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BOOK REVIEWS

***The Emergence of the Telescope: Janssen, Lipperhey, and the Unknown Man, by* M. Barlow Pepin (Duncanville, Texas, T Tauri Productions, 2004), pp. 42, ISBN 0-9758527-0-1 (paperback), US$19.95 plus postage.**

Who invented the telescope? Good question. The short answer is that no-one knows, exactly. We do know that the first name associated with the telescope's debut on the world stage is that of Hans Lipperhey, a humble spectacle-maker who petitioned the government of the fledgling Dutch republic for a patent on the invention late in September 1608. His timing was perfect, coinciding with tense diplomatic negotiations between the Dutch and the Spanish, who had been at war since 1568. But within three weeks, two other individuals had applied for similar patents, so it is questionable whether Lipperhey was the true originator of the telescope.

The contemporary documents that relate these events were uncovered early in the twentieth century by another Dutchman, Cornelis de Waard, and presented, together with related evidence, in his *De Uitvinding der Verrekijkers* (The Hague, 1906). It was in assembling and translating these original sources for a wider readership that the modern historian, Albert Van Helden, performed perhaps the greatest service to today's scholars. He wrote a detailed analysis of their contents in 'The Invention of the Telescope' (*Transactions of the American Philosophical Society*, Volume 67, Part 4, 1977), a monumental work that has become the yardstick against which all subsequent commentaries on the origin of the telescope are judged. It should not be assumed, however, that Van Helden solved all the problems (and, indeed, he made no claim to have done so). The evidence is a maze of contradictory statements and reports, often with well-known historical names intermingled with shadowy figures in confusing circumstances. It is a very difficult area.

Into this minefield has stepped the brave author of *The Emergence of the Telescope*, the late M. Barlow Pepin. His stated purpose is to take a 'fresh look' at the circumstances under which the telescope emerged. While no significant new evidence has come to light since Van Helden's work, Pepin does draw some previously unrecognised threads together in arriving at a conclusion not too different from de Waard's of a century earlier—but with rather greater emphasis. The telescope was perfected not by Lipperhey, says Pepin, but by one Saccharias Janssen, a spectacle-maker, peddler and small-time crook, who secretly presented an example to the authorities shortly before Lipperhey got around to it.

Whether or not you agree with this verdict doesn't really matter. The pleasure is in the journey, for *The Emergence of the Telescope* presents the evidence in a thoughtful, well-written and at times very entertaining way. The book is well-illustrated and delightfully presented. You still have to keep a clear head to avoid sinking in the mass of documentation, but the cross-referencing is, for the most part, up to the task. *The Emergence of the Telescope* is a worthy adjunct to Van Helden's work, and a useful contribution to the scholarly literature. I only wish I'd had a copy a few years ago, when I made my own foray into this morass …

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***The Early Years of Radio Astronomy. Reflections Fifty Years after Jansky's Discovery* (Reprint edition), edited by W.T. Sullivan III (Cambridge, Cambridge University Press, 2005), x + 421, ISBN 0 521 61602 6 (paperback), AU$130:00.**

For many years, Woody Sullivan's 1984 edition of *The Early Years of Radio Astronomy* has been one of my favourites. It takes pride of place in the radio astronomy section of my library, is frequently referred to, and consequently over the years has become rather tired-looking. What I needed was a second copy, but for far too long this 'classic' of historic radio astronomy has been out of print.

