COLLECTIONS OF A Century

by Paddy Berry

Founded in September, 1891, the Western Australian Museum this year celebrates its first century of collecting and research.
What is the value to conservation of such collections?
Paddy Berry, Head of the Museum's Division of Natural Science, explains - using as an example the fauna collection, just one of the Museum's collections of a century.

Before we can conserve our fauna, we need to know which animal species exist now and which existed in the recent past. We also need to know the extent of their distributions and whether those of living animals are increasing or decreasing. This requires hard evidence such as that provided by museum collections. This type of evidence is superior to anecdotal recordings and sightings, as one can return to and more fully scrutinise a collected specimen. Even photographs do not provide the same quality of information; they portray only one dimension, and they deteriorate.

Collections are the basis for studies that provide internationally recognised scientific names for animals - names that are needed for legislation, management and research. This research, leading to classification and naming of animals, is called taxonomy, and is one of the major activities of the Western Australian Museum.

Taxonomy reached its zenith in Europe, the USA and early colonial countries in the late 18th and 19th centuries, so its arrival in Western Australia was rather late for this State to benefit from the boom. Other factors also made the task of collecting and naming rather formidable. The State, with an area of 2.6 million square kilometres, covers one third of the continent, runs along more than 12 500 km of coastline, and spreads across tropical, temperate and arid faunistic zones. As a result, WA's fauna is so inadequately recorded that many species are yet to be discovered. In the last decade alone 11 new species of mammal, 83 new reptiles and 20 new fish were described from WA - and these vertebrates are the best-known of the fauna groups.

However, we need information on all our fauna. The invertebrates, such as insects, corals and worms, are far more diverse than the vertebrates and ecologically just as important. Thousands of species undoubtedly remain undescribed (130 new marine species were discovered recently in two weeks at Rottnest Island!). Invertebrates are probably becoming extinct before we are even aware of their existence. Comprehensive documentation of invertebrates is probably unattainable, and in WA we have a long way to go even to adequately sample subsets of invertebrate diversity or specific groups.

One hundred years ago, in September 1891, the Western Australian Government established the 'Perth Museum' with Bernard Woodward as Curator, and a collection of geological specimens originating from the Geological Museum in Fremantle. In 1892, collections of the Swan River Mechanics Institute were added, including ethnological material and zoological specimens from interstate and overseas. The institution became known as the Perth Museum and Art Gallery. Two years later the first examples of Western Australian fauna were officially recorded in the leather-bound *Catalogue of the Museum, Perth, No. 1.* The first two entries written in Curator Woodward's copper-plate script were: *1894; 'Spined Echidna'; locality Toodyay; collector Otto Lipfert;* and *1894; 'Banded Ant-eater'; locality Coolgardie; collector Frank Reed.*

IRREPLACEABLE INFORMATION

The State's reference collections and associated data bank on its native fauna are now the responsibility of the Museum's Division of Natural Science. The Division ensures that representative examples of the native fauna, fossils, minerals and meteorites of WA, and from

Sea-slug (*Godiva quadricolor*), an example of a poorly known invertebrate group.
Photo - C. Bryce, WA Museum ▲◄

Rough leatherjacket (*Scobinichthys granulatus*) from the fish collection that comprises 37 000 specimen lots.
Photo - J. B. Hutchins, WA Museum ▲

Magnificent treefrog (*Litoria splendida*). Work is required to enable the tadpoles of WA frogs to be distinguished, as they have potential as indicators of habitat and water quality.
Photo - R. E. Johnstone, WA Museum ◄

Which is the common bush rat and which is the heath rat? Many small mammals cannot be identified from photographs; examination of a preserved specimen is essential.
Photos - Babs & Bert Wells ▲

The collections, stored in secure and environmentally controlled conditions.
Photo - D. Elford, WA Museum ◄

Pincushion starfish (*Culcita schmideliana*).
Photo - G. Bryce, WA Museum ▼

X-ray of scalpellid barnacle (*Litoscalpellum juddi*). Identification is by the numbers and arrangement of plates embedded in tissue.
Photo - D. Jones, WA Museum ►▼

elsewhere in the world, are preserved for reference, advancement of knowledge and enjoyment by succeeding generations.

Although young by world standards, the Division's collections are an irreplaceable source of information on our fauna. Even Woodward's second Western Australian specimen record (the 'Banded anteater') provides valuable evidence about the former distribution of our faunal emblem, the numbat, which is now extinct in the Goldfields. The collections include well over 4 million specimens or approximately 800 000 specimen lots (a group of more than two specimens collected from the same locality at the same time) and associated data. Their replacement value is conservatively estimated at $20 million.

The fossil specimens alone total a staggering 1.5 million. The collection includes insects (125 000 lots), terrestrial arthropods such as spiders and scorpions (120 000 lots), molluscs (190 000 lots), crustaceans (21 000 lots), worms (2 500 lots), corals, anemones and the like (10 200 lots), sponges (925 lots), echinoderms such as star-fishes and sea urchins (18 500 lots), other marine invertebrates (3 400 lots), fish (35 000 lots), and 36 000 mammal, 25 000 bird, 85 000 reptile, and 25 000 frog specimens.

Recently, the Division started a collection of soft tissue for modern genetic and bio-chemical studies. Stored at minus 80 Celsius, the frozen tissue collection currently contains samples from approximately 10 000 specimens.

Housed in the Francis Street building, Perth, in environmentally controlled conditions, all the collections are preserved as a reference and research resource in perpetuity. Type specimens, used as the basis for describing new species, have international status and are given special protection.

