

# Fields of discovery

The CSIRO's long history of environmental research is brought to life in a new book, *Fields of Discovery*. In this extract, author **Brad Collis** introduces some early heroes of environmental science.

**T**he CSIRO's involvement in wildlife research by the close of the 20th Century was increasingly being driven by the community's awakening to pressures being put on native Australia by industry, urban sprawl, alien predators and alien plants.

However, when the Wildlife Survey Section was started in 1949 under Francis Ratcliffe, it was native fauna that was regarded as the vermin or pest.

One of the Section's early projects was kangaroo biology – driven not by a desire to learn about Australia's largest native mammal, but to appease graziers who wanted the animal controlled because it competed for food with their sheep and cattle.

Ratcliffe, however, who had undertaken Australia's first biological surveys in 1929–31 and again in 1935, had strong feelings about the lack of knowledge of, and research into, native fauna. While forced to direct research to the economic problems of wildlife, he encouraged all of his research staff to take on 'hobby projects' – part-time, curiosity-driven research into native fauna.

In proposing the formation of the Wildlife Survey Section, Ratcliffe had written:

*It seems to me that a living interest in the bush and its animal inhabitants is a manifestation of one of the most decent and desirable traits in human beings; and it should be an obligation on the part of the government of a civilised country to do something positive to foster and encourage it.*

Ratcliffe was a passionate advocate for Australia's wildlife and was the founder of the Australian Conservation Foundation. Under his influence two streams of research emerged – the work on problem species which tended to be politically driven, and the scientists' self-determined wildlife surveys.

The aim of these surveys was to document and better understand the vertebrate fauna of the country – where it was, how it differed, and what was under threat. The work encompassed a large range of different studies on threatened species, and on perceived problems.

**Frith placed thermocouples and a heating coil, powered by a generator, in mounds and observed the reaction of the male to changes in temperature. He found the male could detect with its beak, temperature changes of as little as one degree.'**

Like the kangaroos, early work on ducks and magpie geese by Harry Frith arose from their status as a 'problem species', however he soon showed that the problem was not the wildlife. His research showed that the real issue was farmers trying to grow rice in their breeding areas.

The scientists' informal surveys accrued a wealth of knowledge and gave rise to the Australian National Wildlife Collection. Like the Australian National Insect Collection, it now provides a crucial data bank for researchers working to protect Australia's natural heritage.

Over time the Wildlife Survey Section gradually shed its problem-species shackles.

Early projects that helped formalise a research role in areas that didn't necessarily have an economic value, included work by ornithologist Dom Serventy and biologist Robert Carrick. Carrick undertook the first major research into magpies, and chaired the Working Group on Biology of the International Scientific Committee for Antarctic Research.

Serventy explored the effects of regular harvesting by Aborigines on the Tasmanian mutton bird population in the Furneaux Islands in Bass Strait. He was also one of the first Australian scientists to use modern media when he made a colour film on the mutton birds of Bass Strait.

Carrick likewise produced two films on the wildlife of Macquarie Island and Geoff Sharman made a widely acclaimed film, *Birth of the Red Kangaroo* – regarded only half tongue-in-cheek as the first sex education lesson for Australian school children in the 1960s.

From 1966–76, the Western Australian office of the Division of Wildlife Research, as the survey section had by then become, was also instrumental in one of the first modern conservation campaigns to save

from extinction the noisy scrub bird near Albany on the south coast.

By this time Harry Frith had taken over as officer-in-charge and the Wildlife Survey Section was reconstituted as the Division of Wildlife Research. Frith, like Ratcliffe, was passionate about conservation and he attempted to change community attitudes by writing a series of popular books on Mallee fowl, waterbirds, pigeons, kangaroos and the birds of the High Country.

He encouraged the development of State services for the conservation of wildlife and with John Calaby was a moving force in the formation and development of Kakadu National Park.

Frith's first major study on the Mallee fowl, *Lipoa ocellata*, in the early 1950s established for him an international reputation in ornithology. On a large patch of mallee owned by a farmer who allowed him to use the area for experiments, Frith recorded the extraordinary behaviour of these unusual birds, in particular their breeding cycle.

He discovered that the mounds the birds built from soil and vegetation for

their eggs were in fact carefully managed incubators, the temperature of which was controlled by the male.

Frith placed thermocouples and a heating coil, powered by a generator, in mounds and observed the reaction of the male to changes in temperature. He found the male could detect with its beak, temperature changes of as little as one degree. He showed that heat for the incubation was provided at different times of the year by fermenting mallee leaves or by the sun.

The male bird adjusted the temperature by either opening the mound to allow the sun to heat it, or closing it to allow fermentation to heat it, providing at all times optimum incubation conditions.

Frith's findings, however, were often unpalatable to outsiders, particularly those whose priority was land 'development'.

In the early 1960s the Ord River development in Western Australia and attempts at large-scale rice farming in the Northern Territory on Humpty Doo station south-east of Darwin caused the first conflict between wildlife and agriculture in Australia's north. The site of the



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Humpty Doo rice project happened to be a breeding ground for magpie geese. Frith was asked to survey the geese, from the point of view of the damage they were doing to the new industry, but was 'swept off his feet' by the creatures.

