



7

THE RECORD IN THE ROCKS

Geology



A number of the early settlers who moved into the Darling Downs in 1841 were interested in their natural surroundings. Unlike many of the later immigrants they did not see the land merely as the source of affluence. Life could not have been easy, nevertheless they found the time to collect and to consider and discuss the significance of the specimens they found. Amongst the things that excited these settlers were giant marsupial bones, which the Aboriginal people knew to be those of the *Gyedarra* that had grazed around the water holes in the days of their forefathers. These bones were soon recognised as the remains of long extinct diprotodons. They are a link between the scientific culture of the newcomers and the folklore of the Aboriginal inhabitants of the land¹⁻³.

From 1859, with the founding of the Queensland Philosophical Society, we can glimpse through the pages of its *Transactions*, the group of naturalists that had gathered together in these early, formative years of the state. We can see the signs that the society was active and successful and that, from the earliest days, there were men and women to foster the science of geology, especially palaeontology⁴. Later, the search for minerals stimulated the government to an interest in geology and more fossils were found by professional geologists. However, mainly it was the collections made by the early settlers between 1840 and 1900 that engaged the attention of a succession of curators for whom the study of vertebrate palaeontology became a life-work, and that eventually made the Queensland Museum the home of vertebrate palaeontology in the state.

The Philosophical Society

Charles Coxen, an outstanding man in the early history of the state and a key figure in the founding of the Philosophical Society and the museum, was one of those early settlers⁵. Relatives of his, Patrick Leslie and his brothers, first settled the Darling Downs in 1840 and Coxen followed them from New South Wales soon after^{6,7}. He and his wife, Elizabeth (Fanny), were among the 15 or so settlers who discovered unusual bones on their properties. Frederick Isaac at King's Creek, George King of Clifton, and R. Turner and Henry Hughes, were doing the same thing on their new properties⁷. In 1842 colonial surveyor-general Sir Thomas Mitchell and C. Nicholson reported the first fossils to come out of Queensland¹⁸. Others, including the few official surveyors and professional naturalists, such as Ludwig Leichhardt, the Reverend William Branwhite Clarke, Samuel Stutchbury, and Dr George Bennett all made their way through the Darling Downs in the 1840s and 1850s acquiring fossil marsupial bones and other geological specimens enroute¹⁹. Most of the bones and other fossils found in this early period were sent either to Sydney to the budding Australian Museum, or to London to Richard Owen, the doyen of British Victorian palaeontology. Many, however, must have been kept at home, proudly displayed, or given to visitors. Some were undoubtedly given to the Philosophical Society — especially after it had founded its museum. In its first report in 1862 to society appealed to colonists for specimens and acknowledged the receipt of fossils from J.K. Wilson of Fitzroy Downs¹⁰.

The Mineral Boom

From the early trips of Commander Logan of the Moreton Bay Penal Colony, coal seams and fossiliferous limestone had turned up at Ipswich, and interest in the geology of the area had been aroused. By 1856 J.S. Wilson, geologist with the Northern Australian Expedition, had presented



The young Patrick Leslie, one of the first settlers on the Darling Downs.

Previous page: Fossil fish *Pachyrhizodus marathonsensis* from the Cretaceous Albian, Boree Park Station near Richmond. The type is in the museum.

a note on the geology of Brisbane to the Geological Society of London¹¹. Quite a few of the members of the Philosophical Society, including Gregory and Tiffin, had given papers on geology. Coxen, though not a geologist, presented a paper for J.K. Wilson *On the Geology of Western Queensland*. They all recognised the need for professional geologists to survey the wealth of their colony and to investigate the content and age of the rocks as potential sources of minerals. In 1859 the newly appointed Queensland government employed its first surveyor-general, A.C. Gregory¹². He, joined later by an assistant George Phillips, began the arduous task of understanding the geological structure of the state. Expeditions were moving north all through the next decade, bringing back rocks and fossils.

On 18 May 1867 the Reverend George Wight delivered an influential address to the Philosophical Society which was reprinted in the *Queensland Daily Guardian*¹³. He called attention to the pressing need for the appointment of a full-time government geologist: such a person was needed 'to guide and aid the development of the vast resources of Queensland' by 'the best, cheapest, and speediest means'. Richard Daintree, who had visited Queensland during his leave from the Victorian Geological Survey in 1863, was appointed to the position of government geologist for north Queensland in 1868¹⁴. Daintree was one of the first geologists to make regular use of photography during field work—one of the many images he has left us is that of the giant fossil marsupial bones at Maryvale. In 1869 he sent specimens and photographs, via Minister for Works C.S. Mein, to the Philosophical Society museum. Attempts were also made by society members to influence government to carry out extensive fossil collecting surveys but to no avail¹⁵.

By the mid-1860s a veritable mineral boom was on in Queensland which led to the need for both a better understanding of the geology and a general increase in geological education. The staff of the Geological Survey was increased to two in late 1868 when Christopher D'Oyly Hale Aplin became government geologist for south Queensland. His field notebooks of 1869–1870 are housed in the museum. A pencilled note for January 1870 tells us that he placed his collections 'in the hall of the Philosophical Society in trust for the National Museum collection whenever such a museum is established'—the Queensland Museum is often referred to as the 'National Museum' in its early annual reports¹⁶. Woods used the *Thylacoleo* specimens collected by Aplin in his review of this genus^{17,18}. D'Oyly Aplin collected around the Downs and in the Stanthorpe region and his new assistant, T.R. Hackett, collected around Gympie.

At the end of 1869 there was opposition to the use and costs of the geological survey, and Aplin's job as government geologist for south Queensland came to an abrupt end the following year. However, the Queensland government had finally decided to establish a mineralogical museum in the Parliamentary building, and in 1871 he was given the task of making a first catalogue of and arranging the minerals and fossils belonging to the government, which included his own and his assistant's collections (see Chapters 2, 3, 4). He completed the job in September 1871, but failed even to get adequate remuneration for his curation of the collection. He finally retreated to north Queensland, and to relative obscurity as a police magistrate¹⁹. Daintree also left his post as government geological surveyor for north Queensland in 1871, to become commissioner for Queensland mineral exhibits in London, going on to become the colony's agent general there.



