as hundreds of thousands of engineers and scientists, is rightly regarded as a triumph for US technology. What is less appreciated is the rôle played by a few-hundred spacecraft trackers and technical staff in the Australian outback.

This book is the story of Carnarvon, a small, isolated town in north-west Australia where communications were *via* short-wave radio or a manned telephone exchange, and television was non-existent. Until 1962, when NASA officials came looking for the ideal site for a tracking, telemetry, and control station, Carnarvon was best known for its prawns, bananas, and sheep stations. Suddenly the sleepy, isolated settlement of 2000 inhabitants became a vital communications hub in the American drive to send humans into space and beat the Soviets to the Moon.

From 1964 to 1975, Carnarvon was home to the largest NASA tracking station outside mainland America. Every manned mission in the Gemini, Apollo, and Skylab programmes was tracked and monitored from the station, not to mention important landmarks in unmanned exploits, such as the *Echo 2* balloon, and the *Ranger-6* and *Helios-A* spacecraft.

In the early days, Carnarvon acted as a magnet, drawing in engineers from overseas, as well as the largest Australian cities. With this sudden influx of technical staff and their families, the entire social structure of the town was transformed. This book, written by two people who were intimately involved in the high-tech transformation of this remote corner of Australia, tells two stories: the evolution and successes of the tracking station from its birth to retirement, and the social revolution which it brought. Meticulously researched and nicely illustrated, the authors provide a detailed, but affectionate, account of how the most exciting episode in human spaceflight opened up a whole new world for thousands of people 'down under'. — PETER BOND.

Plumes vs Plates: A Geological Controversy, by Gillian R. Foulger (Wiley-Blackwell, Chichester), 2010. Pp. 328, 24·5 × 19 cm. Price £37·50 (paperback; ISBN 978 1 405 16148 0).

This new work represents a major contribution to an active and intense debate about the rôle of deep-seated mantle plumes in understanding global tectonics and particularly the origin of 'large igneous provinces'. The concept that magmatism away from plate boundaries might be generated by mantle plumes was first proposed in 1971 by Jason Morgan and since that time the model has provided an increasingly widely applied mechanism for explaining many types of magmatic, thermal, or subsidence anomalies. Foulger has been a spokesperson for a growing number of geoscientists who have come to query the rather uncritical application of the plume concept to many geological settings. In this contribution she reviews a series of different geological, geophysical, and geochemical aspects of plumes and tests whether all the supposed criteria related to plumes can be recognized or not. She notes that, in many cases, only a few of the expected characteristics of plumes can be recognized and then proposes alternative, tectonic-based explanations to account for the apparently anomalous behaviour. The text is mostly convincing and the reader is left with the feeling that the plume model has been over-applied, especially by geochemists in recent years. The seismic tomographic images that largely fail to show deep-seated velocity anomalies are especially telling. Nonetheless, I was left with a feeling that, while many of the supposed plumes can be explained by plate processes, there may still yet be room for some of the largest plumes, such as Hawaii, in our revised model of the Earth. This debate is sure to resonate for several years yet, and this book allows readers to come quickly up to date with the central issues.

This text is well written and easy to digest for the educated reader. Bullet points make it easy to skim read and pick the sections that interest you. It probably best suits advanced undergraduates and postgraduate students and would make a good text for courses in petrology, geophysics, or basin analysis. The book is well illustrated, although some of the figures are not of the highest quality, featuring a jumble of different font styles and sizes, culled from the various source papers and generally not redrafted. The crucial seismic-tomography figures are provided as a colour insert but the black-and-white versions embedded in the text are almost useless and a little frustrating. That said, the book is a valuable edition to any geologist's library and provides material for thoughtful debate, whether you agree with Foulger or not. — PETER CLIFT.

THESIS ABSTRACTS

THE TRANSIENT RADIO SKY

By Evan Francis Keane

The high-time-resolution radio sky represents unexplored astronomical territory where the discovery potential is high. In this thesis I have studied the transient radio sky, focussing on millisecond scales. As such, this work is concerned primarily with neutron stars, the most populous member of the radio-transient parameter space. In particular, I have studied the well-known radio pulsars and the recently identified group of neutron stars which show erratic radio emission, known as RRATs, with radio bursts every few minutes to every few hours.

When RRATs burst onto the scene in 2006, it was thought that they represented a previously unknown, distinct class of sporadically emitting sources. The difficulty in their identification implies a large underlying population, perhaps larger than the radio pulsars. The first question investigated in this thesis was whether the large projected population of RRATs posed a problem, *i.e.*, could the observed supernova rate account for so many sources. In addition to pulsars and RRATs, the various other known neutron-star manifestations were considered, leading to the conclusion that distinct populations would result in a 'birthrate problem'. Evolution between the classes could solve this problem — the RRATs are not a distinct population of neutron stars.

Alternatively, perhaps the large projected population of RRATs is an overestimate. To obtain an improved estimate, the best approach is to find more sources. The Parkes Multi-beam Pulsar Survey, wherein the RRATs were initially identified, offered an opportunity to do just this. About half of the RRATs showing bursts during the survey were thought to have been missed, due to the deleterious effects of impulsive terrestrial interference signals. To remove these unwanted signals, so that we could identify the previously shrouded RRATs, we developed new interference-mitigation software and processing