He became increasingly concerned that the region's geese colonies would be destroyed by the march of settlement which he believed would eliminate much of the biological wealth of the northern coastal plains and Arnhem Land.

Frith grew increasingly passionate about the need to protect the region and began working with Goff Letts, Lionel Rose and Tom Hare from the Northern Territory Animal Industry Branch to push for the establishment of conservation reserves.

Their first achievement was the promulgation in 1963 of the existing Woolwonga

Aboriginal Reserve as a nature reserve. After another eight years of lobbying, the Federal Government finally agreed to appoint a planning team to develop a detailed proposal for a national park in the area. Frith was on the team, and was later joined by Calaby.

The group submitted its recommendation for a 'Northern National Park' in 1971. A year passed without any Federal Government action, prompting the Northern Territory Administration to proclaim the Alligator River Wildlife Sanctuary, covering about 3290 square kilometres of Arnhem Land.

It wasn't until the push for uranium mining in the area, and the subsequent Ranger Uranium Environmental Enquiry, that the Federal Government finally moved. The sanctuary set up by the NT

Administration was expanded and re-established as the Kakadu National Park, today one of the environmental wonders of the world.

In 1975, Frith negotiated with the Northern Territory Administration for an adjacent portion of land, Kapalga, to be assigned to CSIRO as a research site for 20 years. The research station there operated until 1994, compiling crucial knowledge on this unique region.

Despite the importance of this and other work by the division's scientists, it only occasionally caught the public eye. Without public awareness and therefore support, it grew vulnerable to the financial yardsticks increasingly used to measure performance. After a review in 1980, following the retirement of Harry Frith, the division found itself fighting for survival.

## From Aerogard to the galaxies

"THE chatter of small talk faded to a reverent hush as the young Queen and her entourage made their regal entrance to the garden. Guests curtsied and bowed in a rippling procession of floral hats and sombre suits – but at the rear of the garden a solitary figure stood aghast.

The Australian Queen, Elizabeth II, was giving the time-honoured Australian salute, that reflex flick of the hand that begins with the first flies of summer – and she shouldn't have been. She ought to have been waving calmly to deferential subjects gathered in the shady garden of Yarralumla, the Governor-General's official

residence in Canberra, not taking defensive swipes at clouds of hovering flies.

Doug Waterhouse, Australia's internationally renowned insect expert, was dumbfounded. There shouldn't have been a fly anywhere near Her Royal Highness. The previous week he'd tested his new insect repellent thoroughly on himself and Governor-General William Philip Sidney, first Viscount de L'Isle, and not a fly had bothered them. For the garden party, the premier social event during the Queen's 1963 visit to Canberra, Waterhouse had arranged for an aid-de-camp to discreetly spray Elizabeth as she prepared to go outside. Waterhouse hurried from the scene and learned that the aide responsible had lost his nerve, aiming the spray from such a distance that none reached her.

Government House staff, however, had no such qualms the following day when they met members of the royal party and journalists for 18 holes at the Royal Canberra Gold Club. They applied the substance liberally and it wasn't long into the game before the visitors, especially journalists, noticed that as they flailed and choked their way through swarms of flies, their hosts were fly-free. 'It's a new formula developed by CSIRO,' the visitors were told. Within days, Waterhouse's new bushfly repellent was making headlines and it prompted a phone call from the Mortein

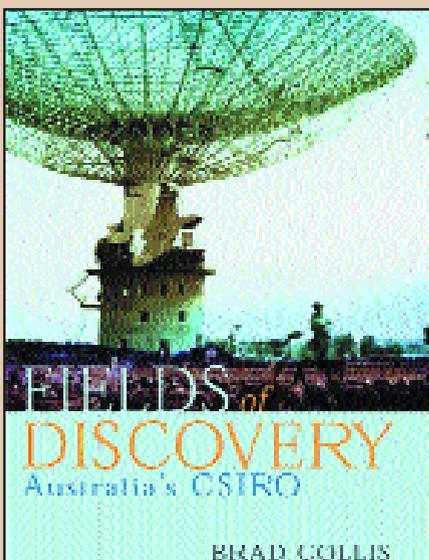
insecticide company, requesting the formula. 'Back then,' Waterhouse recalled, 'CSIRO policy was to make its discoveries freely available because they had been developed with public funding. Intellectual property rights hadn't come in.'

And so it came to pass that the following summer a new fly repellent was launched and it quickly embedded itself into the Australian psyche. 'Avagoodweekend' became the catchcry, and Waterhouse, for his role, was sent a dozen cans of the new product, Aerogard, for Christmas."

So begins 'Adventures in entomology,' chapter two of Brad Collis's book *Fields of Discovery, Australia's CSIRO*. It's a great example of the book's general flavour: peppered with anecdotes gathered during hundreds of interviews with past and present CSIRO staff.

