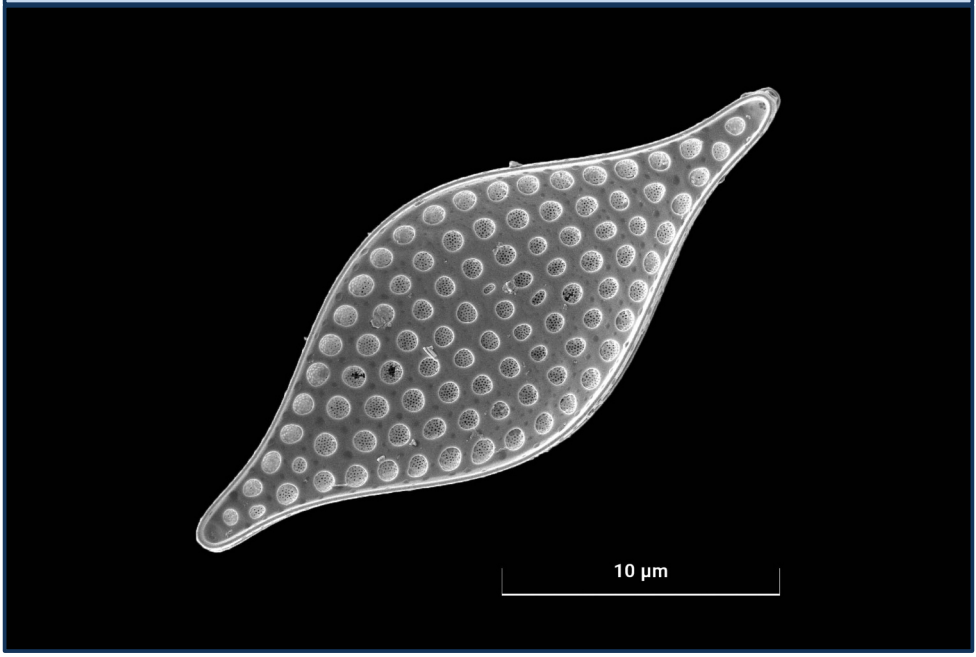
SEM Diaries - 23

Diatoms and De-cluttering

Jeremy Poole



Cymatosira sp. Diatom from Mljet, Croatia

As some of you may know, many amateur microscopists of the 19th century used to spend their time at the eyepiece seeing what resolution they could coax out of their instruments, by looking at diatoms - a practice known, possibly derogatorily, as "diatom dotting". To these chaps (I am sure they were almost exclusively male) the resolution that their unwieldy long tube length instruments and fancy objectives could achieve was far more important than the subject matter per se.

Well, I have been spending a fair amount of time imaging diatoms that I had previously captured on my FEI Inspect SEM, to compare the image quality (almost all down to improved resolution) of my new SEM with that of the old one. This has been nothing less than the modern equivalent of diatom dotting! But it was fun, and has been a good learning experience.

The samples I used were provided by Steve Gill. He had collected these in a National Park in Croatia, and had had about 120 individual diatoms laid out on a coverslip for me to image. One example is shown above, and two more are shown on the following page. For those two I selected a magnification that would show the complete diatom, and then set the magnification to x50,000 to home in on a

small part of the frustrule. The reproduction in BP might not do full justice to the detail that can be observed on the screen.

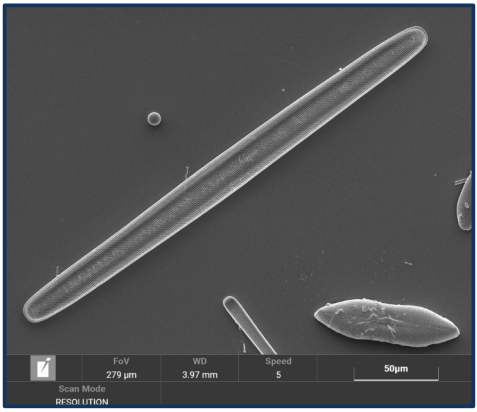
It is worth pointing out, I think, that the crazing seen on the image at the bottom right is the texture of the gold/palladium coating that I have to sputter on to render the specimens conducting, rather than a feature of the diatom itself.

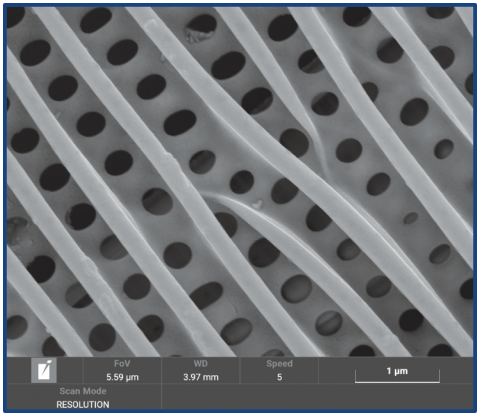
As I mentioned in SEM Diaries - 22, I have agreed to work with TESCAN to provide images for their marketing and to allow them to feature my situation in articles for microscopy publications. My first image, of a pseudoscorpion, was much appreciated and uploaded to the TESCAN Facebook page, at:

https://tinyurl.com/pseudoscorp1.

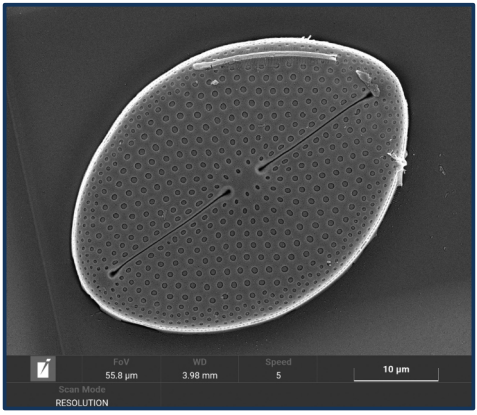
I do not actually use Facebook (or any of the other main social media platforms) so have not been able to access that link myself!