Now Cambridge University Press has finally come to the rescue by issuing a long-anticipated reprint. This faithfully reproduces the original volume, which is split into five discrete sections: "The Earliest Years", "Australia", "England", "The Rest of the World" and "Broader Reflections". Chapters in the first section were penned by Woody himself, Grote Reber and Jesse Greenstein, and they focus on those acknowledged 'founding fathers' of radio astronomy, Karl Jansky and Grote Reber. The Australian and UK sections which follow reflect the pre-eminent position of these two nations during the late 1940s and throughout the 50s, as nicely documented in papers by Taffy Bowen, Ron Bracewell, Robert Hanbury Brown, Chris Christiansen, Frank Kerr, Bernard Lovell, Bernie Mills, Peter Scheuer and Grahame Smith. The fact that half of these luminaries are still alive reminds us that radio astronomy is a comparatively recent phenomenon. "The Rest of the World" features papers about early radio astronomy in Canada, France, Japan and Russia, four nations that were particularly active during the 1950s, and the final section of the book goes beyond national perspectives by looking at the sociology of early radio astronomy, the radio astronomy-cosmology interface and possible future research trends.

The *Early Years of Radio Astronomy* may have first appeared more than twenty years ago, but this 431-page tome remains as valid and important today as it was then. It is mandatory reading for all those wishing to embrace the history of radio astronomy; indeed, it is the first book I have all my new history of radio astronomy doctoral students read! I congratulate CUP on having the vision to reprint this book, and recommend it to anyone with an interest in radio astronomy—past or present.

Wayne Orchiston
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***England's Leonardo: Robert Hooke and the Seventeenth-Century Scientific Revolution*, by Allan Chapman (Bristol, Institute of Physics Publishing, 2004), pp. xv + 330, ISBN 0 7503 0987 3 (hardcover), £24.99, US$ 39.99.**

Although I went to school in Robert Hooke's native country, I was not taught much about him. Of course we learned Hooke's Law—in its Latin form, *ut tensio sic vis*—and I soon became aware of his pioneering work with the microscope, if only because his drawing of the eye of a fly has been so frequently reproduced. I went on, however, to graduate in astronomy without learning much more about the man. Even his quarrel with Newton was something of which I was only dimly aware. As a graduate student, I met a fellow-student who told me that he was fascinated by Hooke and thought that the man had been sadly neglected. I not only could not enlighten him, I could hardly either agree or disagree. My friend was ahead of his time; our conversation took place half a century ago, just before what Chapman describes in his Preface as "… the first modern scholarly study of Hooke's whole life and career …" was published by Margaret Espinasse. But for a most unfortunate accident that took his life only a few months after our conversation, my fellow-student might have become one of the scholars who contributed to rectifying the neglect of Hooke. That past half-century has seen considerable scholarly activity in the study of Hooke and his period, culminating in a flurry of books published around the time of the tercentenary, in 2003, of his death. At least one other author has compared Hooke to Leonardo da Vinci. In the meantime, although I have not been even on the fringe of this work, I have at least progressed beyond the abysmal ignorance of my schooldays. I came

to Chapman's account fully prepared to learn of Hooke's wide-ranging versatility, but still a little skeptical of the comparison between him and Leonardo.

Hooke's versatility is beyond question and brooks comparison with Leonardo's, including as it did experiments with model flying machines. Chapman emphasizes that versatility by devoting successive chapters, each to one or two fields of Hooke's work. Thus we have chapters on "Breathing, Burning and Flying", "Microscopes and Meteorology", "Hooke and the Astronomers", "Surveyor to the City of London" and "Hooke's Geological Ideas", to mention only some. I found the last of these the most interesting. Seventeenth-century geology has seemed to me to offer nothing but a choice between John Ray's hesitant speculations about what the discovery of fossils might imply for what he called the 'novity' of the Earth, and the (to our minds) fantastic scheme of Thomas Burnet. Chapman shows Hooke's approach to have been more modern in spirit than either of these; in some respects he anticipated the ideas of Hutton and Lyell more than a century after him.

Why has Hooke been so forgotten? Of course, the quarrel with Newton is a factor, especially since Newton, the younger man, outlived him and was in a position to impose his own version of history on the record. Chapman also suggests that Hooke often did not claim credit for his many inventions until his priority was questioned, so genuine doubts existed, even in his lifetime, about many of his achievements. Hooke's very fertility of invention may have counted against him; he became known as a 'mechanic'—a term that later was to have connotations of someone inferior to natural philosophers.

