

## Book review: 'Antoni van Leeuwenhoek: Master of the Minuscule'.

by Lesley Robertson, Jantien Backer, Claud Biemans, Joop van Doorn, Klaas Krab, Willem Reijnders, Henk Smit and Peter Willemsen.

Publisher Brill, The Netherlands, May 2016.

*Review by David Walker from the perspective of a microscopy enthusiast.*

*Image above: Book cover overlain with two commercial high quality replica microscopes with bi-convex lenses owned by the reviewer. Left - from the Museum Boerhaave, right - by Chris Kirby, UK of Christopher Allen Replicas. (The latter with a DIY mount for studying aqueous samples on a coverslip fragment.)*



### Additional book details.

ISBN: 9789004304284 (Hardback) ISBN: 9789004304307 (E-book).

Pages XVIII + 229. Extensive colour and monochrome illustrations incorporated in the text.

Pricing: Available direct from the [publisher](#) (link includes publisher's flyer). Hardback, Euros 99 / \$128, E-book \$128 (plus tax if applicable), individual E-book chapters \$30 each.

Typical UK street price in May 2016. Amazon UK  $\pounds$ 78.

First published in Dutch as '[Van Leeuwenhoek. Groots in het kleine](#)' by Veen Media, The Netherlands, January 2014 for  $\pounds$  34-50 (hardback).

These are exciting times for those interested in Van Leeuwenhoek's life and work. In the last few years, free online access to two key primary sources have been provided. Three additional microscopes attributed to Van Leeuwenhoek have been reported which has prompted a wealth of fascinating papers and articles. Last February, *Micscape* was delighted to host a careful reassessment by our regular contributor Wim van Egmond of the identity of Van Leeuwenhoek's first reported aquatic microorganism. (See Footnote 1).

Modern biographies of Van Leeuwenhoek in English suitable for a wide audience seem relatively few compared with those for other 17th century scientists such as Newton and Hooke. Clifford Dobell's is regarded as the classic biography (1932). (See Footnote 2 for a selection of biographies in English published to date.)

*Antoni van Leeuwenhoek: Master of the Minuscule* presents an engaging and copiously illustrated biography in a format which should suit a wide audience and age range. It's the English edition of the biography first published in Dutch by Veen Media in 2014 entitled [Van Leeuwenhoek, groots in het kleine](#). I haven't inspected the Dutch edition but the more recent translation has enabled the discovery in December 2014 of the microscope dredged from Delft canal mud and sold on eBay (misdescribed) to be incorporated. This example is currently being investigated by [Brian J Ford](#) in collaboration with its owner.

The [publisher's flyer](#) notes that "In *Antoni van Leeuwenhoek, Master of the Minuscule*, the Father of Microbiology is presented in the context of his time, relationships and the Dutch Golden Age." and later "This lavishly illustrated biography sets his legacy of scientific achievements against the ideas and reactions of his fellow scientists and other contemporaries."

The scientific and writing backgrounds for the eight authors are provided and all have contributed to a Dutch work on microbiology. Dr. Lesley Robertson's work includes [studies](#) with Van Leeuwenhoek microscope replicas and their value in microbiology education. It's not clear from the book how the writing was assigned (possibly by chapter?) but I found the style to be even throughout.

There are twelve chapters as listed below with the pages allocated for each. Within each chapter there are titled sub-sections and interspersed in the text are supporting topics inset in grey boxes. Supporting topics include 'The Connection Between Microorganisms and Illness' and 'The Jealous Rival' [Swammerdam].

1 The Early Years (15pp)	7 Antoni van Leeuwenhoek and the Question of Generation (29pp)
2 Return to Delft (9pp)	8 The Circulation of Blood (13pp)
3 Antoni's First Brush with Science (21pp)	9 Secrets of Nature (14pp)
4 Van Leeuwenhoek's Microscopes (25pp)	10 The Famous Van Leeuwenhoek (20pp)
5 Antoni van Leeuwenhoek and His Microorganisms (22pp)	11 The End of a Long Life (13pp)
6 The Discovery of the "Semine genitali Animalculis" or Spermatozoa (14pp)	12 The Scientific Legacy of Antoni van Leeuwenhoek (19pp)

Chapter 4 includes a valuable illustrated summary of the twelve microscopes currently believed attributable to Van Leeuwenhoek with their magnifications, focal lengths and brief provenance—currently up to date—until perhaps another microscope surfaces on eBay!

