Books reviewed 4: Diatom Manual

Robert B McLaughlin - *An introduction to the microscopical study of diatoms.* Edited and augmented by John Gustav Delly & (Denis) Steven Gill. 2012.

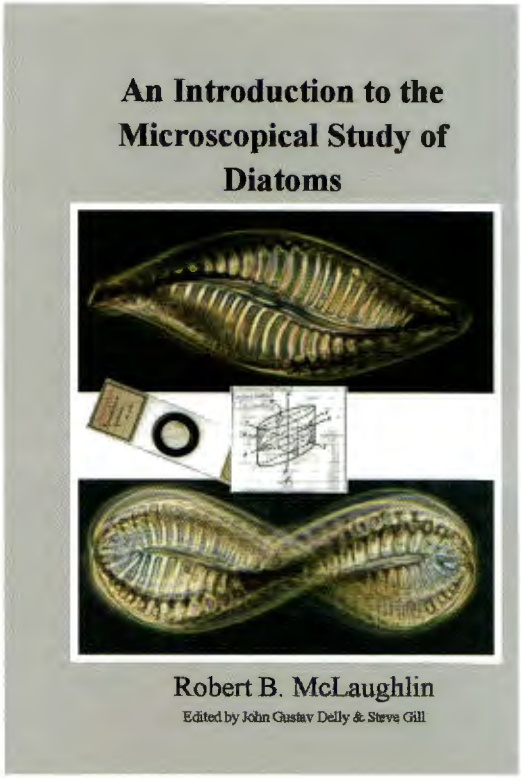
This is book of 508 pages, but available only as a free (!) pdf download from the *Amateur Diatomist* site:
http://www.microscopy-uk.eu/diatomist/rbm_US_Royal .pdf

It is a file of almost 23GB, and it took my machine about three minutes to download it. I have printed it out two-up on A4 (it was formatted for the American Royal size paper): it took over 260 sides, and is perfectly legible.

For those who prefer a paper book, there are 'print-on-demand' companies who will produce a bound paper copy from the pdf file for about £40. Search for 'print-on-demand' on a computer's browser to be offered a wide selection. The cost is less if several people can combine to make one order for multiple copies.

Some notes on the background to this work are required. First, I knew Robert McLaughlin (1922-2012) via the RMS in the 1980s; I also know, as friends, both the editors. Robert ('Mac') will be known to many as a polymath, author of a couple of books in The Microscope Series, published in 1975 and in 1977; he also published on a range of subjects in the Club journal in the 1970s, in *The Microscope* in the 80s and 90s, and elsewhere. When he began his interest in diatoms in the 1960s he lived in Alaska, and had to self-educate in his subject. He made notes from many sources, and then worked to make them into a book. For illustrations he used those in Friedrich Hustedt's 1929 book [1]. The publisher later told him that this was long out-of-print, would not be reissued, and that Robert could use illustrations from it in his own work.

In the 1980s, a large American publisher offered to prepare his book for distribution, took it in, and then did nothing with it for ten years. Mac lost heart, and put it away, until The Hooke College of Applied Sciences in Westmont Illinois later considered the matter, and decided



that it really should be published in some form. By then Mac could no longer help, but gave permission to the American Editor at the College to do with his manuscript as he saw fit. Eventually it was decided to abandon the search for anyone to attempt to complete it, but to publish it online as was, perhaps with a few additions. Some of the text was outdated, of course, and was only in a semi-edited state, but still well worth making widely available.

Dr Delly was the moving force in Illinois: he is a well-known authority on microscopy, originally with McCrone. Steve Gill is a professional in computer security, and an authority on diatoms, among many other subjects. He edited *The Amateur Diatomist*, and was able to use his (very) large personal database to provide a most comprehensive bibliography for addition to this present publication.

The work was in plain (non-digital) typescript, which Steve scanned, and then read and corrected using optical character recognition: this took months and months. After correction the work was formatted and indexed. Finally, both editors re-checked the content. The present work is the outcome: a feature is the small in-text boxes clarifying terminology.

The work contains Mac's own sketches and image place-notes, and also digitised illustrations from Hustedt. Steve found only two library copies of this actually available on the net: one was in Holland, the other was in The University of Washington. The Dutch wanted a large fee to digitise their copy, but the people in Washington scanned the entire 90+ pages for pennies!

And so to the contents, which are listed over nine pages. The eight main sections in the 194 pages of Part One are: morphology; physiology; reproduction; distribution and ecology; classification; uses of diatoms; mountants; and mounting. These last sections alone are a goldmine. The notes on type-slides remain invaluable.