This book is a biography of the man and not just an account of his scientific work. Chapman is at pains to give us a rounded portrait of Hooke's personality. Newton's version of events has left us with the picture of a sour, curmudgeonly recluse. There *was* an irascible and quarrelsome side to his nature, but Hooke had many friends—particularly Sir Christopher Wren and Samuel Pepys—who enjoyed the society of the London coffee shops, and he had a distinguished international reputation when Newton was still relatively unknown.

Hooke lived through a time of turmoil in England, including the Civil War, the Commonwealth and the Restoration. Although he was only in his teens when Charles I was beheaded, Hooke's sympathies seem to have been Royalist; he disliked Puritans and Puritanism. This can perhaps be attributed to his upbringing; his father (who also died while the son was in his teens) was a clergyman, probably of Laudian persuasion. Later in life, Hooke came under the influence of quite senior clergy of that persuasion, and, indeed, counted them among his friends. Since the work of R.K. Merton, it has become fashionable to see the flowering of natural philosophy in seventeenth-century England as connected in some way with the rise of Puritan or Calvinist values. Hooke would provide an interesting counter-example, were it not for the fact that, for much of his life, his religious observances seem to have been entirely nominal. Unlike his mentor Boyle, and his adversary Newton, Hooke does not seem to have been motivated in his research by religious ideas.

Chapman even discusses Hooke's sexual life, which was certainly not Puritan and probably would have offended his Laudian clerical friends as well, had they been aware of it. Hooke never married but he was certainly not celibate. He seemed to regard it as a matter of right to enjoy sexual relations with his maidservants, and had a long incestuous affair with his niece, in a period when the taboo against incest was especially strong. Considering that the niece was not only a minor, but his ward at the time, even today Hooke would be in danger of a long period of imprisonment should the relationship become publicly known.

Ideally in a review like this, I should tell readers how this book compares with the other recent books about the man. Having only browsed through those others, which Chapman himself praises in his Preface, I cannot do so. My impression is that this is the most comprehensive as a biography. The book is readable and errors of proof-reading are few, although, surely, on p.74, where we are told that Hooke "seems to take the facts of both geocentricism and cosmological vastness as read", the context demands "heliocentricism". More serious and surprising is the quoting, on p.92, of Aristotle's belief that stars may be seen in daytime from the bottom of a deep well, without any reference to modern discussions of the matter. I was also puzzled by the reference on p.198 to a falling body increasing "its velocity by a factor of 32 for every second of fall". Surely Hooke would have realized that the numerical value of the factor depends on our measuring distances in feet and time in seconds. Would he not have seen, as Newton did, that Galileo's discovery that the distance travelled is proportional to the square of the time provides the more fundamental relation, independent of the units used?

Such details are relatively minor, however. The book can be safely recommended as providing an excellent account of a major figure in the scientific revolution who has been unjustly neglected. But was Hooke really another Leonardo? He was versatile and highly competent, but did he have the touch of genius? Here, different opinions can be honestly held. We still remember Leonardo primarily for his paintings. Hooke was a highly skilled draughtsman (Chapman provides enough examples in the illustrations to his book to place that beyond all doubt) and also a skilled architect, although most of his buildings no longer exist. Hooke, however, never left us a *Last Supper* or a *Mona Lisa*, and for that reason I place the Italian on a higher level—but perhaps I am idealizing Leonardo.

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***The Astronomer of Rousdon. Charles Grover 1842–1921*, by Barbara Slater (Norwich, Steam Mill Publishing, 2005), pp. [iv] + 276, ISBN 1 898 737 30 4 (paperback), £9.95.**

What a fascinating book about a truly remarkable character! Although I had heard of Charles Grover, I have to admit that I knew embarrassingly little about him before I plunged into this delightful little book. And what an adventurous journey it proved as we traced Charles' life from humble British beginnings; through his acquaintance with distinguished astronomers and instrument-makers like Dr John Lee, the Reverends Cooper Key and T.W. Webb, and George With; a brief period of employment with John Browning; that unforgettable expedition to Australia in order to observe the 1882 transit of Venus; and his subsequent career as Astronomer at Cuthbert Peek's Rousdon Observatory.

