SEM Diaries - 36

Events get in the way of imaging

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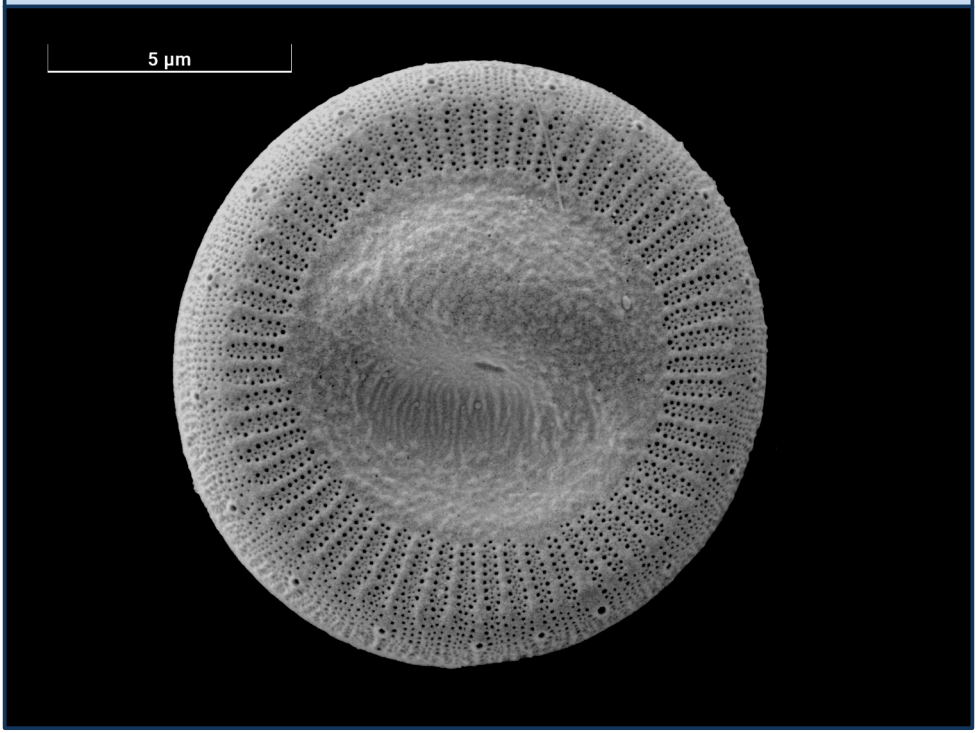
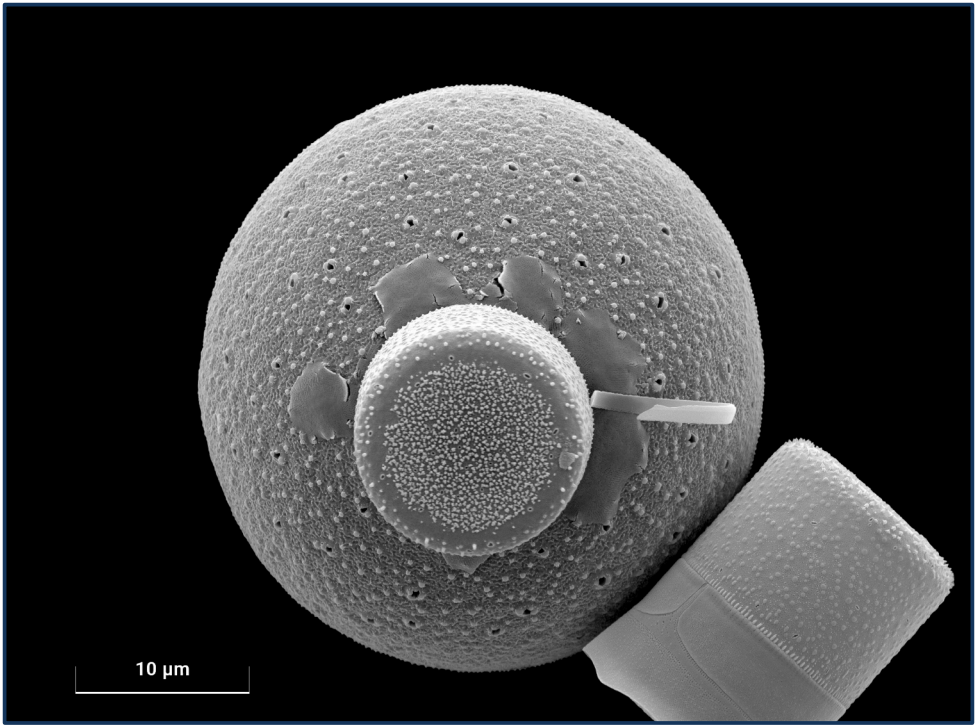


Diatom *Cyclotella varians* collected at Bingley Locks during the 2023 “Cranedale Weekend”. Used in the presentation to the Sherborne U3A on diatoms.