Sir Thomas Mitchell, colonial surveyor-general, who reported the first fossils to come out of Queensland.



Explorer Ludwig Leichhardt, who collected fossils on the Darling Downs in 1844 while preparing for his expeditions.

The Early Museum Collections

Coxen, the first official curator of the Queensland Museum collections from October 1871, had little palaeontological expertise available to him in Brisbane, and sent specimens away to obtain information. Daintree's material went to London in 1873 as did some from the early explorers such as William Hann. Gerard Krefft at the Australian Museum was asked for help with identifications, as was the Reverend W.B. Clarke. Fossil plants were sent to Baron von Mueller in Melbourne. The oldest acquisition book for geology dates back to 1876 with a miscellaneous register back to 1873; in these and subsequent volumes there are listed specimens that were part of the 'old' collection in the Post Office building to which it had been moved from the Parliamentary building.

Nineteenth century donations of geological material, excluding minerals, include quite a representative collection of British material demonstrating that some colonists maintained an interest in 'home' and that collecting was not a new activity for them²⁰⁻¹. Amongst the oldest recognizable donations in the collection today²² are two collected in 1872 by an expedition led by William Hann—one of the many expeditions during the two decades from 1860 that set out for the north²³. Hann was accompanied by the geologist Norman Taylor. When prospecting up the Walsh River they found ichthyosaur remains in sedimentary rocks which they compared with the Cretaceous deposits of the Flinders:



Sheep on the Darling Downs—an early drawing (photographic copy from the museum's negative files).



Bartholomai examining the banks of King's Creek near Clifton Station on the Darling Downs in 1962. Here, in the early 1840s, George King was finding fossil bones of diprotodons.

A more interesting spot for a scientific man can scarcely be conceived; here he is surrounded by the objects of his interest, they are under his feet like pebbles on the seashore, they are hanging over his head ready to crush him if not careful, he cannot move without seeing them around him on all sides; they were of all sizes, and numbers of them beautifully perfect; what, and how many to save was the puzzle, each new find exceeded the last one in beauty, until all the beautiful ones were sufficient to load a dray, could we have saved them, and, as I had not even one packhorse to carry these and the rock specimens, I was put to my wits end how many to transport. However, Mr Taylor and myself collected the best of the various species, which we were content to secure and carry along with us²⁴⁻⁵.

Jack records that a few were carried on 'and the remainder buried beneath the ashes of the camp fire'²³. The specimens donated to the museum were 'two or three bones of the vertebrae of a large animal which were attached to each other by limestone'²⁴⁻⁵ and a fossil turtle²⁶. This material represents the starting point for another of the strengths of the museum geology collection—Queensland Cretaceous fossils.

Following Coxen's death in 1876, Karl Staiger, the government analytical chemist, who had been appointed custodian in 1873, was in sole charge of collections. Records of new geological material are few in his time but one illustrates the opening up of Queensland and its early mineral boom—a Mr G. Smith of Copperfield, an early boom town, wrote to Staiger from the central highlands sending fossil bones from his property, Granville. These were bones of the fossil marsupial *Zygomaturus*.

The flow of specimens from the Darling Downs settlers also slowed. One of Owen's collectors, George Frederick Bennett—son of Dr George Bennett²⁷—came to live in Toowoomba, presumably to be nearer the Darling Downs where his chief love, the fossil bones, were located. He gave a talk about *Rambles on the Downs* to the Philosophical Society in 1875 and later donated a collection to the society museum²⁸. He bemoaned the lack of interest and knowledge in the current landowners compared with the early days, saying they often mistook fossil bones for those of horse or oxen.

Some new material from southern Queensland came to the museum from A.C. Gregory²⁹ who, in 1875, quit the post of surveyor-general and became geological surveyor for south Queensland under the Department of Works. From the museum's point of view it was no doubt useful to have Gregory appointed as one of the foundation trustees of the new museum in 1876. However, after his retirement in 1879 the posts of geological surveyor for the north and south of the state were abolished and united in the Geological Survey of Queensland in 1880 under the control of Robert Logan Jack who had been Daintree's successor in the north³⁰. Jack initiated a collection within the Geological Survey itself and then less material came to the museum from this source.

In 1877 work began on a new museum building in William Street. The first full-time curator, young William Haswell from Edinburgh, appointed in 1880, was a zoologist. Although he tried hard there is no sign of a sustained attempt to acquire fossil donations. They seem to have arrived rather haphazardly, donated by those who found them on their properties, or on their travels. One specimen that came in during Haswell's time was a bone of *Dinornis*, the giant flightless bird of the Pleistocene of Australia, donated by James Daniells of Headington Hall, Pilton in 1880. Alex Macpherson, later to be employed as a collector, also began donating



William Hann, accompanied by geologist Norman Taylor, led an expedition to northern Queensland. They found ichthyosaur remains in sedimentary rocks along the Walsh River.



Robert Logan Jack set up the Queensland Geological Survey in 1880.

specimens in 1880. Other transactions at this time show that perhaps Haswell did not fully appreciate the significance of the old collection, for, in June 1880, 44 fossil marsupial bones from the Darling Downs were shipped to the Canterbury Museum as part of an exchange deal.

Haswell resigned in late 1880 because of poor treatment and low pay. In January 1882, after a sporadic influx of applications for the post, Charles Walter de Vis was appointed curator at the age of 53; he was put on six months probation and an annual salary of £400. He remained in office until he was 75 and during his tenure he built up the reputation of the museum as a centre for vertebrate palaeontology.

de Vis' Era

After a short time in Brisbane getting acquainted with his new collections de Vis began to get interested in fossil bones. This resulted primarily from the preponderance of collections of vertebrate material already accumulated from sources on the Darling Downs. In 1884 he separated off the fossil and mineral collections from the other collections and by 1885 could write—after another successful field season by his collector, Kendall Broadbent—that 'the number and variety of fossil bones gathered in the last two years has necessitated a thorough examination of the whole collection'³¹. So, despite little formal training, without access to reference material and with next to no library, he began to unravel the myriad bones before him. de Vis went on to work on upper Cainozoic marsupials, birds, turtles, lizards, crocodiles, lungfish, and Cretaceous fish and reptiles.

