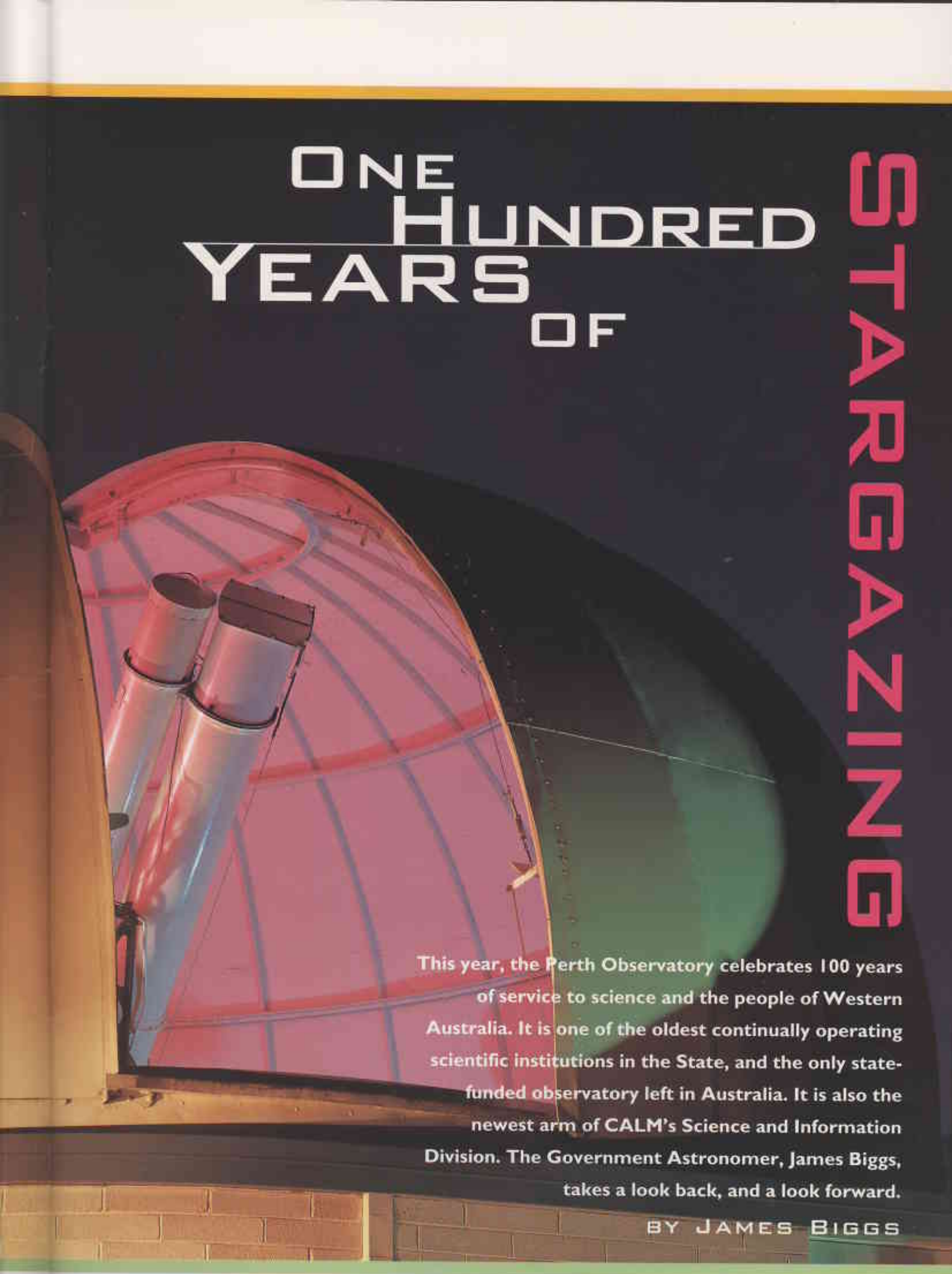
One Hundred Years of Stargazing



This year, the Perth Observatory celebrates 100 years of service to science and the people of Western Australia. It is one of the oldest continually operating scientific institutions in the State, and the only state-funded observatory left in Australia. It is also the newest arm of CALM's Science and Information Division. The Government Astronomer, James Biggs, takes a look back, and a look forward.