As I write this, at the beginning of March, I find that I have made precisely 100 electron micrographs since the beginning of the year. This compares with 2,000 in 2023 and 1,900 in 2022 (or an average rate of 160 per month). There are several reasons for this low productivity. One is that I was on holiday for the latter half of February. Another is that the beginning of any year is a busy time for me, with managing subscription renewals for the British Arachnological Society. Ironically, the third reason was because I had committed to presenting two lectures on my scanning electron microscopy itself!

Readers of Balsam Post may remember that I was fortunate enough to have one of my micrographs shortlisted for the RMS Scientific Imaging Competition, held in conjunction with MMC2023 in Manchester. I received an email from the RMS in September asking if I would be prepared to give a short presentation on my entry for the competition at an RMS event known as EM-UKI (standing for Electron Microscopy in the UK and Ireland) to be held in York University in



An “auxospore” of diatom *Melosira varians*. Diatoms reproduce asexually by division, but each cycle of division leads to a greater proportion of small examples in the sample. Thus at some stage the balance of sizes needs to be restored. This is achieved by sexual reproduction and the creation of auxospores, in which diatoms of the more conventional size are created. The specimen was collected during the 2021 “Cranedale weekend”.
Image used in the lecture to Sherborne U3A.

February. I would be allocated a 10 minute time slot (including questions). In a follow up email the organiser added:

> *Since you are doing SEM as a hobby, I think it will be really refreshing for people to see images of your lab set-up at home and to hear from someone doing SEM purely for the love of it!*

- all within the allotted 10 minutes, of course. One further snippet was that:

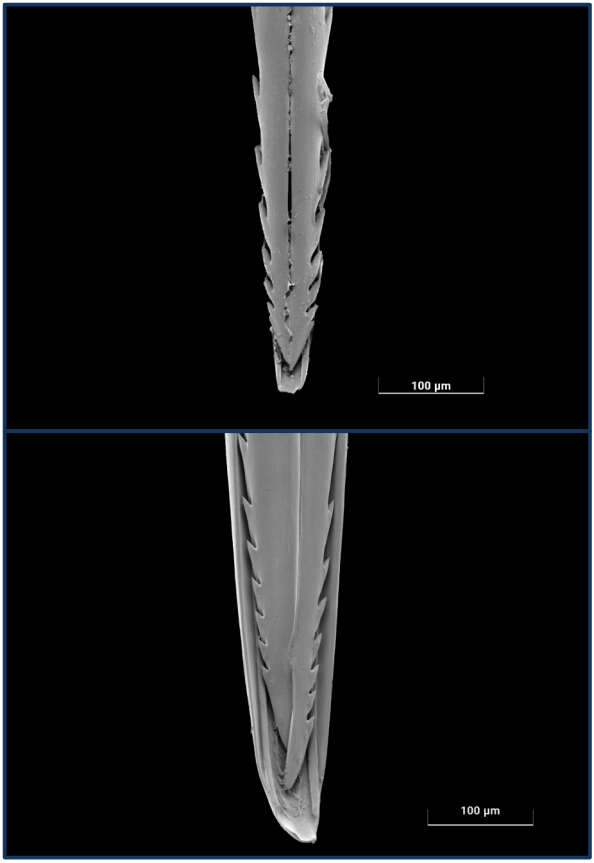
> *We do not pay expenses, although attendance at the meeting is free.*

Thus I had to decide - did I really want to travel 287 miles each way to York and back, and stay in a hotel for three nights, all for a 10 minute ego-trip. Well, of course I did!

In the event, only two people who had had micrographs selected for the competition were able or willing to attend, and mine was the last presentation of the whole meeting.

The other presentation I gave this year was on Diatoms, to the Science Group of my local University of the Third Age (U3A). Members of the group are encouraged to give presentations once a year, and it was a no-brainer that I would do something that involved showing some scanning electron micrographs. This presentation was an hour long and took quite a bit of preparation. The audience was small, around a dozen members, but they seemed to enjoy the talk.

So, what was the subject matter of the 100 micrographs that I had made this year, you may ask! Well, I am keen on collaboration, as you know, and I am



Stings of a honey bee (*Apis mellifera*) top and of a wasp (*Vespula germanica*) bottom, to the same scale. "Conventional wisdom" has it that bee stings are barbed, and hence cannot be withdrawn after "use", while wasp stings are not barbed and hence can be removed from the "victim" following an attack. These images clearly show that the wasp sting is also barbed, although it is clear that the wasp is able to withdraw its sting from its prey without separating the sting from its own body.