One of his manuscript books remains which shows his lists of new names for fossil marsupials. It illustrates the quandaries he encountered and the temptations that existed to give every fossil a different name. He resisted those temptations, and most of the manuscript names that he did use have stood the test of time and very few have been submerged in synonymy. He often had large samples—a desideratum for good taxonomy—and he clearly understood the nature of intraspecific variation—his judgements have usually turned out to be correct. He became a respected worker in his day and his opinions on fossil vertebrates, especially birds, were sought. He seems to have been an evolutionary biologist and this is illustrated by his inference in a paper on Darling Downs turtles that 'the chelonian division of the fauna accords with the others in declaring that since its remains were buried a total change has swept over the vertebrate life of Australia'³²—he found no fossil forms coeval with existing species. He also does not seem to have taken kindly a dedication to him in a book by a local teacher of geology, who undoubtedly had some dated ideas³³, for in the museum's copy of the book de Vis has written to deny all association with its preparation.

Of course, much of his time was taken up with running the museum virtually single-handed with little positive support from outside. He did much to foster acquisition and exchange of geological material—in 1882 he wrote numerous letters to initiate deals with museums and universities, both within Australia and overseas, and with the Queensland Schools of Arts—at Bundaberg, Maryborough, Cooktown, Charters Towers, Ravenswood, Gayndah, Mount Perry, Rockhampton, and Batesford Free Library and Museum. Several of these efforts paid off, and one collection of note which came by exchange from the University of Newcastle-upon-Tyne is a representative collection of Carboniferous Coal Measure vertebrate material collected by Thomas Atthey³⁰.

For the scientific community of Queensland, 1883 was a high point

with the Royal Society replacing the old Philosophical Society. This year also saw a high 10% of all donations to the museum coming to the geological section. The donors, many of whom recognised the significance of their finds, included residents of Brisbane of varying backgrounds and nationalities, amongst them some of the earliest free settlers in the Brisbane region including David C. McConnel from Manchester³⁰ and a member of the Petrie family. Many of the donors were squatter-politicians such as Thomas McIlwraith, Albert Norton, W.H. Corfield and Edward Palmer, some of whom roamed far in their early days as stockmen, or during election times³⁴. Station owners, such as Ernest Henry of Hughenden, and their managers, land commissioners, surveyors, engineers of railways and roads, well- and bore-sinkers, and general travellers—usually professional civil or hydraulic engineers such as J.E. Falconer, R.E. Graham and Patrick Doyle—all collected material. There were also a few rare men and women who were actually out and about collecting fossils and rocks for their own sake, such as Gregory himself, and John Simmonds, stonemason, who specialised in fossil plants³⁵ and was a staunch member of the Royal Society from its inception¹⁵. The Ogg family continued to send material to the museum from the time that the Reverend Ogg took up land on North Pine River and found fossil plants. Later his relative E.J. Ogg moved north to Rockhampton from where he sent a steady trickle of specimens including some interesting Carboniferous blastoids (relatives of sea urchins and sea lilies) that were not to be described until the 1960s³⁶. A. Williams and his son John found lungfish and turtle remains while sinking wells at Eight Mile Plains in 1885.

de Vis found time to write many papers on fossil material and also instituted the *Annals of the Queensland Museum* in an attempt to overcome problems of publication³⁷. Indigenous journals were rare throughout Australia in the 19th century and much local reporting of scientific meetings and new discoveries, including descriptions of new taxa, were given in local newspapers. de Vis, who had a journalistic background, resorted to this on several occasions using both the *Brisbane Courier* and the *Queenslander*. Later workers have sometimes complained of the extraordinary medium chosen for scientific announcement²³. Now, with



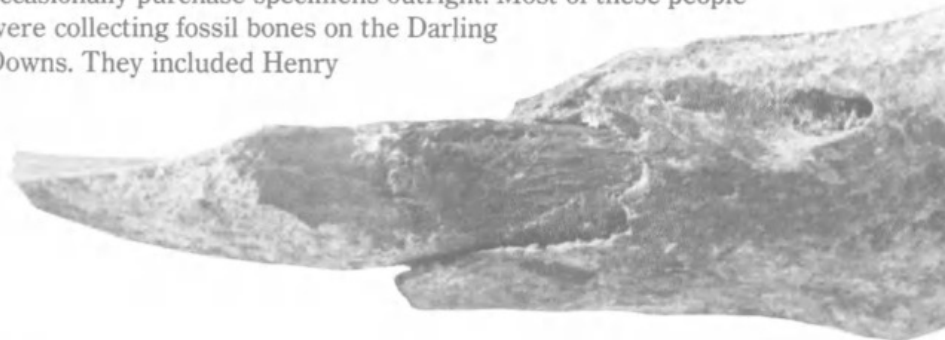
Jack Woods with a skull of *Euryzygoma*, the Giant Cheek-pouched marsupial (photograph from the *Brisbane Telegraph* 4 November 1954).

the *Royal Society Proceedings* (which followed on from the *Philosophical Society Transactions*) and the museum's *Annals*, joined briefly in the early 1890s by the short-lived *Natural History Society Transactions*, publication of scientific work was not such a problem.

Robert Etheridge jnr, a palaeontologist from the British Museum, worked on many of the specimens with colleagues in Britain but also with Robert Jack of the Queensland Geological Survey³⁸. Etheridge subsequently became director of the Australian Museum²⁷ and on several occasions acted as honorary palaeontologist to the Queensland Museum. He left a legacy of important described fossils, many acquired during de Vis' time as director. From the museum collection, a Carboniferous palaeoniscoid (ray-finned) fish and 'sharks' of the same age³⁸ were the oldest vertebrates recorded from the state until almost a century later. Some were found in the new rail cutting at Bogantungun by a Mr Sexton of the telegraph station in 1883. A shark tooth from the Rockhampton district, *Deltodus australis*, had been collected by de Vis himself. Etheridge, with Woodward, also described Cretaceous fish and reptiles from the western districts of the state³⁹, and Plio-Pleistocene vertebrates including fossil teeth of the Queensland lungfish from the Darling Downs and elsewhere³⁸.