BY JAMES BIGGS

Festivities to mark 100 years of the Perth Observatory began with a BANG! Smoke billowed, and the Old Observatory on Mt Eliza, overlooking the city of Perth, once more reverberated to the sound of the 'One o'clock Gun'. As the signal cannon recoiled, journalists recorded a dramatic re-enactment of the daily time signalling that, for more than 50 years, alerted people north and south of the Swan River that one o'clock had just passed.

It was 1892 when Sir John Forrest, Western Australia's first premier, announced in a parliamentary speech that something should be done to encourage scientific pursuits in the colony. He said that an observatory would be useful in many ways, and do a great deal of good. It would give the colony a status in the scientific world.

A site at Mt Eliza was hailed as ideal, and backed by political will and the wealth generated from WA's Goldfields, the Perth Observatory became reality. Sir John Forrest conducted the ceremony to lay its foundation stone in September 1896.

William E. Cooke was appointed first Government Astronomer of Western Australia. His salary was a handsome £500 per annum, and his residence was within the gracious Observatory complex

on Mt Eliza. Frequent dinner guests included prominent Western Australians Sir John Forrest and Sir John Winthrop Hackett.

IN SPACE AND TIME

At the turn of the century, astronomical observations were the most accurate way of determining the latitude and longitude of a site. The Perth Observatory was responsible for, quite literally, putting Perth on the map. Once one site had been pinpointed, other trig stations (important reference points used in surveying) could be established to allow routine surveying to be undertaken. (The exact position of the original telescope is marked by a plaque in the car park of Dumas House, once part of the Old Observatory complex.)

Time was another crucial concept that, at the turn of the century, depended on accurate observations of the stars. From 1901 to 1957, the Perth Observatory provided a time service to the State, in one form or another. Time signals were sent around Perth by way of electrical cables to the Forrest Place Post Office, Central Railway Station, Fremantle Harbour and other institutions and businesses, including watchmakers.

The 'One o'clock Gun', introduced in 1902 to help Perth people keep correct time, was the brainchild of William E. Cooke. Before radio time calls and recorded telephone services were available, the firing of a six-pound brass cannon at 1.00 pm on weekdays and noon on Saturdays was considered the best way to sound the hour. This service ceased in 1955.

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Left: Astronomers, Andrew Williams and Ralph Martin ready the Lowell Telescope.
Right: The 99-year-old Astrographic Telescope, has been recently superseded by a 10" robotic prototype.

Above: The colourful Eta Carina Nebula near the Southern Cross.
Photo – Vic Levis

Below: Andrew McManus with the orrery, an instrument used to illustrate the movement of the planets around the sun.

Perth Observatory established its own radio time service in the 1920s, and was commended in the late 1940s by both the Australian and US armed forces for this contribution to the war effort.

The Observatory also provided early meteorological services. Weather readings were telegraphed from recording stations all over the State. From this information, the Government Astronomer made a daily forecast for Perth, the Goldfields, and the remainder of WA. This service was taken over by the Commonwealth Government in 1908, in recognition of the national scope of weather systems. In recent years, the Observatory has again provided weather readings, from its site at Bickley.

TURN OF THE CENTURY TECHNOLOGY

The grand old instrument used for the Observatory's early latitude, longitude and time work, was a transit-circle or meridian telescope. It was built by Troughton and Simms of London in 1897, but did not become fully operational at the Perth Observatory until 1901.

The meridian telescope was one of the best of its kind in the world, and specifically designed to measure star positions. Its telescope section was mounted so it could only rotate in a north-south vertical plane (meridian). Timing information was obtained as stars were observed passing through this meridian.

In the first decade of this century, the output from this telescope represented Australia's most significant contribution to astronomy—even though there were long-established observatories in Sydney, Melbourne and Adelaide. Observations it made were used to define Western Australia's 'standard time' from 1901 to 1940. During the Great Depression and Second World War, however, activities were scaled down.

