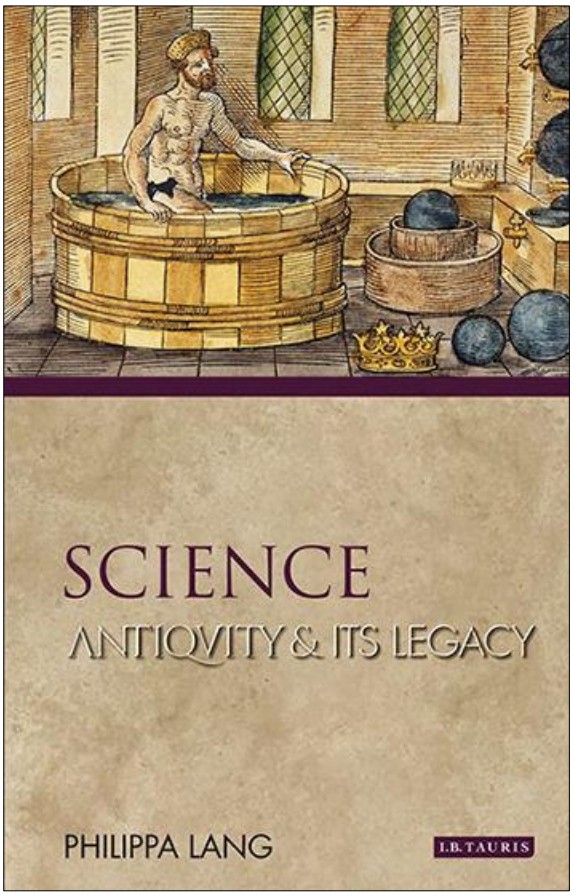
***Science: Antiquity & Its Legacy* by Philippa Lang. (I.B. Tauris, London and New York, 2016). Pp. xiv + 226. ISBN 978 1 78076 171 8 (hardback), 143 x 233 mm, US $95.**

This is part of a series of books in the Ancients and Moderns Series by I.B. Tauris. Other titles have explored such varied topics as Medicine, Gender, Slavery, War and Religion. This volume is written by Philippa Lang, who was Professor of Classics at Emory University from 2004 to 2013.

Her Masters and Doctoral dissertations both focused on medicine in the ancient world, especially Ptolemaic Egypt. That is reflected in this book, where she devotes forty pages to the topic of illness and disease.



She engages with astronomical issues in various places. One is calendar reform. After a rather perfunctory survey of the development of the Julian and Gregorian systems, she offers an important observation on Julius Caesar's reliance on advice from Sosigenes of Alexandria:

> Authority had shifted from religious authority and civic officialdom to the astronomer ... Astronomical and mathematical expertise had created a new international technocracy ... The Julian calendar marks the first moment in Western history in which astronomy superseded other kinds of expertise in defining time (and place). (p. 138).

Lang also does a fine job at relating analog computers to the ancient Greek Antikythera mechanism (which I recently saw on display in Athens). Its 32 bronze gears, and others that may have existed, were able to show the motions of the planets, the phase of the Moon and the rising/setting of certain stars. “A slide rule is an analog computer of a mechanical kind,” she explains. “The Antikythera mechanism is much more like a very complicated slide rule than a Mac or PC or a smartphone.” (p. 161). She uses the chance discovery of this mechanism to remind us of how we might either underestimate or misrepresent ancient science and technology.

The author identifies attempts to explain the motion of the planets in the sky, both eastwards and westwards, as a prime “… impetus of Greek astronomy.” (p. 182). This leads Lang into a discussion of the role of Ptolemy in the development in meteorology and astrology. She argues it “… was the movement of the planets in relation to the fixed stars …” (p. 184) that led Ptolemy to link these to weather and climate. These varying environments, in turn, partially formed a person's character. Ptolemy's version of astrology, says Lang, was a weak one. Even Ptolemy conceded many astrologers were charlatans.

Lang notes that

> It is ironic that Ptolemy, a leading and influential mathematician and theorist of the ancient world, would be hopelessly adrift in cosmology if transported into the present, but could still make a perfectly good living as an astrologer. (p. 188).

This quote offers a good idea of how this book is being pitched. Professional historians of astronomy will find nothing new here; rather, it is a very fine overview of ancient science and how modern culture can relate to it, and vice versa. It could be used as a supplementary text in an advanced high school or introductory university class, to provide an easily readable way for students to put broad scientific concepts in context.

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***The Invention of the Achromatic and Aplanatic Lens With Special Regard to the Role Played by Samuel Klingenstierna*, by N.V.E. Nordenmark and Johan Nordström. Edited by Roger C. Ceragioli; translated into English by Elisabeth Goodwin. (A Special Publication of the Antique Telescope Society: *Journal of the Antique Telescope Society*, Issues 39-40, 2016). Pp. [ii] + 142. No ISBN or ISSN (hardback), 220 x 288 mm, no price.**

For those of us with an interest in the history of the telescope, an important publication was the 2-part paper by N.V.E. Nordenmark and J. Nordström on the invention of the achromatic and aplanatic lens, but this was published in Swedish in the 1930s and in a journal that was not easily available world-wide.