Charles Grover is the perfect example of Allan Chapman's working class astronomer, but one who definitely 'made good'. Trained as nothing more than a brush-maker and with little formal education, he taught himself astronomy, acquired a (very) small refractor, made and reported his observations, came to the attention of men of influence, and eventually went on to fulfill his lifetime ambition and work as an astronomer. In the process, he was elected an FRAS, came to be respected by people like Professor H.H. Turner, established a reputation as a variable star worker, and published a succession of notes and research papers mainly in the *Journal of the British Astronomical Association*.

Of special interest for me was Grover's Australian sojourn of 1882 associated with the transit of Venus. He went along as the astronomical assistant of a wealthy young British amateur astronomer named Cuthbert Peek, who was a member of the British expedition led by Captain William Morris. After the passage of more than a century, perhaps the best-known member of Morris's party would have to

be Lieutenant Leonard Darwin. Morris' party was well-equipped, and arrived in Australia with ample time to spare. After visiting Melbourne and Sydney Observatories, they ventured further north to Jimbour—a day's journey west of Brisbane—where they settled into a stately mansion, and set up their portable observatories and instruments nearby. Unfortunately, all these careful preparations counted for naught on the vital day when heavy cloud cover denied them even a glimpse of the Sun, and they returned to England empty-handed. This whole episode occupies about ~45% of the book and therefore is described in intimate detail, often by way of lengthy quotations drawn directly from surviving Grover manuscripts. Also included in the Australian section of the book are sketches that Grover made, and photographs of the transit party personnel and their instruments.

Upon returning from Australia, Grover was offered and accepted the post of Astronomical Observer at Peek's Rousdon Observatory in Devon, which featured the 6-in Merz refractor that traveled with them to Queensland for the transit. Despite its very modest aperture, Grover was able to make a useful series of variable star observations. He also maintained a fully-equipped meteorological station. Observations continued to flow out of the Rousdon Observatory until 1920, just one year before Grover's death at the age of 79.

In assembling this book, Barbara Slate has succeeded in weaving a fascinating web that entwines adventure, astronomy, social history and even a splash of Australiana. Along the way we are exposed to shipboard life and the Australian Aborigines, and at the end of the book we are introduced to the idea that Thomas Hardy may have used Charles Grover as inspiration for his astronomer, Swithin St Cleve, in *Two on a Tower*. And, throughout its 276 pages we also learn much about astronomy. But the author does not claim to be an astronomer and this is no scholarly reference book, so we should perhaps excuse those occasional astronomical lapses, such a thinking that Tebbutt's 'Great Comets' of 1861 and 1881 were one and the same when in fact they were two quite distinct visitors. Nor did Tebbutt possess an observatory—let alone a 4.5-in Cooke refractor—back in 1861, as these only came later, in 1863 and 1872, respectively. These issues aside, *The Astronomer of Rousdon* ... is a delightful read, and I thoroughly recommend that you add it to your library. At just £9.95 it is both affordable and excellent value.

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***Stromlo, An Australian Observatory,* by Tom Frame and Don Faulkner (Sydney, Allen and Unwin, 2003), pp [xiv] + 364, ISBN 1 86508 659 2 (paperback), $A35.**

This is an exciting well-researched history of the life of Stromlo Observatory from its conception until it was partially destroyed by a bush fire in January 2003, nearly eighty years later. The book was written by a leading historian, Tom Frame, and one of the Observatory's senior research astronomers, the late Don Faulkner, and they detail the personalities involved and the significant contributions that have been made to international astronomical research.