In the field de Vis was ably served by a few good collectors. Alex Macpherson had been appointed in 1881 as geological collector. In March 1882 a man who certainly was one of the most able of collectors of his time was appointed. This remarkable man, Kendall Broadbent of Yorkshire, was appointed on a temporary basis only for nine months. He stayed on and began a series of field seasons liaising with settlers and collecting fossil vertebrates on the Darling Downs. On one trip he 'bagged' over 100 bones including new diprotodontids and nothotheres — according to de Vis — and a giant extinct bird *Dinornis queenslandicus* which was prepared by a Mr Daniells of Pilton³¹. Broadbent's reports to de Vis give an insight into the problems of field collection in Queensland around the turn of the century. Apart from the vagaries of weather and its effect on transport and the problems with Aborigines, the collectors suffered from the habitual lack of money and were continually having to prise resources from the bureaucrats several hundreds of miles away in Brisbane in order to continue. The last geological collector employed by the museum was Henry Gilbert Stokes, geologist and a prominent member of the Natural History Society of Queensland. He took up the post of collector for a short time in 1892. In 1893 money for paid collectors as such ran out and even field work was often out of the question in the economic depression that led on to the Great Shearers' Strike. The two collectors on the staff at that time were brought back to the museum to act as attendants. To make up the loss, de Vis had to rely on purchases, exchanges and donations. He fostered a group of men to collect for him from whom he would occasionally purchase specimens outright. Most of these people were collecting fossil bones on the Darling Downs. They included Henry

Fossil jaw bones of *Macropus tilan* collected by Broadbent from Gowrie, southeast Queensland.



Hurst—who had been a collector on the staff before his dismissal in 1891, Richard Frost and C. Herman Hartmann. de Vis also kept sending out requests for donations and exchanges to all major institutions in the world, and, nearer to home, made acquaintance with as many people as possible. He contributed regularly to the few statewide societies including the Royal Society of Queensland and the Australian Association for the Advancement of Science. The museum archives show that he maintained regular correspondence with several interested landowners. One such was Frederick L. Berney, of Sylvania station near Hughenden, who for a decade or more in the late 19th and early 20th century donated numerous specimens to the museum, including several important vertebrate and plant fossils⁴⁰.

Donations in the first decade of the 20th century still included material from well sinkings. The Hon. J.T. Bell sent fossil kangaroo, diprotodontid, the giant emu *Dromaeius* and giant lizard *Megalania* remains from Warra in 1909. de Vis wrote: 'This well-section illustrates the (disturbed?) character of the bone deposits on the Downs, the bones show by their different colors and different original matrices that they have been swept together from previous burying grounds'⁴¹; Mr Gore of Yandilla—'one of the few who are alive to the interest felt by many besides themselves in the fossils of the Darling Downs—while engaged in watching the progress of workmen employed in sinking a well' came across bones of an extinct bird which de Vis went on to name *Palaeolestes gorei*⁴⁰. Another interesting donor of this time is Charles Campbell, railway works surveyor, who over the period 1891–1911 was regularly writing and sending fossils to de Vis. These included diprotodontid bones and Silurian fossils found as he worked the new sections of railway. His letters invariably show a picture letterhead from the town where he was billeted. Antarctic rocks from the summit of Mt Erebus reached the museum in 1909, forwarded by Professor T.W. Edgeworth David on behalf of Sir Ernest Shackleton.

de Vis retired from office in 1905 but stayed on, by public petition, as scientific advisor to his successors. He continued to deal with geological matters, including his research, during C.J. Wild's period as acting director and during the first years of Hamlyn-Harris' tenure as director. He died quietly in 1915, age 86 and was hailed as a 'pioneer'³⁷.



The Longman Era

In 1911 Director Hamlyn-Harris had the foresight to appoint, as scientific assistant, a man with no professional museum or biological training as such, but who was a keen and able amateur naturalist⁴². Heber Albert Longman, before he entered the museum (as assistant curator), had specialised in insects and had made an important plant collection. However, with no formal training in geology or anatomy, he set to and became one of the most important practising vertebrate palaeontologists in Australia for the several decades that followed. Longman elevated the reputation of Australian research on vertebrate fossils to the world arena. He became director of the museum in 1917 determined to continue his enthusiastic work on fossil bones—usually by working through his annual three weeks leave and on Christmas Day⁴³.

Longman's first palaeontological paper was on a fossil fish, *Portheus australis*, two specimens of which had been donated around 1912 by S. Dunn of Hughenden in response to a series of letters sent out by Hamlyn-Harris⁴³. Thus began the museum's active research on Cretaceous fishes which is maintained to this day. In 1932 Longman described a new genus of Cretaceous fish, *Flindersichthys denmeadi*⁴⁴, named after the brother of a young man who worked during his university vacation at the museum, Alan Denmead—later to be chief government geologist of Queensland. W.S. Higgins of Richmond, who later came down to Brisbane to meet Longman, had found the fossil on the golf links—'the holy spot', according to W.E. Schevill of the Harvard Exploring Expedition⁴⁵.

In 1915 Longman turned his attention to fossil reptiles with a paper in the *Memoirs* on a giant fossil turtle which had been donated by Frederick Berney from Sylvania station. He described a new genus and species *Cratochelone berneyi* and noted that it was 'a matter of some surprise to those interested in palaeontology that the Queensland Cretaceous formations have as yet yielded comparatively few remains of the giant reptilian forms which characterized Mesozoic faunas'⁴⁶. Longman put this down to lack of systematic research in these areas. Over the next three decades he went on to describe ichthyosaurs; the plesiosaur *Kronosaurus queenslandicus*⁴⁷, identified amazingly from only a scrap of jawbone given to the museum in 1899 by A. Crombie of Hughenden; the giant sauropods *Rhoetosaurus brownei*⁴⁸ and *Austrosaurus mackillopi*⁴⁹, the former found by Thomas Jack and a Mr Wood and dedicated to the station manager of Durham Downs, Arthur J. Browne, who sent the first pieces to the museum and helped Longman visit the Eurombah Creek site in 1926; and the crocodiles *Pallimnarchus pollens* de Vis, and *Crocodylus nathani* named after the governor of Queensland at that time, Sir Matthew Nathan^{50,51}.