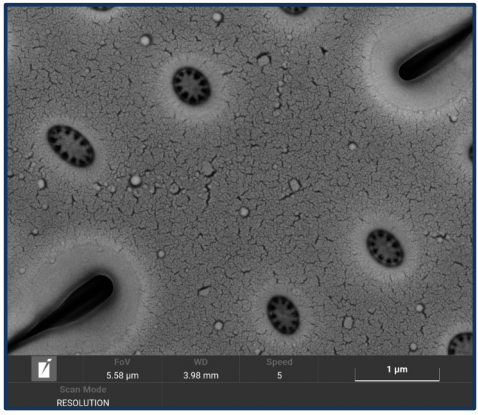
I also worked with a copywriter on behalf of TESCAN to help them produce a news page for in**focus**, the magazine of the Royal Microscopical Society. This type of article could loosely be referred to as an "advertorial". Since I have already featured in one for Deben (who made the backscattered electron detector I used on my previous SEM) I guess readers of that publication will be getting used to the idea of "Scanning Electron Microscopy's very own Spider Man", since that is how Deben described me.





Synedra sp. Field width 280 µm (left) and 5.6 µm (right)





Mastogloia fimbriata Field width 56 µm (left) and 5.6 µm (right)

The copywriter did rather get carried away, and first came up with three pages worth of material, which she then had to reduce to the single page of the brief. I was sent the single page version to comment on, and it did require quite a bit of correction and clarification. When it appeared in print, in in**focus** issue 60, December 2020 this had been further reduced in length, leading to at least one error that suggested I was not using the SEM as intended! One reason the text had been further shortened was to include a half page image of me seated at my SEM, which I had taken by "remote control". When shown this image, a friend who has a degree in photography commented: "The composition is terrible and that's before we talk about posing the model." Hopefully readers of in**focus** will be more generous! Sadly, the space limitation meant that they were unable to include any of my micrographs, but at least they printed my web address.

I mentioned in the sub-title to this edition of SEM Diaries that it would include something on de-cluttering. However, before readers get excited about the possibility I might wish to dispose of some of my optical microscopes at bargain prices, I need to say that this de-cluttering is on a much smaller scale, although it has worked out well.

One of the advantages of working with an SEM supplier such as TESCAN is that the UK office is very small - by which I mean that the entire full-time staff in the UK amounts to just five individuals (of whom I have so far met four). We seem to have a good relationship and I am not above teasing them by pointing out features that were present on my FEI Inspect that the MIRA does not have. In fact, there are one or two features from the FEI that I really do miss.

I have submitted a list of "nice to have" features that I would like to see in the MIRA SEM. One of these is a drawer on the desk in which I can store all the little things that I need when using the SEM. These include tweezers for handing stubs, a hex key for securing the stubs onto the stage, stub support "trays" and simple items such as pens and spectacles. I decided to remedy this by making my own

SEM desk cluttered with the paraphernalia of imaging, plus too many cables

drawer. Sadly, the space where I could fit it is constrained by the way the desk is constructed and by the fact I need to be able to get the arms of my chair underneath the desk surface, but I decided that even a small drawer would be better than nothing and set about constructing one.

Unlike the vast majority of the little jigs and fittings that I had previously made for my SEM out of metal, this time I refreshed my woodwork skills, including dovetail joint cutting. Given the length of time it has been since I last cut a dovetail, this required serious re-reading of my Leigh Jig manual.

Not wanting to get over-complicated I decided to use " through" dovetails, rather than the more attractive "blind" ones, and I also decided against making or buying runners for the drawer, instead settling on an inverted "U"-shaped tray in which the drawer could sit. This is illustrated opposite.

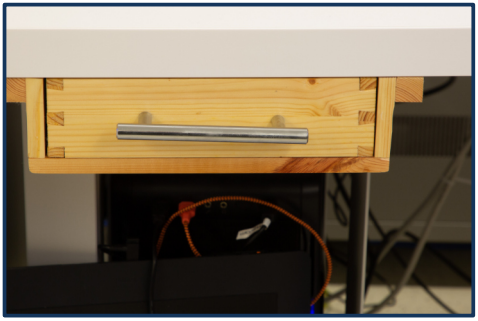
All went pretty well until I was unable to locate the collet for my router that matched the diameter of the shank of my dovetail cutters. After an hour's fruitless search I ordered a new one from the manufacturers at a cost of £30 with next day delivery. Needless to say, the missing collet turned up before I actually needed to use the replacement!

Construction went more-or-less without any more hitches and the photos opposite show the finished article, complete with contents.

Now that the desk is devoid of other clutter I need to work out how I can remove the untidiness of the three USB cables that feed the keyboard, mouse and rollerball. An obvious approach would be to use wireless devices. However, for health reasons I use an ergonomic mouse and keyboard and I am not aware of wireless versions, at least of the keyboard. Similarly, the rollerball is quite advanced, and seems to require a special interface, or it behaves like a mouse instead! I need to sound out TESCAN on wireless options.

I really do notice the difference now that I have the drawer. An unexpected bonus is that the lab has been smelling of wood oil for the last few days rather than the less pleasant aroma of HMDS.

The drawer and its supporting tray prior to installation on the desk.



Two views of the drawer installed under the desk top.