To mark the Observatory's centenary, this historical instrument has been meticulously restored by Perth Observatory staff. If sufficient funds can be raised by the National Trust of WA, the telescope will be permanently housed at its headquarters (the Old Observatory), as a gift to the people of Western Australia.

Top right: The Old Perth Observatory at Mt Eliza looks much the same today as it did in the time of William E Cooke.
Photo – Dennis Sarson/Lochman Transparencies

GLOBAL CONTRIBUTION

As well as its practical services, Sir John Forrest hoped the Observatory would provide cultural and scientific benefits. To this end, another major acquisition was made—an astrographic telescope from English telescope manufacturer, Sir Howard Grubb.

This telescope was one of several purpose-built to photograph the sky in the first global research project ever undertaken—the *Carte du Ceil* (Map of the Sky). This project, initiated in Paris in 1887, aimed to use the developing technology of photography to map all the stars in the sky down to 11th magnitude (100 times fainter than the eye can see). Perth Observatory was one of 18 observatories involved, others included Berlin, Cambridge, Greenwich, Melbourne, Oxford, Paris, Rome and Sydney.

Observations for this project were made between 1901 and 1912, but the last publications cataloguing the positions of the tens of thousands of stars did not appear until the 1950s, after substantial assistance from the Royal Observatory at Edinburgh. Perth Observatory, supported by a population of under 100 000 taxpayers, made a substantial contribution to the *Carte du Ceil* project. A detailed account of its participation is available in *Astronomy in Western Australia* (vols 1, 2 & 3) written by Observatory historian Muriel Utting.

The astrographic telescope is still in operation today. Its usefulness is limited, however, because it requires manual guidance and uses film to record images—

Right: Clear skies above the Lowell Telescope tower bode well for stargazing once darkness descends.

Left: Perth Observatory's Technical Manager, Arie Verveer, works with Government Astronomer, James Biggs, in the Meridian Telescope dome.

Below: Rugged up against the cold, astronomers have used the Astrographic Telescope to scan the skies over Western Australia since the early 1900s.

a relatively insensitive medium compared with modern light detectors. One significant advantage it has over most modern telescopes is its large field of view. This makes it particularly good for the study of wide objects, such as bright comets.

Over the last two decades, the astrographic telescope has provided an invaluable service to the international astronomical community by tracking comets and asteroids from the southern hemisphere, an area with relatively poor telescope coverage. It has been involved in the discovery of nearly twenty asteroids, and provided about 10 per cent of all high-precision positions of Comet Halley. This pinpointing of the famous comet was particularly valuable for those navigating the Giotto spacecraft through its 'fly by' of the comet in 1986.