Fossil marsupials also came under Longman's discerning gaze. In an elegant paper, he described and reconstructed a new genus *Euryzygoma dunense* from material de Vis had referred to as *Nothotherium*⁵². The model, so admired by Sir Arthur Smith Woodward of the British Museum of Natural History⁵³, had been made by Longman and his new assistant, Tom Marshall, with the aid of Portland cement and glue. More marsupials donated by Charles Campbell, by Thomas Jack of Dalby and N. Pearson of Nobby were worked on in the 1920s^{47,54}. Longman also spent some time on the first major cave fauna of vertebrates from Marmor Limestone Quarry near Rockhampton where he arrived in 1924 with the manager Samuel Evans.

Longman did endeavour to bring scientific matters to the public, at



Heber Albert Longman as Hamlet. Longman's lectures and articles on the evolution of man were given great prominence in the press. It was a popular subject at this time and Longman made a special study of it (cartoon from the *Courier Mail* 10 October 1936).

least in Queensland, through newspaper articles⁵⁵⁻⁶ and lectures. He was also probably the first to give courses on vertebrate fossils at the University of Queensland in the geology department⁵⁷, thus inspiring some local people to consider vertebrate fossils in their geological work. Vertebrate palaeontology had never been an integral part of either geological or biological courses at the University of Queensland, which had been founded in 1910—the museum being recognized as the centre in Queensland. Schools, however, had long taught geology and had certainly considered vertebrate fossils^{33,57}.

In the early 1930s Longman invited a young Melbourne geologist, Edwin Sherborn Hills, to take up the study of Queensland's Tertiary fish which had been turning up in geological surveys around the Brisbane region for about 20 years. Hills had recently begun work on fossil fish at Melbourne University and had won a research scholarship to London⁵⁸. He produced two papers on the Tertiary fish from Darra, Bald Hills and Red Bank Plains in 1934 and 1943^{59,60}. This work remains largely unreviewed to this day and only recently Anne Kemp, an associate of the museum, has been studying the Tertiary lungfish.

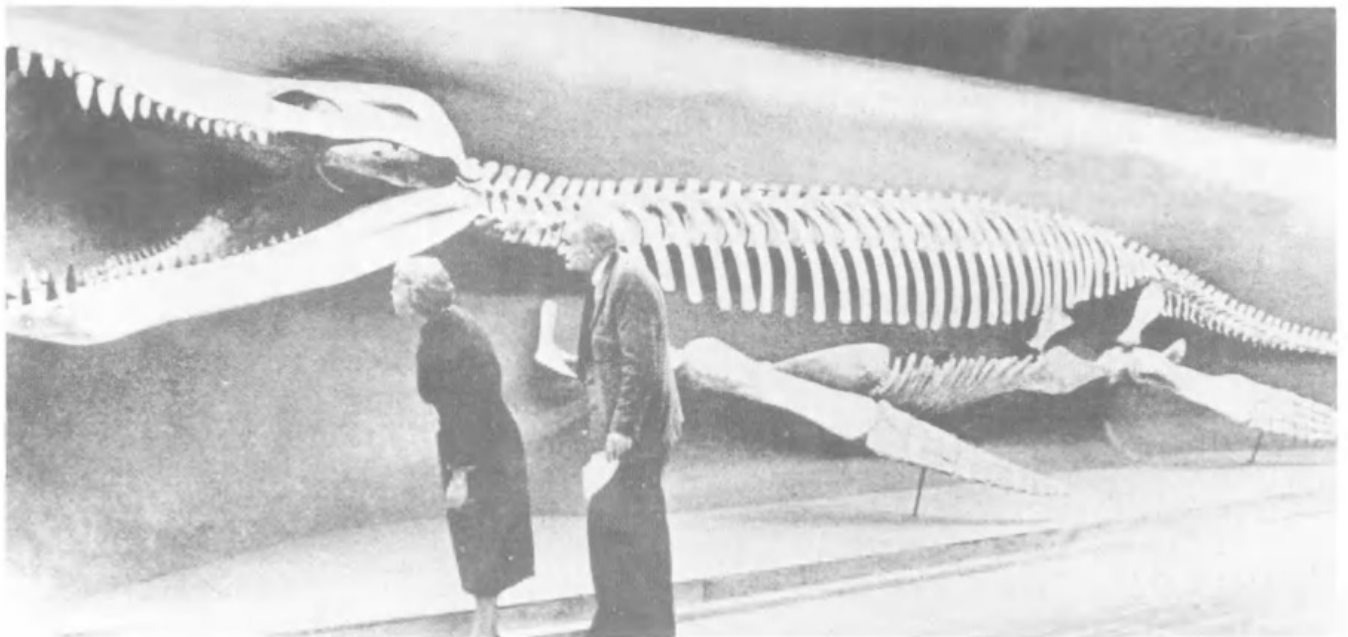
Other palaeontologists were encouraged by Longman, as by his predecessors, to work on museum specimens. These included Henry Casseli Richards, the first professor of geology at the University of Queensland, and A.B. Walkom. In 1915, Walkom reviewed de Vis' work on plants and named *Nilssonia mucronata*, another of Berney's finds, this one from O'Connell Creek on Wyangarie, and described plants apparently collected by one of the few women who accumulated fossil collections, Mrs Lumley Hill of Bellevue, near Esk⁶¹⁻². F.W. Whitehouse, of the geology department at the University of Queensland, did much pioneer work on the important Cretaceous ammonite collections which Robert Etheridge had not found time to tackle at the turn of the century. Among his type specimens are ammonites collected by Henry Hurst from Victoria Downs station, Morven, and Walsh River material from E.W. Smith⁶³.



Longman preparing the skull of *Kronosaurus* collected in 1935 from Telemon Station, Hughenden (photograph from the *Queenslander* 28 May 1936).

During the post-World War I depression years the museum was run on very stringent lines and there was little or no funding available for field work or research. However, Longman gave hospitality and assistance to two major expeditions which came to Queensland. Firstly, Australian-born Sir George Hubert Wilkins led a British Museum expedition in 1923–4 to explore the ‘unknown’ regions of north Queensland. He was pleased to receive museum and state assistance, eventually honouring Longman in the naming of species⁶⁴. Although not the main objective of the expedition, fossil reptiles and ammonites were collected and sent to the British Museum, and some were later donated to the Queensland Museum (see Chapter 8).