The Foreword is by Professor Jeremy Mould, a former Director, and he highlights how the Observatory's history witnessed its ups and downs. He also points out that the authors had access to a wealth of documentation to drawn on, not to mention verbal contact with many of the 'key players'.

The book opens with a long introduction, where it is suggested that many philosophers of science consider that the two hundred and fifty years from Copernicus in 1473 to Newton in 1727 witnessed the birth of science and the 'need to know'. This same 'need to know' was instilled in Geoffrey Duffield while still a research student, and it drove him for the next twenty years as he fought to establish a solar observatory in the Southern Hemisphere. His efforts were finally rewarded when site pegs were driven into the ground at Mount Stromlo, near the nation's capital, in 1911. Quite rightly so, Duffield became the first Director, and he oversaw the establishment and construction of the first buildings. He also hired staff and obtaining the first telescopes. Without his efforts it is unlikely that non-positional astronomy would have been established in Australia so soon after the Federation of the nation. Geoffrey Duffield died on the Mountain in 1929, and was buried there.

The authors then document the activities of the Observatory through the various Directors as they impose their different astronomical ambitions and interests. Because the Observatory was dependent on Government funding, the successive Directors spent a significant portion of their time lobbying politicians. Woolley, who succeeded Duffield, worked hard to get astronomy introduced into the new Australian National University and although this eventually happened, the struggle between the Observatory and the CSIRO's Division of Radiophysics (which concentrated on radio astronomy) is entertaining to read about.

As the years passed the city of Canberra began to grow rapidly and it became obvious that light pollution would become a problem. Under the Directorship of the inimitable Bart Bok, an extensive site survey program was carried out, and Siding Spring Mountain in mid-west New South Wales was ultimately chosen as the field station for all future major developments. Initially, 16-in, 24-in and 40-in Boller and Chivens telescopes were installed there.

When Woolley became Astronomer Royal in 1956, he took with him to England an ambition to build a large telescope at Siding Spring as a joint venture between Britain and Australia. Although he was successful and the 3.9-m Anglo Australian Telescope (AAT) was built, politics intervened and Stromlo was not able to play the key role that was initially intended.

From this point Stromlo moved relatively quickly from individual research projects to large-scale international projects, and under the various Directors became known internationally as a builder of new and innovative instruments (including the 2.3 m Advanced Technology Telescope, which was installed at Siding Spring in May 1984).

Frame and Faulkner note that some of the research that was carried out during this period did not receive the attention it deserved. For example, the fourth Director, Olin Eggan, followed his own research interests and obtained an unexpected and largely unheralded result when he identified some of the moving groups in the halo of our Galaxy.

The first Director appointed from the internal staff was the former radio astronomer, Don Mathewson, and he widen Stromlo's involvement in multi-wavelength research by using the CSIRO's new 64-m Parkes Radio Telescope to show that there is a bridge of gas linking our Galaxy and the Large and Small Magellanic Clouds. Mathewson is also credited with bring Stromlo into the Space Age.

Alex Rodgers was the next Director appointment from among the existing staff, and it was he who decided to assign the refurbished Great Melbourne Telescope to the MACHO Project, an ambitious search for the enigmatic 'missing mass'. This began in 1992 as a four year project, but ended up running until 1999. During this period, the MACHO team took 200,000 million individual photometric measurements, and numerous microlensing events were identified. While this was a significant result, the success of the MACHO Project caused some ill feeling amongst other astronomers at Stromlo who missed out on funding for their projects.

The next Director was Jeremy Mould, and he took Stromlo further into the arena of major international projects by committing the Observatory to the 2dF Galaxy Redshift Survey and Mapping of the Galaxies. Unfortunately, his

successor, Penny Sackett, hardly had time to settle into her new role before the 2003 bush fire swept across Mount Stromlo and destroyed much of the Observatory. But her first words to the staff after the fire are worth noting: "Fortunately, the Research School's most valuable assets remain entirely intact—its people, its reputation and its spirit."