PERTH OBSERVATORY TODAY

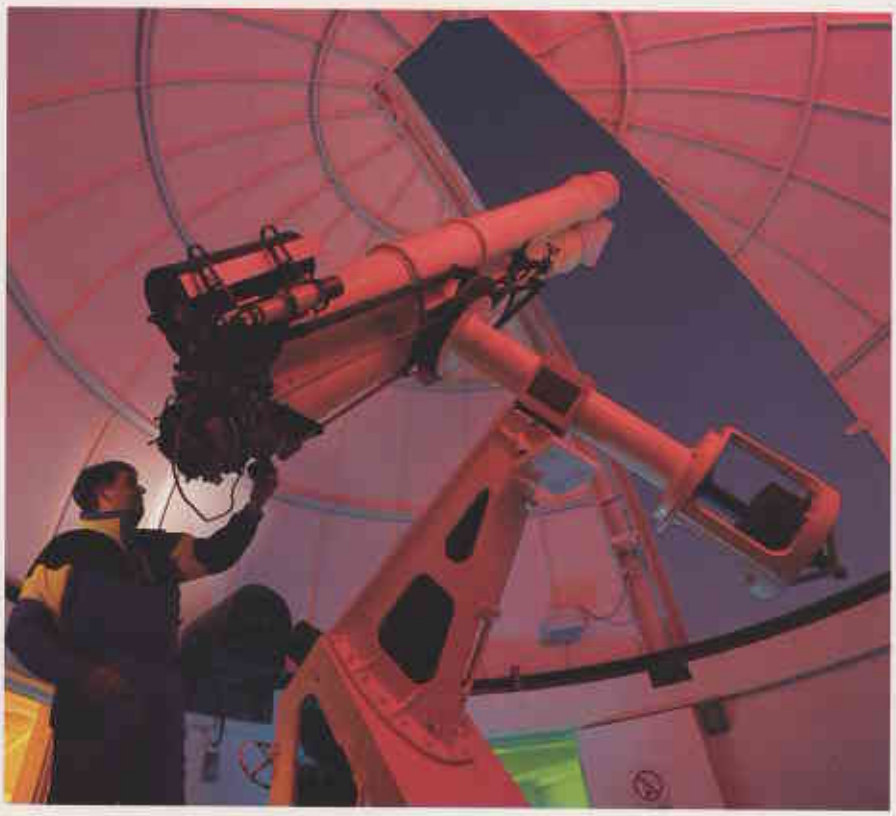
Since 1966, Perth Observatory has been based at Bickley, 25 kilometres east of Perth. It was forced to relocate from Mt Eliza because light pollution (glare caused by the scattering of artificial light off dust particles in the air) was making detection of faint objects difficult.

There are 11 telescopes at Bickley, used for a variety of purposes. The largest is a 24" (61 cm) Boller and Chivens reflecting telescope, on permanent loan from the Lowell Observatory in the USA. It was assembled in 1971 and was initially used for planetary photographs to assist NASA's planning for spacecraft exploratory missions.

Recently, this telescope has been equipped with a CCD camera (similar to that used in video camcorders) and automated, so that its tracking of targets and camera operation is fully computer-controlled. This work has been undertaken by the Perth Astronomical Research Group, which includes Observatory staff and academics from Curtin University, Murdoch University, and the University of WA. The first project using this new system has involved a search for supernovae (the catastrophic explosions of massive stars at the end of their normal life). Six supernovae have been discovered so far.

The Lowell telescope is also being used to monitor the variation in light output from stars as 'dark matter', an invisible material, passes between observation sites and the star. This is important because of its implications for cosmology and the fate of the universe. In 1977, the Lowell telescope played an important role in the discovery of the very faint rings around Uranus.

A new 10" (25 cm) telescope, built in the Observatory workshop and equipped with a CCD camera, will soon take over the task of tracking comets and asteroids from the astrographic telescope. The more sensitive newcomer is a fully computer-controlled prototype and should be able to complete a whole night's observation with minimal operator intervention.



Right: James Biggs and some of his staff surround the recently restored Transit Circle (Meridian) Telescope. Next to James is Carmel Borg, Arie Verveer, Peter Birch, John Pearse and Andrew Williams.

A PEOPLE'S OBSERVATORY

More than 2 000 people tour the Perth Observatory by night each year, with a further 4 000 visiting during daylight hours. Visitors come to wander around the museum and display area, view the telescopes, see slide shows, but perhaps most of all, to witness the wonders of the universe.

The Perth Observatory offers a unique chance to view astronomical objects through well-maintained, high-quality instruments, in a relatively dark location, with professional astronomers as guides. Because of this, and the unpredictability of the weather, waiting lists, especially for night tours, can be long.

A visitors' observing facility has been set up, with six telescopes available for the use of guests. The largest of these telescopes is 14" (35 cm) in diameter, and housed in its own dome. Another is 11" (27 cm) and located in a special building with sliding roof to facilitate star viewing. It is anticipated that the 12½" (32 cm) Calver telescope will soon be overhauled and added to the visitor attractions. The Calver was originally ordered in 1910, to satisfy public demand to view Comet Halley. Unfortunately it did not arrive until 1911—too late for the comet—but nevertheless popular with the public.

Three smaller telescopes are also available, and are used during Astronomy Field Nights when Perth Observatory staff take their knowledge and their scopes 'on the road' to school and community groups throughout Western Australia. The Observatory is looking to expand and improve these 'astro-tourism' activities.