A decade later, from 1931 to 1933, the Harvard University Museum of Comparative Zoology Exploring Expedition toured Australia. For much of the second year Harvard geologist W.E. Schevill was expedition leader. He travelled widely, recruiting local help when he could. The Queensland Museum was offered the opportunity to participate but this was not approved — because of lack of funds or lack of interest on the part of the state government. Longman gave the expedition every assistance, storing specimens as they were sent to him, fixing collecting permits, and keeping



The skeleton of *Kronosaurus queenslandicus* Longman, prepared and on display at Harvard University Museum of Comparative Zoology in 1959. Viewing the exhibit are the distinguished vertebrate palaeontologist Alfred S. Romer and Mrs. Romer.

up a correspondence with Schevill. However, the major consequence of Longman's inability to join Schevill was the loss to Australia of the first articulated skeleton of *Kronosaurus*, the genus which Longman had described in 1924 from a scrap of jawbone. This is one of the most fascinating fossils to come out of Queensland and its loss was a source of some comment at the time⁶⁵. Later, Longman tried to persuade Harvard to return a cast of the restored skeleton but war intervened and this was not to be⁶⁶. The fossil was found when Schevill came to hear of a series of large nodules in a paddock near Hughenden. Schevill's assistant, a British migrant whom he called 'The Maniac', had experience with explosives from his military training and, after initial confirmation that they were dealing with a large reptilian fossil, they decided to dynamite out these heavy blocks — 'The Richmond district took much more time than I had anticipated, largely because of some heavy lumps that were hard to shift — I had to use gelignite for some of them'⁴⁵. They then dug a trench into the

paddock to the lower level of the concretions and loaded them into the back of their Ford truck—which just managed to get them to the nearest railhead. The blocks were shipped off to Harvard wrapped in end-of-sale bloody wool, which so horrified the director of the Museum of Comparative Zoology, Thomas Barbour, that he made Schevill wash every enormous block with disinfectant for fear of anthrax⁶⁷.

In 1934 Schevill asked Longman to send a cast of the original jawbone to compare with the new material, and his assistant, Tom Marshall, made a fine copy. Eventually the almost complete skeleton was prepared by T.E. White, and *Kronosaurus queenslandicus*, the species which Longman had first named in 1924, was revealed. It fulfilled Longman's predictions, based on only the fragment of the lower jaw, about the plesiosaurian relationships. The Harvard *Kronosaurus* was spectacularly mounted and displayed in 1959⁶⁸. When this event was announced in the Australian press without a mention of Longman, Professor W.H. Bryan sent a cable to Harvard reminding them that Longman was the discoverer of *Kronosaurus* and that it was a matter of regret that such an important announcement should lack any reference to the original discovery and to Mr Longman's masterly interpretation of the initially fragmentary material. Longman was certainly consulted throughout the early work on the skeleton but, presumably after Longman's death and with Schevill leaving Harvard to enter the world of oceanography, his contribution was allowed to fade.

Longman in his letters to Schevill dropped several hints that he would like to see the *Kronosaurus* during preparation in the late 1930s but he never was to leave Australia. An attempt was made to send Tom Marshall to the USA on a Carnegie travelling scholarship in 1939⁶⁹. However, with the coming of war Marshall was not able to take up this chance. Longman was naturally disappointed and not a little envious at the loss of the prize specimen, and it seems ironic that *Kronosaurus* remains inadequately known to this day. At least one large block of *Kronosaurus* and other reptile remains collected by Schevill rest, still unprepared, in the stores of Harvard University Museum of Comparative Zoology. New material collected in 1935, and by Bartholomai and Tebble in 1979, is now being prepared in the Queensland Museum. T.E. White did venture that the more common plesiosaur remains from Queensland were similar to the New Zealand *Mauisaurus*, but suggestions that this be written up for the *Memoirs* were not carried through⁷⁰.



W.E. Schevill (left) with colleague R.H. Denison outside Harvard University Museum of Comparative Zoology in 1983 (photograph by courtesy S. Turner).

The Post War Upsurge

There was a break after Longman's retirement in 1945 until 1948 when Jack Tunstall Woods joined the staff, but from thereafter the holders of the curatorships of geology, mammals, and of the post of director have continued to lay emphasis on vertebrate palaeontology.

Woods, a 1946 graduate of the geology department, University of Queensland, had been much influenced by Professor H.C. Richards, changing his course from engineering to geology. On joining the museum staff as assistant he was thus the first qualified geologist to handle the collections, and his appointment began a new era for geology in the museum. One of his first jobs was to clean up all the old geological displays and specimens, but after a thorough grounding in the more menial tasks of curation he took up the vertebrate palaeontology banner, working over de Vis' and Longman's material with the aim of a review of fossil marsupial genera⁷¹. During this work he recognized the Pliocene nature of the Chinchilla fauna and made the first thorough restoration of the skull of the marsupial lion *Thylacoleo*. His work on the skull of *Thylacoleo carnifex* was the first truly modern vertebrate palaeontological study from the museum⁷². He prepared the material with modern techniques, and provided not only accurate morphological data on brain case and external structure but also an analysis of the function of marsupial lion teeth with an extrapolation about the diet of the animal. More recent work on tooth wear has sustained his conclusions⁷².

Woods' first publication in the *Memoirs* was about a small fauna of Cretaceous crabs and lobsters from Currane station—a donation from Miss Sanna Shannon (now Mrs Huessler) in the late 1940s⁷³. His work on the marsupials *Palorchestes*, *Propleopus* and the extant *Hypsiprymnodon* again went beyond basic data to functional morphology, and provided thorough taxonomic revision⁷¹. Admirers of his invertebrate work⁷⁴ implied that he had regressed from invertebrates to Cainozoic vertebrates.

In 1949 Woods collected Tertiary plants and insects from deposits near Brisbane in company with Olof Selling, well known Swedish palaeobotanist. The museum's collection of fossil insects did not increase again until in 1961 it acquired its first specimens from the Triassic Ipswich Coal Measures. These were donated by F.A. Perkins of the entomology department of the University of Queensland. The collection was subsequently added to by Dahms, the museum's entomologist. However, apart from reports on the Hemiptera⁷⁵ little work has yet been done on these Triassic collections.