A real feature of this book is not just the detailed historical narrative, but also the description of the changing face of the Observatory as different staff members (and not just the various Directors) came and went. If there are two minor criticisms, they are that the book could have been more copiously illustrated and that there is sometimes a little too much detail about peripheral matters that did not really impact on the future of the Observatory. Nonetheless, for historians of Australian astronomy, and other astronomers interested in how a major observatory functions, this book is well worth buying and reading.

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***Transit of Venus. The Scientific Event that Led Captain Cook to Australia,* by Nick Lomb (Sydney, Allen and Unwin, 2004), pp. 24, ISBN 1 86317 103 3 (paperback), $A5:95.**

This is a thin high-quality production of the Powerhouse Museum in Sydney, Australia, prepared by the Curator of Astronomy at Sydney Observatory. There are 24 pages and 28 figures.

This pretty volume was published for the festivities relating to the 2004 transit of Venus and is aimed at the popular end of the book-buying market. It was, one assumes, an item designed to be sold at Sydney Observatory and in other sales outlets of the Powerhouse Museum. It is designed for school students, the general public and amateur astronomers. For me it was a quick and entertaining read that condensed two historic transits of Venus.

As is well known, there is an historic connection linking the 1768-1771 voyage of James Cook, the transit of Venus of 1769 and the English claim on the continent of Australia. It was in April 1770, during the return voyage after the transit, that Cook landed at Botany Bay, near Sydney. It is natural, therefore, that Dr Lomb and Sydney Observatory should participate in the celebrations of the 2004 transit of Venus.

This little tome is beautifully presented. It is A4 in size and tastefully printed on quality paper. The art work is top-end and the reproductions are large, clear and colourful. The cover, for example, is in tones of blue and sand, with a touch of red—this is a 'must pick-up-and-buy' item.

Dr Lomb's book is essentially in two parts. The first is about James Cook and the 1769 transit. Here the story is told at a comprehensive, albeit popular, level. Dr Lomb has included quotes from Cook's Log Book and from his 1771 report to the Royal Society, and these bring the story to life. The illustrations are of Cook, Fort Venus, a Shelton clock of the type used on the 1769 expedition, and Cook's own description of the transit (which shows the notorious black-drop effect). Missing from this chapter are technical data and the description by Cook of the quality of the timings—Cook was unnecessarily disappointed with the consistency of the Tahitian observations and talked down their quality. I would have liked to have seen a modern analysis of the quality of these data (Cook's observations resulted in a value of the AU within 1%). There is no statement of the other timings collected as part of the Royal Society's program, or the wealth of other data collected world-wide from non-Royal Society observers. The other voyages of Cook also do not receive a mention.

The second part of Dr Lomb's book reports the observations of the 1874 transit of Venus that were coordinated by Sydney Observatory. This is a popular insight into a small part of Australian scientific history, but it is specific to that work, and again the bigger picture—the observations of this event made elsewhere in Australia, and world-wide—is not mentioned.

Lomb's book draws heavily on the book *Observations of the Transit of Venus, 9 December, 1874* by H.C. Russell (which I will henceforth refer to as *Observations - 1874*), which is an account of the observations made at Sydney Observatory and at three field stations established by the Observatory. Aficionados of astronomical history will note that *Observations - 1874* was not published until 1892, some eighteen years after the transit itself. Even then, the only reason Russell (who was then Government Astronomer of New South Wales) published this book was to respond to public criticisms made by John Tebbutt that Sydney Observatory was neglecting its astronomical duties in preference to meteorological work. Russell retorted by publishing *Observations – 1874* as a demonstration of the astronomical work of Sydney Observatory and in an attempt to head off such attacks. For more on this episode see Orchiston (2002).

Observations - 1874 was itself a grandiose production, and the attractive colourful cover is reproduced, approximate full size, as the frontispiece in Dr Lomb's book, as are many of the plates. But Lomb also includes new material in the form of reproductions of original drawings of the transit, which he located in the New South Wales State Records. Much of this new material is annotated with what one assumes to be notes that were made on the day by the observers.

