

The Cow-pat Agenda

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Brad Collis

Fields of Discovery: Australia's CSIRO

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IF YOU ARE looking for a rattling good yarn of national success that is, for a change, neither military nor sporting, *Fields of Discovery* is your book. Rich with Eureka moments, Brad Collis has created a great read. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is 'an Australian icon' according to the book's front flap. It provides a framework for a national(ist) story with scientists as heroes. Science is a very important and distinctive aspect of Australian nationhood, but frequently sidelined by cultural historians. The challenge is to write an interesting narrative about 'Big Science', which is typically dominated by large teams of workers and labyrinthine administrative structures.

Collis has grasped the nettle of the 'human-sized narrative' with great success. *Fields of Discovery* offers a rich pastiche of individual stories that unfold in the dramatic style of an adventure narrative. Beginning with 'alien invaders', Collis depicts the war on acclimatised plants and animals that have thrived excessively in Australia's distinctive ecosystems — a war whose unlikely heroes are scientists.

Wendy Forno appears in her fisherman's waders, scouring Brazil for a natural enemy to the floating aquatic weed, *Salvinia molesta*. Forno built on a long history of finding biological controls for pest species. The early Council for Scientific and Industrial Research (as it was called until 1949) had built its reputation on the success of the Cactoblastus moth in combating the noxious garden escapee, prickly pear. Collis treats this contextual material lightly, and focuses on the lone woman on 'a search for the proverbial needle in the haystack'. First she had to locate the salvinia itself in its native habitat. In a piranha-infested swamp, less than one hundred kilometres from where she was stationed, she had 'sheer luck', and pressed a specimen. It then took four more years to find a suitable beetle, and confirm that this could indeed destroy the weed.

The sixteen chapters compress work from the many sections and divisions of CSIRO that have waxed and waned over its history, but all are enlivened by individuals, thinking creatively and laterally to solve Australia's perceived problems. George Bornemissza, an observant entomologist working in Western Australia in 1951, was 'struck by the quantity of old cow-pats'. In his native Hungary, dung beetles could clean up a fresh cow-pat in three hours. As a result of his observation, and some detailed research of various species

abroad, dung beetles arrived in Australia. The risky second introduction (the dung beetle) dealt with a problem arising from the first (the cattle), whose dung had provided Australia's native bush fly with excessive breeding grounds. Collis notes that the rise of café society in Australia has depended on the steady reduction in bush flies since the 1980s.

Collis has a real gift for explaining science in plain English, and for making everyday connections to keep his narrative interesting. Protein biochemistry was essential to a 1940s mission to recover wool from sheepskins. In the 1970s, with wool industry funding declining, the Division of Protein Chemistry recognised that its biochemical knowledge would have applications for human medicine. Collis explains just enough biochemistry to make sense of Peter Colman's Relenza flu drug. We all understand influenza, if not X-ray diffraction technology. The idea of a neuraminidase (enzyme) inhibitor was not new: it had been tried before, and abandoned. Colman, with Jose Varghese, and ANU biochemist Graeme Laver, established the 3-D structure of the neuraminidase protein on the flu virus and observed the very distinctive changes that occurred when the virus mutated. 'There was one small part on the surface of the neuraminidase that didn't change.' But this Eureka moment was just the beginning. A local entrepreneur established the Biota company to back the project to manufacturing stage: a \$100 million enterprise. Only when the drug was clearly proven to be active did the big global companies, in this case Glaxo, venture capital in trials and marketing.

The CSIRO's publicly funded national science has focused on perceived 'useful' ends in all eras. *Fields of Discovery* offers the reader a rich set of responses to the question: 'What is Australia about?' CSIRO stories reply loudly: 'The agricultural economy.' The land, its pests and its productivity have been the overwhelming pivot for national scientific effort for most of the twentieth century. In 1949 Trevor Pearcey and others, concerned about the time taken to do mathematically complex research, designed CSIRAC, one of the world's first computers. It was commissioned in 1951.

Soon after, the CSIRO Executive abandoned computer research, still apparently influenced by British advisers 'who recommended Australia concentrate on agriculture'.

But what happens when the sheep's back is no longer available for a ride? Colman's story indicates just some of the many complexities of big science in the 'commercial-in-confidence' era. Colman, with CSIRO's agreement, became a Research Director of Biota, but found that this meant giving free scientific advice. 'When they get legal or accounting advice they pay for it,' Colman commented. 'But for scientific advice, which is even more fundamental, they weren't accustomed to paying.'

'Strategic research' sits uncomfortably at the intersection between basic research and commercial patents. Basic research produces intellectual property available to all through peer-reviewed literature. Product patents are only affordable for a handful of global players. There is an in-between 'strategic' science, where the property rights are in a grey area. There is definite national interest in being in the 'strategic' game, but even for the 'success' stories the lead-time is long (just over two decades for Relenza).

The stories of the scientists and their quests for discovery are mostly drawn from the memories of CSIRO staff. Collis is a good listener, and clearly many of the scientists are great storytellers. Collis has combed the secondary literature (much of it published by CSIRO itself) in his search for a new 75-year synthesis, but few documentary primary sources, such as letters and memoranda, appear in the notes.

This is a 'strategic' synthesis, built on 'inside' sources informed by hindsight, biased towards stories of success, and with only limited authorial comment. While such a strategy is understandable in a climate where CSIRO must find thirty per cent of its funding from non-government sources, it is a dangerous trend. Communicating good news is reassuring, but science needs to know 'bad' stories too. Negative results may be important for future developments in a different context. History is much more than a mere communication and marketing tool.

In a commercially published book where the words 'commissioned history' never appear, it is intriguing that copyright rests neither with the author nor the publisher, but with CSIRO. The reflective moments in this book are brief and inhibited. The epilogue of less than four pages (in scientific jargon, less than one per cent of the book) is surprisingly nervous. The challenge 'is to determine how to invest rather than squander this (scientific) legacy'. The fear of the future hangs heavily in this analysis. Like David Rivett's science, good history needs to travel that road to knowledge 'with unrestricted, passionate and fearless enthusiasm'. The CSIRO executive needed to invest more trust in this excellent writer, at least granting him the independence of copyright — or else to admit openly that this was a commissioned work with an agenda.