In many respects the collections are like a library. They are widely used by scientists from Australia and overseas, who either visit the Museum to work or have specimens lent to them. Each specimen is a miniature data bank, of an array of information that is not apparent from the exterior: for example, its unique genetic makeup, special food requirements and feeding habits, parasites and pathogens, reproductive information (breeding cycle, litter size, etc.), age and rate of growth, and levels of pesticides and pollutants. Scientists from many disciplines are making increasing use of the collections.

Caterpillar, probably of a boab hawkmoth.
Photo - T. Houston, WA Museum ◄

Gwardar (*Pseudonaja nuchalis*). The Museum answers over 12 500 enquiries each year, many of which are about potentially dangerous animals.
Photo - R. Johnstone, WA Museum ◄◄

Skull of 350-million-year-old fossil lungfish (*Latocamurus coulthardi*) from Gogo, Kimberley.
Photo - J. Long, WA Museum ▲

Efficient retrieval of individual specimens and/or data associated with them is very important. All vertebrate registers (except birds) and some invertebrate registers are now computerised. This allows researchers, wildlife managers, mining companies and environmental consultants to make rapid searches of species recorded within a specified area.

BUILDING A PICTURE

The collection continues to grow. Most specimens are acquired by Museum staff, but other government agencies such as the Department of Conservation and Land Management (CALM), universities and members of the public make substantial contributions to them. That dead possum lying on the road or the 'mouse' your cat brought in could provide valuable information and should be sent to the Museum. It is not just rare species that are important. Today's 'common' species could be on the decline (brushtail possums are a good example), and each record helps to create an overall picture of the distribution and status of the species that becomes more and more valuable with time.

A museum specimen can also directly benefit conservation. For example, in 1983, the Museum was given routine sample specimens of the common bush rat (*Rattus fuscipes*). The specimens were found during a fauna survey near Ravensthorpe by biological consultant Andrew Chapman (now an ecologist with CALM). In 1987, these specimens were examined by Museum research associate Alex Baynes and found to be the similar-looking heath rat (*Pseudomys shortridgei*), of which only three specimens were known from Western Australia. It had been last recorded in 1931 and was thought to be extinct in WA. This find helped establish that the heath rat survives near Ravensthorpe. Further searching has now established its presence in the Fitzgerald River National Park.

Some people are concerned about killing animals for collections. However, collecting is controlled by a scientific licence, issued by CALM, which limits numbers and distribution of specimens taken. This level of collecting, spread over a wide geographical area and period of time, has a negligible impact on survival of populations (compared with habitat destruction and competition and predation by alien species) and must be weighed against the benefits to conservation and knowledge derived from it. Museum staff also operate under the auspices of Murdoch University's Animal Welfare and Ethics Committee.

The Division of Natural Science has 16 curators and 10 supporting technicians, whose job is to maintain and expand the collections, conduct research on them and communicate the results to the community. The Museum's scientific journal *Records of the Western Australian Museum* documents much of this work.

This basic research has to be done before it is possible to produce authoritative books that allow non-specialists to recognise and identify WA animals. Over the past decade the Museum has averaged more than 50 scientific publications per year. During the same 10-year period, books on birds, lizards (skinks, dragons and monitors), frogs, snakes, sea-shells, sea-stingers and freshwater and marine fishes have all been published. Staff also received more than 12 500 direct inquiries each year on fauna, fossils, minerals and meteorites.

New displays on natural history, with particular emphasis on animal diversity, the environment and conservation, are being planned for the Museum's Perth complex. This will help make the collections and the information derived from them even more accessible to the public. ◘

NAMES DO MATTER

In 1962 Dr Ray George, then Curator of Crustacea at the Museum, recognised that the western rock lobster was a distinct species, confined to the west coast of Western Australia, and named it *Panulirus cygnus*.

Before this, the western rock lobster was considered to be *Panulirus longipes*, a species widely distributed in the Indian and Pacific Oceans. Because of the great distributional capabilities of rock lobster larvae in ocean currents, it was uncertain whether the Western Australian adult rock lobster population originated from Australian larvae. It was also unclear whether or not management of the adult stock would necessarily benefit the local fishery.

Recognition that *Panulirus cygnus* was a distinct species, confined to Western Australia and hence solely the management responsibility of this State, was the catalyst for research, management and legislation that resulted in the most successfully managed rock lobster fishery in the world and the largest single-species fishery in Australia. The fishery for *Panulirus cygnus* was worth $200 million in 1989-90.

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A wave of colour is spreading from Shark Bay to Jurien and inland to Meekatharra. Our story on page 10 takes you into Wildflower Country.

LANDSCOPE

VOLUME SEVEN NO. 1 SPRING EDITION 1991

The WA Museum is 100 years old. It houses a staggering four million specimens of insects, marine animals, fish, birds, reptiles and frogs. Page 22.

Seven species of microscopic dieback-disease fungi are attacking WA's unique wildflowers. See page 28.

The rugged Pilbara landscape has some hidden delights. On page 16, go up hill to Hamersley Range, then down Dales and other spectacular gorges.

How does WA's conservation heritage look to the people who look after it? Turn to page 26 for some great photographs from a recent competition run for CALM staff.

C O V E R

Out now! Wildflowers are blooming in the vast tracts of country north of Perth, especially in the northern sandplains and Murchison, which is experiencing a bumper wildflower season following heavy winter rains. Philippa Nikulinsky's illustration shows some of the wildflowers for which WA is justly famous: the splendid everlasting, buttercup, red leschenaultia, Sturt's desert pea, catspaw, wattle, native wisteria, black kangaroo paw, flame pea, and scaevola - all covered in the newly released book, Wildflower Country. *See page 10.*

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