Dr Roger Ceragioli and Elisabeth Goodwin have now solved this problem for us by translating the Swedish paper into English, but they have done more: they have combined the original two-part paper into a single attractive hard-cover publication; brought all of the references together as a single listing; and introduced three new appendices. Ceragioli and Goodwin state:

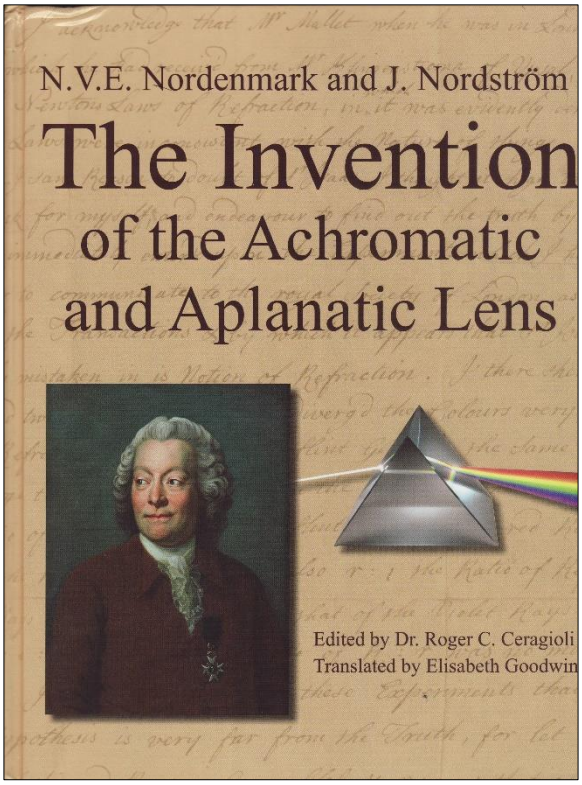
> By performing this labor, we hope at long last to bring Nordenmark and Nordström's paper before a wider audience, so that it will have the impact that it deserves on the scholarship of the telescope. (p. 3).

The 'blurb' on the back cover nicely summarises the contents for this book:

> The invention of the achromatic lens in the 18th century was a watershed event in the history of optical technology, revolutionizing enquiry into the sciences. The invention was, however, long shrouded in confusion, with conflicting claims concerning who did (or knew) what and when.
>
> The present work … presents the first systematic attempt to clear away the confusion. It focuses on the central role of the mathematician Samuel Klingenstierna in the invention. It brings to bear a wealth of documents in the Swedish language – never before available in English translation – stemming from Klingenstierna's network of informants who travelled or were resident in the London area (where the device was invented) and Paris (where it was extensively developed).

The translation of Nordenmark and Nordström's two papers fill pages 8 to 79, and include numerous lengthy quotations drawn from letters and diaries. Along the way we encounter many familiar figures, including Isaac Newton (1643–1727), Chester Moor Hall (1703–1771), John Dollond (1707–1761), Jesse Ramsden (1735–1800), Leonard Euler (1707–1783), Alexis-Claude Clairaut (1713–1765), and of course Samuel Klingenstierna (1698–1765). We learn a great deal about the relationships between John Dollond and Jesse Ramsden and between Dollond and Samuel Klingenstierna. We also find Dollond curiously silent about the fact that Chester Moore Hall invented the achromatic telescope years before Dollond claimed to have done so.

Dollond and Klingenstierna both published hall-mark papers in the *Philosophical Transactions of the Royal Society*, in 1759 and 1761, respectively, and in 1760 Klingenstierna had published an earlier account, in Swedish, in the *Transactions of the Royal Swedish Academy of Sciences*. Yet in 1760, the astronomers of Paris were unfamiliar with the work of either scientist, primarily because the Seven Year's War had prevented regular communication between France and England. Once apprised of these international developments, Clairaut began his own research on refracting telescope optics, and in 1762 and 1764 he published two important papers in the *Historie de l'académie royale des sciences*.



One name that surprised me because it cropped up so often was that of the Swedish Professor of Astronomy, Bengt Ferner (1724–1802) who spent much time in England and in France, and very effectively communicated de-tails of Klingenstierna's work to Dollond and Klingenstierna and Dollond's achievements to the French (and arranged for them to purchase Dollond achromatic refractors). Ferner was an astronomical advocate *par excellence*, and was responsible for prodding Clairaut into action. Although he was not directly involved in optical design, Ferner served as a catalyst, and he deserves a place in the history of the refracting telescope.

Between pages 80 and 126 (inclusive), the book contains twelve Appendices. Most of these are letters that Nordenmark and Nordström included in their original publications, but there are three new ones. Two are letters from the archives of the Royal Society that relate to John Dollond and have never been published

before. The third new Appendix is an English translation of a speech about recent improvement in the optics of refracting telescopes that Carl Lehnberg gave at the 17 October 1762 meeting of the Royal Swedish Academy of Sciences. The text of this speech has never before been published in English.

Finally, for those wishing to pursue this topic further, there are nearly 20 pages of References, many in the form of detailed and informative end-notes.

This 142-page book is well laid out and well illustrated. It is an invaluable resource for those with a research interest in the history of the refracting telescope, and is also an enjoyable read for those with a passing interest in the subject. The Antique Telescope Society is to be applauded for taking the trouble to publish this fine book. Copies can be obtained through the Society (http://antiquetelescopesociety.org).

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