Dobell's biography covered his life in detail but discussions of Van Leeuwenhoek's work concentrated on studies of his 'little animals'. These microorganisms are covered in chapter 5 of the present book. Later chapters (6-9) clearly present his important work on spermatozoa, generation and blood circulation in the wider context of earlier and later studies right up to the present day. Chapter 9 provides a flavour of some of the many other subjects he studied including the compound eyes of insects and associated micrometric studies.

In chapters 10-12, a fascinating survey is presented on the impact Van Leeuwenhoek's work had during his lifetime, after his death and the legacy he has left. Legacy aspects include his portrayal on stamps (see also the gallery in the April 2016 issue of [Micscape](#)), genera / species named after him and street names.

The authors have found a good balance for the level of depth presented without becoming a dry read. Perhaps the relative merits of the single lens and compound pre-achromatic microscope could have been expanded upon—it is noted that Van Leeuwenhoek's single lenses were superior to the compound microscope optics of the time but not the underlying reasons.

The style chosen doesn't use either in-text numbered references or footnotes and presents a more inviting read than the sometimes dense appearance of a heavily annotated monograph. The 'Selected Bibliography' at the end is kept brief. A potential disadvantage of this approach is that where some authored work is cited, the reader does not have the reference if they wish to read further. Although the extensive bibliography on Douglas Anderson's [lensonleeuwenhoek.net](http://lensonleeuwenhoek.net) website would allow readers to quickly find them (and cited by the authors as the "best website dedicated to Van Leeuwenhoek at the time of writing.").

The reproduction of the illustrations is to a high standard, presented on bright white paper and incorporated into the body of the text rather than as separate plates. Together with an attractive hardback cover it is a book that is inviting to read. The preview on [Google Books](#) allows a good selection of the first 50 pages to be inspected.

Many of the photomicrographs used in the book have been taken by Dr Robertson using replica microscopes made by Hans Loncke with ground biconvex lenses, including one with a magnification of 303X. Hans has shared his techniques on [Micscape](#). The typical setup she uses is illustrated on her [Weblog](#) on the TU Delft School of Microbiology website. A number of the images are stills from her award winning video shared on YouTube '[Through Van Leeuwenhoek's Eyes](#)'. I know from my own studies with replicas with only 80-100X lenses that such photomicrography of living subjects is challenging. The authors successfully present imagery (including darkfield) which provides an insight into the sort of views Van Leeuwenhoek may have seen, rather than use modern microscopes and techniques.

The book is commendably free of typographical mistakes and only spotted one. There were a couple of potentially misleading factual points. (See Footnote 3).

The list price of the English edition published by Brill is 99 Euros compared with the original Dutch

hardback edition published by Veen Media at 34-50 Euros. I'm not familiar with the factors that govern the price chosen by a publisher, but my feeling is that the English edition is expensive for the readership it is primarily intended for and no saving is offered for the E-book version.

I thoroughly enjoyed reading the book and deserves a wide audience for those wishing to learn more of Van Leeuwenhoek's life and work.

Comments to the reviewer [David Walker](#) are welcomed.