In Part Two (on collection and preparation methods) are five sections: an introduction; collection; examination of cell contents; cleaning the frustules; and washing, separation and storage. The advice on cleaning requires reading of an important note in the preamble on page ii (not in the body of the text), about the chemical procedures described in the book. This makes very plain that some procedures are what I would call heroic, that is dangerous, and not to be employed nowadays unless one is already an expert and working in proper surroundings. The details of collecting remain comprehensive and really helpful, with superb practical advice and sketches of the kit.

Part Three (study methods) includes seven sections: introduction (to the literature); microscope equipment; microscopical techniques; observation and interpretation; drawing diatoms; photomicrography of diatoms; and quantitative examination of diatoms. The notes on the use of then-contemporary microscopes and other equipment are almost a small manual in themselves; while good advice on drawing is nowadays not easy to find, but this section is practical and an excellent source. The advice on setting-up for photomicrography remains apposite, even if digital media have been substituted for silver-based since Mac wrote. The quantitative methods also still apply – counting, length measurements, and the rest are very clearly set out.

There follow three appendices: six pages of MacLaughlin bibliography; two pages on *Gomphonema maclaughlinii* (a diatom named after Mac); and sixty-three pages of Steve's bibliography on diatoms, as noted above.

This is all a tour de force, to say the least. Every section contains a vast amount of information set out in simple language, in admirably logical manner. Some of it is dated, of course, having been written forty years ago in some cases. A lot has been learned since then, and some notes on more recent developments have been added.

I can only admire this monumental manual, which offers a superb detailed overview of working with diatoms. It is rather more than that, for much that is said in the less-specialized sections applies to all kinds of work with microscopes.

It took the original authoritative author a long time to produce this epic. It has taken Steve Gill, acting in a purely private capacity, a long time to render it into pdf files for publication on a website, to format it, and to add his unique extensive bibliography. It required the input of another highly experienced microscopist to check it all over again. It is to their credit, to say the least, that they have done all this with no thought of reward, making it all available without charge of any kind to all who want to download it.

If you have any interest at all in diatoms, you should definitely possess and read this work – it is rewarding, to say the very least. If you have a more general interest in microscopy, a lot of it will repay study.

At the risk of seeming to stretch credulity I go further in my praise of this work. I find a parallel in making available this vast store of knowledge for free, with the recent blossoming of free on-line courses provided by an increasing number of universities (MOOCs – Massive Open Online Courses). Doubtless these latter will have to generate some income from

somewhere sooner or later, but at the moment they seem decidedly altruistic.

It will be obvious that I am amazed by the sheer content of this book, and humbled by the fact that the editors have worked so hard for so long with no thought at all of monetary reward.

Brian Bracegirdle

Reference

1. F Hustedt – *Von Sammeln und Praparieren der Kieselalgen sowie Angaben über Untersuchungs- und Kulturemethoden.* Bremen: Urban & Schwarzenberg, 1929. [99 pages, 33 plates].
(Volume XI of *Handbuch der biologischen Arbeitsmethoden,* E Aberhalden, editor).

E-Book review
How to Find Tardigrades

Michael W Shaw – *How to Find Tardigrades.* Kindle Edition. Price £1.90 (on Amazon).

Tardigrades are microscopic metazoans that show both arthropod and annelid characteristics (they actually belong to the arthropod clade). Because they are not truly aquatic organisms, typically living in moss, studying tardigrades requires a little more technique than pond-life microscopy; surprisingly little information is currently in print describing how to work on these interesting animals.

How to Find Tardigrades, an electronic book only available for the Kindle e-reader, provides very simple guidance for those who want to start the study of tardigrades. It is written in a style for younger readers, but still provides some useful information for the more seriously interested. Chapters provide a simple introduction to tardigrades and where to find them, practical tips on collecting specimens and the laboratory stages of rehydrating and examining moss washings under the microscope. Later chapters comment on making permanent mounts, photography and how to couple a camera to the microscope.

The coverage is basic but is written in a very plain and easy to understand style (ideal for children) and the author provides sufficient information to really help those starting out to find tardigrades. Some of the advice is questionable. For example it is recommended not to make permanent mounts (a necessary process for identification of many species) and the process of mounting describes dehydration with alcohol followed by mounting in 'Oregon' Balsam. Other mountants (Hoyer's and PVA) are mentioned but not recommended; these are in fact very simple to use aqueous mountants and are in fact the standard mountants for any work on tardigrades. Likewise the chapters on photography and coupling camera to microscope are too superficial to be of any practical use. I would also recommend that the author considers a PDF edition which can be read by most tablet computers (and even mobile phones); the Kindle reader does not have sufficient graphics capability to display the images within the text. Some further reading, such as Morgan and King's British Tardigrades (available secondhand) or Kinchin's The Biology of Tardigrades would also have been useful for readers.

These are, however, minor considerations and for £1.90 who can complain! Hopefully this e-book will stimulate wider interest in these charismatic animals.

Phil Greaves