*Fields of Discovery* captures the highlights of 50 years of research by CSIRO, bringing to light many of the scientific endeavours that have underpinned Australia's development during the second half of the 20th Century, from the development of advanced agricultural systems to new metallurgy processes, the discovery of galaxies, and the development of the lifesaving anti-influenza drug.

The book is available for \$49.95 from CSIRO Publishing, freecall 1800 645 051, email: [publishing.sales@csiro.au](mailto:publishing.sales@csiro.au).



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In 1981, the acting chief, Hugh Tyndale-Biscoe, learned by chance that the division was to be transferred from the Institute of Biological Resources to the Institute of Animal and Food Sciences. Tyndale-Biscoe was horrified, there being one obvious consequence of wildlife research being placed under an administration devoted to food production. It would be back to solving the problems of economic pests and an end to the division being a source of independent research into wildlife-agriculture conflicts.

The news reached Tyndale-Biscoe on a Friday afternoon and after several frantic phone calls he was given the weekend to prepare a counter argument. With the help of John Calaby he prepared a three-page memorandum outlining the necessity of ongoing, even expanded, research into wildlife ecosystems. The CSIRO Executive met on the Monday and after a lengthy debate accepted Tyndale-Biscoe's case.

But from that moment the pressure was on to change the overall research program; in particular to strengthen botanical work, to increase the use of mathematical

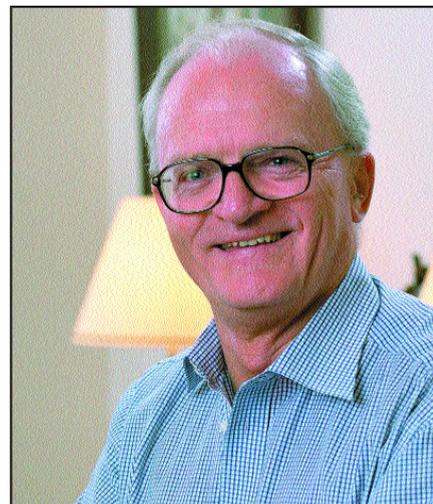
modelling, and to adopt multi-disciplinary and multi-species ecological studies.

In the mid-1980s the division was restructured as the Division of Wildlife and Ecology under Brian Walker, who had been professor of Botany and Director of the Centre for Resource Ecology at South Africa's University of Witwatersrand.

Walker brought with him a strong conservation ethos and a hard-nosed managerial streak. The division's budget had again been slashed and Walker knew the only way back was for his scientists to identify national environmental priorities and to make the work more visible to the general public.

Under Walker the CSIRO was gradually seen to be more in step with a growing global realisation about the extent to which natural ecosystems were being punished by human activity: 'When you suddenly realise that the planet has lost a quarter of its bird species you have to ask what the hell is mankind doing,' Walker commented when interviewed shortly before resigning in 1999.

Walker steered the research into areas of increasing importance to the community,



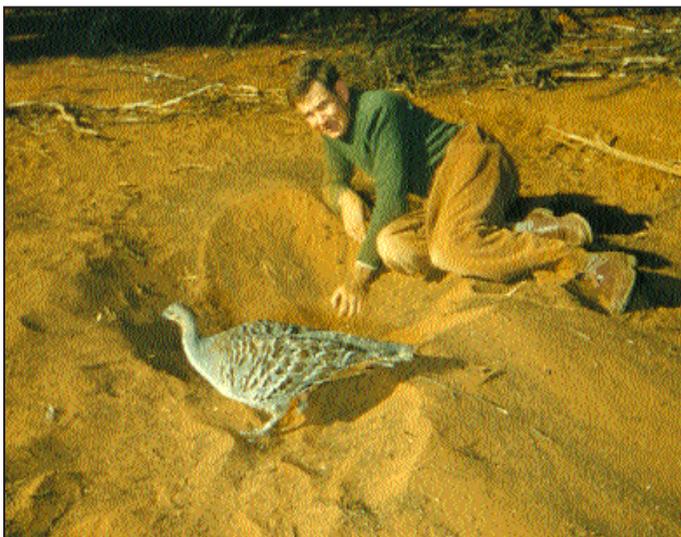
**Brian Walker: 'When you suddenly realise that the planet has lost a quarter of its bird species you have to ask what the hell is mankind doing,'**

focussing the division on the environmental problems of entire ecosystems.

He also helped a new generation of scientists adjust to 'scientific accountability' and to realise that the environment and endangered species could no longer wait for scientists to passively await research funds.

For the first time, scientists started shouldering responsibility for approaching and convincing industries and community groups of not only the need for wildlife research, but why they, the community 'stakeholders', should pay.

*The division has remodelled again to become Sustainable Ecosystems, under Steve Morton.*



**Above left: Harry Frith's major study on the Mallee fowl in the early 1950s established for him an international reputation in ornithology. Frith also made the first scientific survey of Australian waterfowl and was one of the pioneers of modern conservation. He wrote the first Australian book on wildlife conservation and, with colleague John Calaby (above right), was a moving force in the formation and development of Kakadu National Park.**