

Book Review

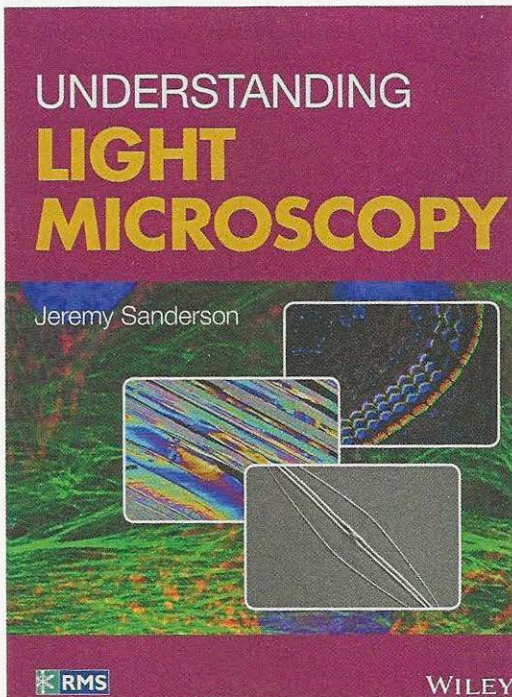
Understanding Light Microscopy

Jeremy Sanderson. John Wiley & Sons, Chichester, UK (2019). Hb. 815 pp. ISBN 978-0-470-97375-2. Price £147.50 (Amazon).

microscopy right up to 2018. In-between these two is possibly the most comprehensive book on light microscopy ever written (here I would remind readers of the review in the last issue of this Journal of the most comprehensive book ever written on *Polarized Light Microscopy* by John Delly).

The 31 chapters of *Understanding Light Microscopy* can be considered in several sections. First are chapters on the fundamentals of vision, light and basic microscope optics. The next 6 chapters introduce the reader to the microscope stand, ergonomics, optical aberrations and the key components of both transmitted and reflected light microscopes. To reach this stage within the book has taken some 211 pages, an indication of the depth to which the author goes in describing 'the basics'. Chapters 10 to 16 move on to the theory of image formation and the techniques that most readers will be familiar with; brightfield, dark-field, phase, interference contrast, reflected light, polarized light and fluorescence. There then follows 11 chapters on what we may consider the modern 'renaissance' techniques of light microscopy; confocal, light-sheet, multiphoton and super-resolution amongst others. This section concludes with guidance on choosing a microscope 'platform' and setting up a core imaging facility. Chapters 28 and 29 focus on biological and material specimen preparation respectively, with the final two chapters providing guidance on recording the image.

If I take one chapter to consider in detail – as an indication of the scope of this book – let me review just Chapter 7 – The Microscope Objective. This is divided into 17 sub-sections and covers (as we would expect) achromatic, semi-apochromatic and apochromatic objectives, manufacturers' inscriptions and barrel marking, numerical aperture and resolving power, homogeneous immersion (so many more options than just 'oil' immersion!), working distance etc. More unusually are the subjects that other books rarely cover; depth of field and depth of focus, brightness of the image, specialised objectives, fungal contamination and delamination, handling of objectives and an 18



I have been somewhat daunted in starting to write this review; how in the page or two that a journal review allows, can I possibly do justice to a book of some 800+ pages, innumerable illustrations, the several years of the author's work in putting this together, let alone his lifetime of experience in microscopy? But that is my task, so here I go.....

My first – and lasting – impression is that this is a monumental book. It is huge (A4 format) and heavy, the binding is good and the front cover is attractive. Open up and within the first few pages there is a dedication, and wonderful (youthful!) photograph of our much missed ex-President Dr. Savile Bradbury; seeing this we just know the book is going to be good. There are some 31 chapters and 7 appendices; it starts with a very helpful Glossary and the final appendix is a timeline of key events in

point chapter summary (a useful feature of every chapter). In this chapter alone there are 19 illustrations and 7 tables. Examples of equipment (in this case, objectives) feature prominently to give the reader context and familiarisation with equipment by different manufacturers, and of different ages (as might be encountered in commercial or academic laboratories). This indeed is a key aim of the author – to provide many examples of actual equipment, and he achieves this superbly.

Throughout the style of writing is very fluent and concepts are explained in the simplest and easiest of terms. I cannot claim to have read every page (yet!) but I failed to find any typographic errors, for which the Wiley editorial team should be proud. And that brings me to an important aspect of this monumental textbook; it is designed to be *read!* I aim to do so, and it will take me

considerable time, but the information contained within is first rate and the knowledge gained will be immeasurable.

Would I recommend this book to the average Quekett Club member? That depends both on your budget – £147 is a lot of money but probably much less than many members would ‘splash’ on an unnecessary additional microscope or couple of lenses, and how you enjoy your hobby. It is, of course, possible to use a light microscope with only the most rudimentary understanding of how it works. But if you wish to understand, to get the best out of the equipment available to you, and if you wish to improve, then this book is for you. Realistically, for most Quekett members, nearly one-third of the book covers those modern techniques that we are unlikely to encounter in our hobby. But, for the two-thirds of the book that is relevant to us, it is money well-spent.

PHIL GREAVES