*The reviewer is a microscopy enthusiast with a particular interest in studying selected subjects which Van Leeuwenhoek reported, e.g. the adult silk moth [Bombyx mori](#), using both modern microscopes and commercial Van Leeuwenhoek replicas.*

## Footnotes

### 1) Recent developments in Van Leeuwenhoek studies:

- 2011. The [Royal Society](#) provides free online access to its *Philosophical Transactions* dating back to 1665. Many of Van Leeuwenhoek's letters were sent to the Society and translated and published in whole or in part in this journal.
- ca. 2014. 'The Collected Letters of Antoni van Leeuwenhoek' ('Alle de Brieven ..') - volumes 1-15 of the definitive primary resource now transcribed and available free online on the [dbnl.org](#) website.
- 2015/6. Papers on the recent microscope discoveries include: [And then there were 12 - distinguishing Van Leeuwenhoek microscopes from old or new copies](#), by Lesley Robertson (2015) and [Genuine or copy? Novel methods of authenticating new Leeuwenhoek microscopes](#) by Brian J Ford (2016). (Thank you to Dr. Lesley Robertson for a copy of her paper.)
- 2016 February issue of [Micscape](#). *The riddle of the 'green streaks'. In search of the first microorganism which Antoni van Leeuwenhoek described*. By Wim van Egmond in collaboration with Frans Kouwets. Presents arguments that a coiled cyanobacterium in the genus *Dolichospermum* not *Spirogyra* was the first aquatic microorganism described by Van Leeuwenhoek in 1674.
- 2016 April, published online in [Annals of Science](#), *Antony van Leeuwenhoek's microscopes and other scientific instruments: new information from the Delft archives*, by Huib J. Zuidervaart and Douglas Anderson. Extensive 32 page paper which includes "... new insights about the way Leeuwenhoek began his lens grinding and how eventually he made his best lenses." (Quote from Abstract.) (Thank you to Dr. Douglas Anderson for a copy of this paper.)

### 2) Selected biographies in English of Van Leeuwenhoek or which cover in-depth aspects of his life and/or work.

- Clifford Dobell, 'Antony van Leeuwenhoek and his "Little Animals"', pub. Harcourt, Brace and Company, 1932. Dover reprint, pub. 1960. Available on [www.archive.org](#).
- A Schierbeek, 'Measuring the Invisible World. The life and works of Antoni van Leeuwenhoek', pub. Abel-Schuman, 1959. This is a condensed English edition of his earlier two volume work in Dutch.
- Brian J Ford, 'The Leeuwenhoek Legacy', pub. Biopress, 1991.
- Edward G Ruestow, 'The Microscope in the Dutch Republic', pub. Cambridge University Press, 1996.
- Laura J Snyder, '[Eye of the Beholder. Johannes Vermeer, Antoni van Leeuwenhoek, and the Reinvention of Seeing](#)', pub. Head of Zeus, 2015. Douglas Anderson has recently had published online in May 2016 an open-access four page review essay on this book in the journal *Studium* entitled '[The tensions between facts and fantasy](#)'.

3) a) On p.73 when discussing Van Leeuwenhoek's sampling of the Berkelse Meer it states "His examination of the sample while out walking ..." implying that he sampled from the shore. This is translated from the original Dutch letter as "passing lately over this sea" (*Collected Letters*, Vol. I, 1939) and context implying sampling from a boat. (A Dutch colleague notes that the Dutch edition does use "passing" so may have been introduced in the present English translation.)

b) On p.83 the text drawing attention to Figure 5-19 implies that it is an electron micrograph, rather than it being taken with an optical microscope.

c) On p.197 it states that "Single-lens microscopes went out of use in the 18th century, when compound microscopes with at least two lenses - an eyepiece and an objective - became the norm." The single lens microscope continued to have an important role into the 19th century for critical work until the development of achromatic objectives (ca. 1820s-30s) improved the performance of compound microscopes. The single lens designs evolved to models that were more practical with stand, rack and pinion focus and stage. Robert Brown used single lens microscopes for his work on plants and his studies reported in 1828, later to be named after him as Brownian motion. Charles Darwin took a single lens microscope on his *HMS Beagle* voyage.

Published in the June 2016 edition of Micscape.

[www.microscopy-uk.org.uk/mag/artjun16/dw-AvLreview.html](http://www.microscopy-uk.org.uk/mag/artjun16/dw-AvLreview.html)

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