Woods did much to popularize the dinosaurs and other vertebrates⁴⁸ as well as to enhance the scientific reputation of the museum abroad. One of the important tasks he carried out was the location of most of the type specimens in the museum collections⁷⁶, which has been the basis for more recent compilations⁷⁷⁻⁸. To broaden his experience he moved to the Mines Department in 1959 as senior palaeontologist, but was recalled to the museum to be acting director during the last difficult months of Mack's life; he subsequently became director in 1964.

Woods was succeeded as geological assistant by another Queensland University graduate, Alan Bartholomai. Bartholomai began extensive fieldwork throughout Queensland collecting fossil marsupials from many horizons. His work on Cretaceous fossil fish with a review of the predatory pachyrhiziodids was published in 1966⁷⁹. Later in the same decade the American Museum of Natural History began a series of field expeditions to Australia and Bartholomai was to work with them.



Undescribed Triassic cockroach from the Ipswich Coal Measures, collected in 1984.



Measuring the distance between the dinosaur footprints in the ceiling of Westvale Colliery, Rosewood, southeast Queensland.



J.T. Woods with natural limestone concretions, often containing Cretaceous fossil vertebrates, from the Back Channel of Flinders River near Richmond.

Modern Times

Bartholomai became director in 1969, and continued the museum's tradition of research in vertebrate palaeontology covering a wide range from Cainozoic marsupials to Mesozoic reptiles and fish. More importantly he fostered a whole team of experts in vertebrate and invertebrate palaeontology—adding to the strength of the geology section by the appointment of honorary fellows who have been able to use the museum as an institutional base from which to apply for government grants. Research fellows Anne Kemp—formerly of the University of Queensland—working on lungfish, and Susan Turner—formerly of the Hancock Museum, Newcastle-on-Tyne—studying Palaeozoic to Mesozoic fish, are both adding new and known taxa to the collections and extending the museum's field of expertise. Director Bartholomai's assistant, Tempe Lees, is working on Cretaceous fossil fish—including *Belonostomus*. Further, Bartholomai has encouraged links with palaeontologists in other institutions both in Australia and elsewhere, and close collaboration with invertebrate and vertebrate palaeontologists in the University of Queensland, notably J. Jell and R.A. Thulborn, both being associates of the museum. Another associate, F.S. Colliver, formerly curator of the geology museum in the University of Queensland, has donated his extensive fossil collection of Australian and overseas material to the museum.

Ebenaqua ritchieri, an almost complete fossil fish from the Late Permian, Rangal Coal Measures, Utah coal mine, Blackwater, Queensland. The type is in the museum.



A new genus of bony fish from the Cretaceous, Laura Downs Station, Julia Creek.



Peter Jell, a third University of Queensland graduate appointed by Woods, succeeded Bartholomai as museum geologist in 1969. He was the first full-time invertebrate palaeontologist on the staff and during his short tenure added significantly to the collections of Palaeozoic fossils and Cambrian trilobites from north-western Queensland. Unfortunately Jell left the museum in February 1970. His replacement, the present curator of geology, Mary Wade, was also an invertebrate palaeontologist when she was appointed in 1971. Wade came from the University of South Australia where she had been studying the peculiar Precambrian fauna of Australia. Finding no such deposits in Queensland, she turned her attention to the rich faunas of Cambrian and Ordovician nautiloids from the north-west of the state. She also succumbed to the vertebrate fossils. The world's most complete Cretaceous ichthyosaur, which came from Telemon station in north Queensland, had been languishing on display in a half-prepared state since 1935. Wade arranged for its preparation and eventually described some of the museum's ichthyosaur material⁸⁰. Several more ichthyosaurs await preparation—the rocks laid down in the Cretaceous seas, which covered the Great Artesian Basin 120 millions years ago, seem

to have preserved at that time as many ichthyosaurs as the rest of the world put together.

In 1976 the museum became involved in a project which gained international recognition. A chance discovery in the 1960s by Ron McKenzie while opal fossicking near Winton led to the subsequent exposure of thousands of dinosaur footprints. Bartholomai and R.H. Tedford of the American Museum of Natural History had seen the site in 1971. But it was not until 1976 that Wade and Thulborn, guided there by McKenzie, made a trial excavation. A museum party, assisted by the army and volunteers mainly from the university excavated a much larger area in 1977. This revealed that Queensland had the world's only known stampede of dinosaurs in rocks about 100 million years old. Thulborn was the first to realize that all the dinosaurs but one, the biggest, were going one way and were probably running hell for leather at that. He and Wade took on the huge task of counting, measuring and identifying the footprints—a task which has culminated in a definitive monograph⁸¹.

As a consequence of this work, the museum is now a trustee, with the Winton Shire Council, for Lark Quarry Environmental Park, being responsible for its conservation, and for the interpretive information supplied through Queensland National Parks and Wildlife Service to the public. The park is named in honour of volunteer worker, Malcolm Lark of Miles, who helped with the 1976 excavation. This site, which contains nearly all the known tracks of running dinosaurs in the world, is truly a part of our world's heritage.

Wade and Turner with Jell of the University of Queensland, have made collections of Silurian and Devonian corals, nautiloids, plant and fish remains, as well as early Carboniferous fish including some very unusual sharks⁷⁷ from the Broken River district of north Queensland—a place of great beauty first shown to the geological world by Richard Daintree in 1873⁸².

A large Jurassic labyrinthodont amphibian was also located when Wade was investigating tooth-bearing rock found by Colin Kehl, a farmer at Wandoan⁸³. It is now named *Siderops kehli* by Anne Warren of La Trobe University. Until a slightly younger specimen was found in China in 1985 this was considered to be the last known labyrinthodont in the world. However, *Siderops* is one of the largest and most complete known. The