Dr Lomb's little book reports the observations made at Sydney Observatory, and three country New South Wales stations located at Eden, Woodford and Goulburn. The fifteen male observers who worked under the supervision of Russell are shown in one plate. There are also plates showing substantive prefabricated wooden observatory buildings and canvas-covered temporary domed observatories at Eden and Woodford. In addition, there is a fine image of Sydney Observatory's 11.25-in Schroeder refractor that will satisfy any romantic historic telescope-dreamer, and plates of the telescopes used at Eden and Woodford. Sadly, there is no photograph of Sydney Observatory, even though the work was coordinated from there.

Much discussion is given to the appearance of the planet Venus at the time of both transits. The black-drop effect is readily seen in the drawings by Cook, and was confirmed by observers of the 1874 transit who reported "parachutes" and a "narrow line" connecting the planet to the edge of the solar disk. Others observing that transit reported a halo resulting from the atmosphere of Venus—seen by them in exaggerated (and unbelievable) glory. Lomb reports observers as having seen "... white and red flames mixed and so close together that they formed a continuous ring ..." and halos that were "... one-third as wide as the planet, and ... greenish yellow with outer edge shaded orange".

In short, Nick Lomb's book is a great read for the train trip home after a visit to Sydney Observatory. I loved it!

Reference:

Orchiston, W., 2002. Tebbutt vs Russell: passion, power and politics in nineteenth century Australian astronomy. In Ansari, S.M.R. (ed.). *History of Oriental Astronomy*. Dordrecht, Kluwer. Pp. 169-201.

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***Science Technology and Learning in the Ottoman Empire. Western Influence, Local Institutions, and the Transfer of Knowledge*, by Ekmeleddin Ihsanoglu (Aldershot, Variorum, 2004), pp. 352, ISBN 0 86078 924 1 (hardback), £60.**

The Ottoman Empire, the last great Islamic dynasty, was the inheritor of the Islamic and Arabic civilization along with its scientific tradition. By the sixteenth century the Ottoman

Empire expanded to engulf most of the Byzantine Empire and a large area of central and Eastern Europe, Asia Minor (or what is now known as the Turkish state) and most of the Arab world. But by the seventeenth century the Empire started to decline in relation to the emerging European states.

In this book, Professor Ihsanoglu uses a collection of studies to examine the scientific development which took place after the decline of the Ottoman Empire, and its relationship with the newly-emerging Western scientific traditions. The interesting idea in this book is how the Ottomans reacted to these new scientific traditions and how they eventually adopted some of these new concepts.

The main idea which Ihsanoglu emphasizes in his book is that the Ottomans had always been aware of scientific developments in the West. However, in the beginning they did not embrace these foreign concepts, as in the case of the heliocentric theory of Copernicus. Ihsanoglu then goes on to show how several astronomical books were translated into Arabic or Turkish. The Ottomans then gradually acknowledged these new European sciences, and accepted that they conflicted with their own traditional Islamic heritage.

Ihsanoglu also writes about the developments of institutes of higher learning in the Ottoman Empire, which went by the name of *medreses*. He examines how Western scientific concepts and ideas were eventually adopted when the first Ottoman university (called 'Darulfunun') was established and it utilized the ideas and methods of the new European sciences and technologies. However, Ihsanoglu also points out the failure of the Ottomans to develop scientifically-based research like that found in Europe.

The decline of Islamic scientific activity after a brilliant and successful start has attracted the attention of a great number of scholars and historians. In this book Ihsan-oglu tries to shed some light on Ottoman scientific activity during this decline. He also points out that, contrary to some beliefs, there was not as great a conflict between science and religion in the Ottoman world as there was in Europe.

I would strongly recommend this book to those who are interested in trying to find the answers to many of these puzzling historical questions.

