On the smaller (but still vast) scale is the interstellar medium within the Milky Way, which is addressed by McClure-Griffiths *et al.* who consider the role of atomic hydrogen, and on an even smaller scale in accretion in the environment of binary stars by Lai & Muñoz. While we know quite a bit about the generation of magnetic fields in stars, it came as something of a surprise to me to find that galaxies themselves have dynamos, outlined in the work of Brandenburg & Ntormousi.

On the instrumental front we have a report on imaging spectroscopy of radio emission from the Sun by Gary, and on advances in interferometry, especially ESO's *GRAVITY* instrument on the *VLTI*, by Eisenhauer *et al.* And finally an elaboration of the benefits of Gaussian processes in the analysis of time-series data by Aigrain & Foreman-Mackey. — David Stickland.

America's First Eclipse Chasers. Stories of Science, Planet Vulcan, Quicksand, and the Railroad Boom, by Thomas Hockey (Springer, in association with Praxis Publishing), 2023. Pp. 444, 24 × 16·5 cm. Price £27·99/$37·99 (paperback; ISBN 978 3 031 24123 9).

Professor Thomas Hockey is well known for his authoritative and well-written historical studies. One recalls, for instance, his excellent *Biographical Encyclopaedia of Astronomers* and his *Jupiter before Voyager*. The present book looks back at the total solar eclipse of 1869, with the imminent prospect of yet another such event being visible from America in 2024.

In 1869, it had been four years since the Civil War of 1861–65, an apocalyptic national event. In those times, as the country was returning to normality, the recent growth of the railroad, racing ever westward to link the east and west coasts of America, was to play a key role in the eclipse expeditions of 1869 and later. It was now possible for astronomers and their bulky luggage to travel *en masse* to witness a total solar eclipse upon American soil.

Observations of total solar eclipses don't always go smoothly. When choosing a spot from which to watch one from India in 1995 I was threatened by an armed guard when innocently straying onto the pitch claimed by another group. Here, as Hockey follows the many and varied groups that travelled to position themselves beneath the long track of the Moon's shadow in 1869, the battle for legroom was hardly an issue: it was more a question of what facilities an isolated frontier town could offer to a scientific party. It is likely that Simon Newcomb carried a pistol in his luggage when he travelled to Des Moines, Iowa. Although there aren't any Tombstone-style shootouts in this book, some expeditions literally shot themselves in the foot through basic error and incompetence, while others succeeded admirably.

There is the story of the retired Naval Commander who bumped into his telescope, shaking his precious long-exposure photographs; how E. C. Pickering avoided the crowds and stayed safely in his hotel room to observe, simply propping up his telescope and spectroscope on a chair in an amateurish manner; and so on and so forth. Others were still wasting their time to look for the non-existent planet Vulcan. It is interesting that Asaph Hall, the leader of one party, once had to host President Lincoln when he had called unexpectedly one evening at the US Naval Observatory to do some practical observing, while Edward Curtis, who carried out spectroscopic work with Professor Harkness (also part of the USNO expedition), was a former pathologist turned photographer, and one who had performed the autopsy upon the assassinated Lincoln. The 1869 spectroscopic work was perhaps the most interesting from a

scientific point of view, leading as it did to the discovery of the coronal green line.

The pioneering spirit pervades this enjoyable romp through the American mid-west. I highly recommend it. It is richly illustrated, and I have honestly only ever seen one or two of the illustrations previously. (Figure 5.1, by the way, is printed upside down. There are few obvious typographical errors.) There is a very good collection of portraits of individuals, observing locations, charts, and drawings and photos of the eclipse. Hockey's book offers sound background details, and nicely sets the 1869 events and discoveries in context. It can either be read from cover to cover or just dipped into at random, as the chapters are self-contained. It is an engaging work, always informative and comprehensive, and — in quite a few places — highly amusing. And what about that quicksand mentioned in the title? Well, I leave that to Hockey's readers to discover, but I might just add that the unfortunate Naval Commander was involved. — Richard McKim.

Nobel Prizes in Astronomy, by Pushpa Khare (Springer), 2023. Pp. 173, 23·5 × 15·5 cm. Price £22·99 (paperback; ISBN 978 3 031 29638 3).

Strictly speaking, there are no Nobel Prizes in Astronomy, but we all know of cases where a Nobel Prize in Physics has been awarded for work very strongly related to astronomy. Research significant enough to merit a Nobel Prize is often not easily explicable to high-school students and we owe this book to Dr. Khare's daughter, who suggested that she wrote an account suitable for students. Recently retired from Utkal University, near Pune, and with plenty of experience in giving popular talks and writing for science magazines, she took up the challenge.

She covers 13 Prizes, starting in 1967 with the award to Hans Bethe for his work on what we now call nuclear astrophysics: the nuclear reactions that happen inside stars and provide the energy source for stars. She recognizes seven categories: 'Stellar Structure', 'Stellar Evolution', 'Radio and X-ray Astronomy', 'Extra-solar Planets', 'Black Holes', 'Gravitational Waves', and 'Cosmology', and devotes one chapter to each category. For each Prize (sometimes several in each chapter) she starts with the citation, followed by some biographical information about the recipient (complete with a photograph in most cases; she did not in time receive permissions for two). She then gives appropriate background information, which for Bethe runs to 12 pages (an overview of the whole of stellar structure), followed by an account of the specific work for which the Prize was awarded.

As well as Bethe, the first chapter includes the 2002 award jointly to Ray Davis Jr. and Masatoshi Koshiba, mainly for their independent 'detection of cosmic neutrinos', using, respectively, the Homestake mine and *Kamiokande* (originally set up to look for proton decay; the full name is *Kamioka nuclear decay experiment*). Davis recorded solar neutrinos, but for a long time there was a puzzle: he detected only about a third of the expected number. It wasn't until the much later *SNO* experiment that it was realized that neutrino oscillations had reduced the number of electron neutrinos during the journey from the Sun to the detector. Koshiba's first detection was of neutrinos from SN 1987A, but later his group confirmed Davis's results for the solar neutrinos. *Super-Kamiokande* was able to detect muon neutrinos and confirmed the *SNO* result.

The 'Stellar Evolution' chapter records the 1983 Prize, shared between Chandrasekhar (essentially for the 'Chandrasekhar limiting mass' of a white dwarf, although the citation is much wider) and Fowler for his seminal work