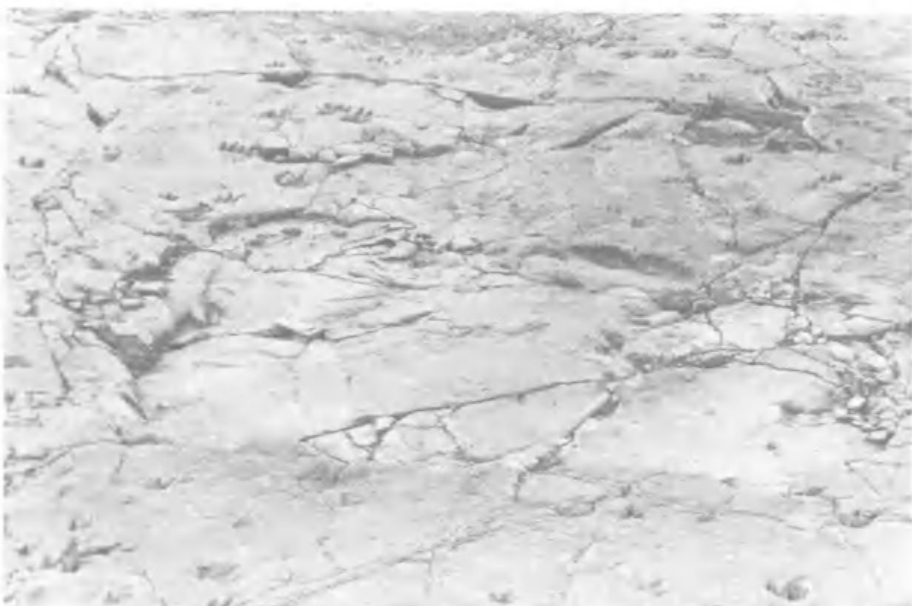


The head of the ichthyosaur *Platypterygius australis* found at Telemon Station between Richmond and Hughenden in 1935. It is one of the most complete Cretaceous ichthyosaurs in the world.

Museum staff working on the dinosaur trackways at Lark Quarry, Winton, 1977.



The dinosaur trackways at Lark Quarry Environmental Park.



Entrance to the covered observation platform at Lark Quarry.



specimen had been buried at right angles to a river cliff and was collected by excavating a cut through the collapsed cliff front, following carefully from the partly-buried head to the shoulders at the top of the cliff. The rest of the body and most of the tail were found later in a buried pile of boulders 50 metres away towards the bottom of the cliff. Despite their enthusiasm no member of the collecting party felt tempted to excavate further for the tip of the tail, which apparently went downhill with an earlier rock fall.

In 1978 Wade, Thulborn and Bartholomai joined a British Museum (Natural History) expedition to Queensland to collect Mesozoic reptiles. Most of the important specimens from this expedition are being prepared in London and then will be returned to the Queensland Museum. An exception was the dragonfly wing from the Cretaceous which was retained in Queensland—a wing of the same age and possibly the same family as that acquired by the museum in the 1920s. In 1980 further Cretaceous insects—a cockroach wing and a beetle elytra—were collected from the Winton area by a museum party.

Another interesting site at Rewan in the Carnarvon district of central Queensland has yielded many vertebrate, and more recently, plant fossils to a succession of museum field parties since it was visited by Bartholomai who investigated its small Triassic reptiles. Warren has also defined an extensive range of labyrinthodont amphibians from this site. Surprisingly, in 1929, Longman had misinterpreted a fossil from Rewan as Cainozoic crocodilian. It was a small mistake but one that held up the search for Triassic vertebrates for a while. When reexamined, his specimens also turned out to be Triassic thecodonts and labyrinthodonts. Thulborn, an expert on dinosaur locomotion, worked on the description and restoration of a Triassic pre-dinosaur *Kalisuchus* from Rewan, and has recognized bones of the first Australian mammal-like reptiles, the forebears of the mammals over 200 million years ago. As well as the 'Rewan beast', a kannemeyeriid similar to forms found throughout the southern continents in the early Triassic, he is studying Longman's *Rhoetosaurus*, a further leg and hind foot bones of the sauropod having been collected by Wade and himself from the original site.

At the end of 1972 a graduate of Yale University, Michael Archer, was appointed to the newly-created position of curator of mammalogy. He had first come to the Museum of Western Australia as a Fulbright scholar in 1970. He was to work on both recent and fossil mammals during his five years at the museum, pushing back through time to older marsupial faunas in the Tertiary deposits found especially in north Queensland in the Carpentaria sub-basin (Pleistocene), at Bluff Downs (Pliocene) and at Miocene sites in the Northern Territory. His identification of a fossil bat enabled dating of this site by comparison with a Middle Eocene bat in France where terrestrial and marine deposits are interlayered. Thus a virtually complete Tertiary record is present in the sediments of Queensland. He also completed an analysis of the basicranium of all extant Australian marsupial genera, necessary to interpret fossil material. He was involved in several major fossil collecting trips, some made jointly by the museum and the American Museum of Natural History and also some financed by American fossil collector, Ray E. Lemley.

Archer left the museum to join the University of New South Wales in 1978, from which institution he continues his exploration of Australian mammalian fossils, his latest excavations being made at a remarkable site at Riversleigh⁸⁴. R.E. Molnar, also from the United States, who replaced



The re-discovery of the Rewan site. A. Bartholomai excavating.

Archer on the staff of the museum, has concentrated on fossil crocodiles, dinosaurs and marsupial locomotion. He discovered the first pterosaur remains in Queensland and, with Bartholomai, undertook a study of the large Cretaceous ornithomimid dinosaur which they named *Muttaburrasaurus* after the town of Muttaburra in central Queensland. This is one of the most complete skeletons of an Australian dinosaur. It was originally collected in 1963 by Bartholomai and Dahms—the entomologist on the museum staff. Its preparation for display was possible only through the corporate sector support of Kelloggs—through an Australia-wide ‘back of pack’ promotion on their Rice Bubbles product.

Understanding of geology, and particularly the study of fossils and their use to the state of Queensland, has come a long way since the founding fathers began amassing their private collections over 140 years ago. It is a science which underpins many of the endeavours of the state to this day, for accurate knowledge about the rocks of Queensland is still necessary for a proper understanding of its history and its resources. Coxen, Gregory, Daintree, D'Oyly Aplin, de Vis, Longman and many others would wonder at the changes of the last few years and each would have applauded the endeavours of the men and women who built on the foundations that they put in place.



Allingham Creek. Above:: Archer excavating kangaroo skeleton; below: main quarry.



Jurassic Durikai plant beds near Warwick, Queensland. *L to R*: Associate Stan Colliver, Tempe Lees, A.R. Colliver.



Archer, assisted by Errol Beutel, excavating Miocene deposits at Alcoote, northwest of Alice Springs, on an expedition financed by American fossil collector Ray E. Lemley.



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