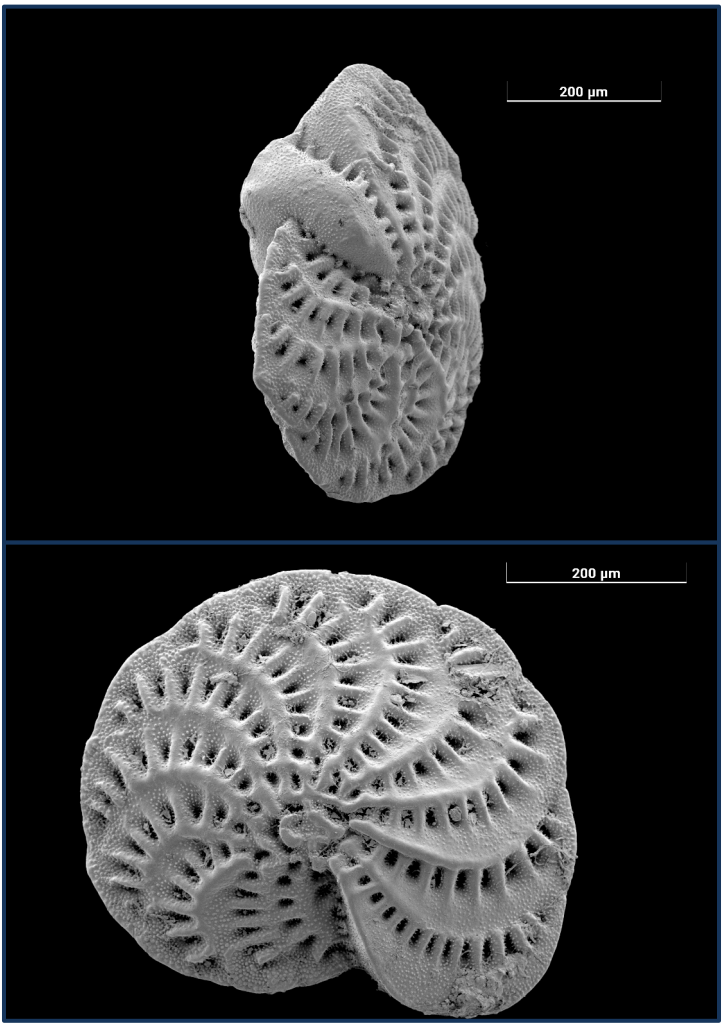
currently involved on one project each with three different collaborators .

One collaboration is with a PMS member to produce electron micrographs of key features of the external anatomy of bees. This member wrote an article for the previous Balsam Post for which I provided one micrograph. The remainder were hos own light micrographs. In addition to the electron micrograph of the sting of a bee I could not resist imaging other features, notably the legs and pollen basket. These have found their way to the editor of the British Beekeepers Association's magazine 'BBKA News' and interest has been shown in sharing them more widely with beekeepers in a future article. This led to my receiving a shopping list of images and a few more tubes of bees preserved in German pear brandy. (He had run out of denatured alcohol.) I have made inroads to this list but as implied earlier, events have been getting in the way, and most of the micrographs need quite a bit of post-processing to mask out the backgrounds.

The second collaboration was with a retired professor of geology, who asked me to image and analyse the composition of various samples of the mineral siderite. There were three types, showing different features. The results were not entirely as expected, I am told, so either we have discovered something interesting or, equally likely, I have messed up somewhere.

The third collaboration is with a local amateur palaeontologist with whom I am working to image small bivalves in seams found on the Jurassic Coast. Dorset, where I live, is blessed with a very rich fossil heritage. It is, after all the home county of Mary Anning! This friend has promised to introduce me to key personnel in the world of Dorset geology and palaeontology once the weather improves.

In addition to these projects I have managed to fit in some imaging of forams from a collection that has been loaned to me. So far I have made 17 stubs of these, with around 25 forams on each stub. I have developed an efficient workflow for imaging these. This involved my post-processing the images in the time it takes to produce the next image. Well, that is the theory, but in reality the post-processing does tend to take a bit more than the 1 minute 5 second duration of a scan, despite my having created Photoshop "actions" to automate part of the process. Nonetheless, working in



Two forams from the collection loaned to me. I believe these to be the same species, but they are presented at two different orientations.

parallel with the imaging does save a lot of time.

Regular readers of this series will know that I have been imaging forams regularly over the years. I do find them fascinating, and possibly a bit too easy to do - hence my ever-growing library of foram images. The down side of this is that I then have to identify the species of each image! This is very much work in progress!