

# The Microscope - an instrument for progress

Written by Kerry Swanson.

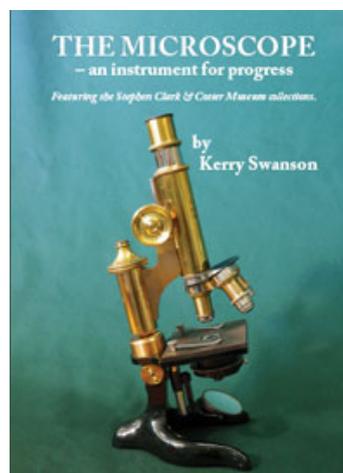
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It is remarkable how, like the distributions of declining animals, human artefacts end up near the “edges” of civilisation. It should not be surprising, therefore, that that an internationally important collection of microscopes resides in Christchurch, far away from their European makers.

The development of the microscope was a long, intermittent, haphazard process, as many great advances in technology were. And it came to fulfilment, as they often also do, in a comparative rush, from the late 16<sup>th</sup> into the 17<sup>th</sup> centuries. The application of the instrument to new questions went hand in hand with its development. Most notable among the new explorers of the very small were the Dutch draper Antonie van Leeuwenhoek and the English polymath and real discoverer of universal gravitation, the Englishman Robert Hooke. Their observations were recorded in many papers by van Leeuwenhoek submitted to the newly formed Royal Society of London, and in Hooke’s monumental *Micrografia*. This book was published by the Royal Society, but we know it was Hooke’s own work because the Society explicitly distanced itself from its – for modern eyes – most important results. Including universal gravitation, whose discovery was claimed years later by Isaac Newton.

The observations of these pioneers changed not only science but our view of the world. In his new book *The microscope – an instrument for progress*, author Kerry Swanson, himself a long-term exponent of the technology, traces the history and development of microscopes and their lenses. As an aside, the word *lens* comes from the resemblance of a classic biconvex magnifying glass, familiar to all children, to that of a lentil, a staple food for millions. Swanson outlines the long history of lenses, from their use in ancient Egypt, through to the sophisticated instruments of today. He illustrates the developments with abundant, usually colour, images of microscopes in the combined Stephen Clark and Cotter Museum collections, whose cataloguing was the genesis of the book.

In this slim (140 page) volume, he covers not only the surprisingly long history of lenses and lens making, but also the progressive refinement of the lighting, specimen preservation and preparation methods essential to the productive use of the instruments built around, and holding, those lenses.

From van Leeuwenhoek's single – and single use – lens microscopes, with which he discovered microorganisms, including bacteria, through Hooke's significant improvements, which led to his epochal *Micrografia*, to today's highly sophisticated imaging systems, the development of the microscope has underpinned advances in our knowledge of the world too small for our Mark I eyeballs to resolve. Our ability to now see the REALLY small is exemplified by the scanning electron microscope in the book's final image, which uses electron beams rather than light and so needs magnetic, not glass, lenses. This instrument can magnify **half a million** times, but that range was extended in the 1980s to the **500 million** times magnification a clever instrument, the scanning tunnelling electron microscope, can achieve. That machine can reveal individual atoms.

The book's six chapters cover lenses, the simple microscope, resolution (the ability of the microscope to separate items that are very close together), specialised instruments and their accessories, the concepts of dimensions and scale, and the processes of preparing samples for observation. Technical aspects are covered in accessible prose. The volume is copiously illustrated, with 108 figures, from line drawings of lens types, to historical images, and with many colour images, mostly taken by the author.

*The microscope – instrument of progress* is as much a “how to” primer in microscopy as a celebration of the collections and the efforts of the passionate collectors who assembled and preserved them. Microscopes and microscopy are, from the evidence of this book, also obviously passions shared by the author.

The book is published by the Cotter Medical History Trust, which oversaw the amalgamation of the collections and facilitated their cataloguing and preservation and promotes their use in education.

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