The Observatory's educational programs are designed not only to increase knowledge of astronomy, but to foster understanding of the fundamentals of nature—the physical and mathematical sciences. Activities range from general talks at school and community halls, to lectures at universities and supervision of postgraduate students.

The Observatory receives an endless stream of enquiries from curious stargazers. To help head off some of the more general questions, it produces a yearly astronomical handbook, information kits, and a recorded information service. Still, after an unusual or unexpected astronomical event, the telephone can be expected to ring off the hook.

Perth Observatory staff are also called on to provide information on natural lighting conditions—sunrise, sunset, moonrise and moonset times—as well as moon phase tables. The Observatory can prepare this information for any date and any location on Earth. One unusual request came from a Swedish engineering company that wanted to know sun angles for an entire year, so that it could build sun shades for ticket machines in the Hong Kong transportation system.

LOOKING AHEAD

The future looks bright for the Perth Observatory. On 26 January 1996, it officially became part of the Department of Conservation and Land Management. Within CALM's Science and Information Division, the Observatory will benefit from an infrastructure that is supportive of science and research, but at the same time respects and acknowledges the unique nature of Australia's sole surviving state-funded observatory.

One advantage of the move to CALM is the computer network support that will become available to the Observatory, and help it attain world's best practice in astronomical research and education. It will provide easy communication and open many educational avenues on the burgeoning internet. Networking of the Observatory's computers will also allow remote control of the telescopes, releasing staff from routine observational work to carry out more creative and demanding scientific pursuits.

After 100 years, the Perth Observatory is still deeply involved in activities that are of practical benefit to the community, as well as scientific research that gives us a better understanding of the cosmos, and our place within it. Centenary celebrations merely serve as a reminder of these contributions. And when the smoke finally clears, the Observatory will continue to serve WA well into the next century.

James Biggs is Government Astronomer and Director of the Perth Observatory. He can be contacted by phone on (09) 293 8255 or fax on (09) 293 8138.

General astronomical information is available from the Observatory Infoline on (09) 293 8109.

Photos by Robert Garvey, unless otherwise indicated.

LANDSCOPE

VOLUME ELEVEN NO. 4 WINTER ISSUE 1996

The Perth Observatory celebrates its centenary this year, and during its 100 years' life it has played some major roles in the world of astronomy. Find out more on page 10.

John Forrest National Park has long been a popular picnicking spot for Perth residents, but this place of beauty has much more to offer. See page 16.

The Cape Range, in north-west WA, is known for its harsh environment. But if you look a little closer you'll discover the vast 'Range of Flowers' that live there. See page 28.

In 1961, the noisy scrub-bird was rediscovered at Two Peoples Bay. In 1994, the Gilbert's potoroo turned up unexpectedly. Find out more about this haven for the lost and found on page 35.

If all goes to plan, the Ord River area, will soon be known as a prime farming area for rare tropical timbers. Find out why on page 23.

FEATURES

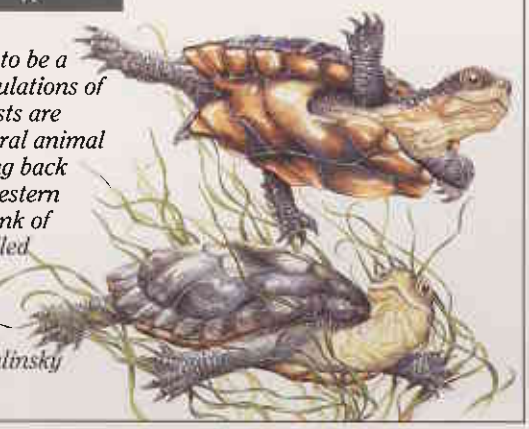
REGULARS

COVER

Fox-baiting has been shown to be a major tool in rebuilding populations of native animals. Now, scientists are embarking on a Statewide feral animal control program to help bring back native species, such as the western swamp tortoise, from the brink of extinction. The project is called 'Western Shield'.

The story is on page 41.

Illustration by Philippa Nikulinsky



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