desert
near Desolation Camp