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***John Herschel's Cape Voyage. Private Science, Public Imagination and the Ambitions of Empire,* by Steven Ruskin (Aldershot, Ashgate, 2004), pp. xxx + 229, ISBN 0 7546 3558 9 (hardback), £45.**

There is already an extensive bibliography on Herschel's sojourn at the Cape of Good Hope, so when I first encountered Ruskin's new book I could not help but wonder whether there really was anything new to say on the subject. Wouldn't it simply traverse territory that was already well-trodden in the volumes and papers by Evans, Warner and others?

Well, how wrong I was! Instead, Ruskin introduced me to a totally new John Herschel, an individual trapped in the cultural and political milieu of his day where astronomy was merely part of the overall story. Ruskin was interested in what historical analyses of (1) the private, public and political interpretations of Herschel's voyage, and (2) the preparation, publication, distribution and reception of his *Cape Results* volume, might tell us about British science, British and colonial Cape culture, and the British Empire.

After a lengthy Introduction, Ruskin queries the general explanation for Herschel's Cape voyage (that it was carried out as a filial duty) and shows that Herschel had exploratory aspirations in the best tradition of Humboldtian scientific traveling, and that his Cape voyage—although undertaken as a private venture—was perceived by the public to be an official affair (and therefore Government-sanctioned and -supported).

The third and final chapter in Part I ("Herschel's Cape Voyage") deals with Herschel's astronomical observations, but not for their scientific content (which Ruskin correctly points out has already been adequately discussed by others). Instead, he goes to some pains to demonstrate that Herschel's observations

> ... were appropriated differently in different cultural contexts. In Britain, Herschel's voyage fueled the public imperial imagination. In the Cape colony, Herschel's presence was seen as a way to promote colonial self-esteem ... [and] in America, his voyage was used to expose a cultural susceptibility, as well perhaps as to provide a rallying point in American notions of the extension of civilization in uncivilized areas.

In the course of two interesting chapters, Part II details the preparation, publication, distribution and reception of *Results of Astronomical Observations Made ... at the Cape of Good Hope* ... (henceforth referred to simply as *The Cape Results*). This massive tome—now an expensive and highly sought-after collectors' item—was published in 1847 (five years after Herschel's triumphant return to London) thanks to financial assistance provided by Hugh Percy, the Third Duke of Northumberland. When he was preparing his book for publication, Herschel had two principal aims: (1) to provide readers with the results of his Cape observations, and (2) to "... promote a particular view of nature in postulating dynamic, Humboldtian explanations of phenomena." However, Ruskin examines *The Cape Results* in the context of the production of scientific books, and views it as an agent of scientific change.

Despite a limited print run and privileged distribution list, the book was, for the most part, well received and attracted excellent reviews. Not so laudable were the actions of Peter Stewart, Sir John's brother-in-law, whose embezzlement of funds almost brought the publishers, Smith, Elder and Company, to the point of bankruptcy. More pointedly, both Herschel and his wife suffered financially from their relative's thieving, as they had personally invested in the company. As some small measure of compensation, through the carefully-orchestrated publication and dissemination of *The Cape Results*, Sir John Herschel "... obtained in the eyes of the British government, and public, a new national role."

The third and final section of Ruskin's book draws together his concluding remarks on "Herschel, Icon", and is followed by two appendices and a useful 13-page bibliography.

While most astronomers will find *John Herschel's Cape Voyage* well-written and liberally footnoted, and will applaud Ruskin's frequent use of quotations from manuscript sources, those without a committed Southern Hemisphere perspective may find some of his diversions into the history of science a little tedious at times. They may also wonder at those specialist terms 'metropolis' and 'periphery', and realize that to claim Australia's Parramatta Observatory as a British government initiative is a gross over-simplification of the facts—for it began life as a private observatory. Nonetheless, these are minor quibbles and cannot detract from the overall merits of this welcome addition to Southern Hemisphere astronomy. I recommend that you add it to your library.

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