Microscopy in the Third Age – You are never too old to Learn!

Michael Gibson

For as long as I can remember I've been involved with microscopy in one way or another. As a teacher I enjoyed the opportunity of being able to encourage youngsters of all ages to effectively use microscopes in the classroom setting. When I got older my interest was sustained and enhanced by membership of various clubs and societies including the RMS. Now that I am retired, I still find that much of my time is spent looking down microscopes, preparing slides, writing articles, attending meetings and doing outreach work particularly in schools, libraries and youth clubs.

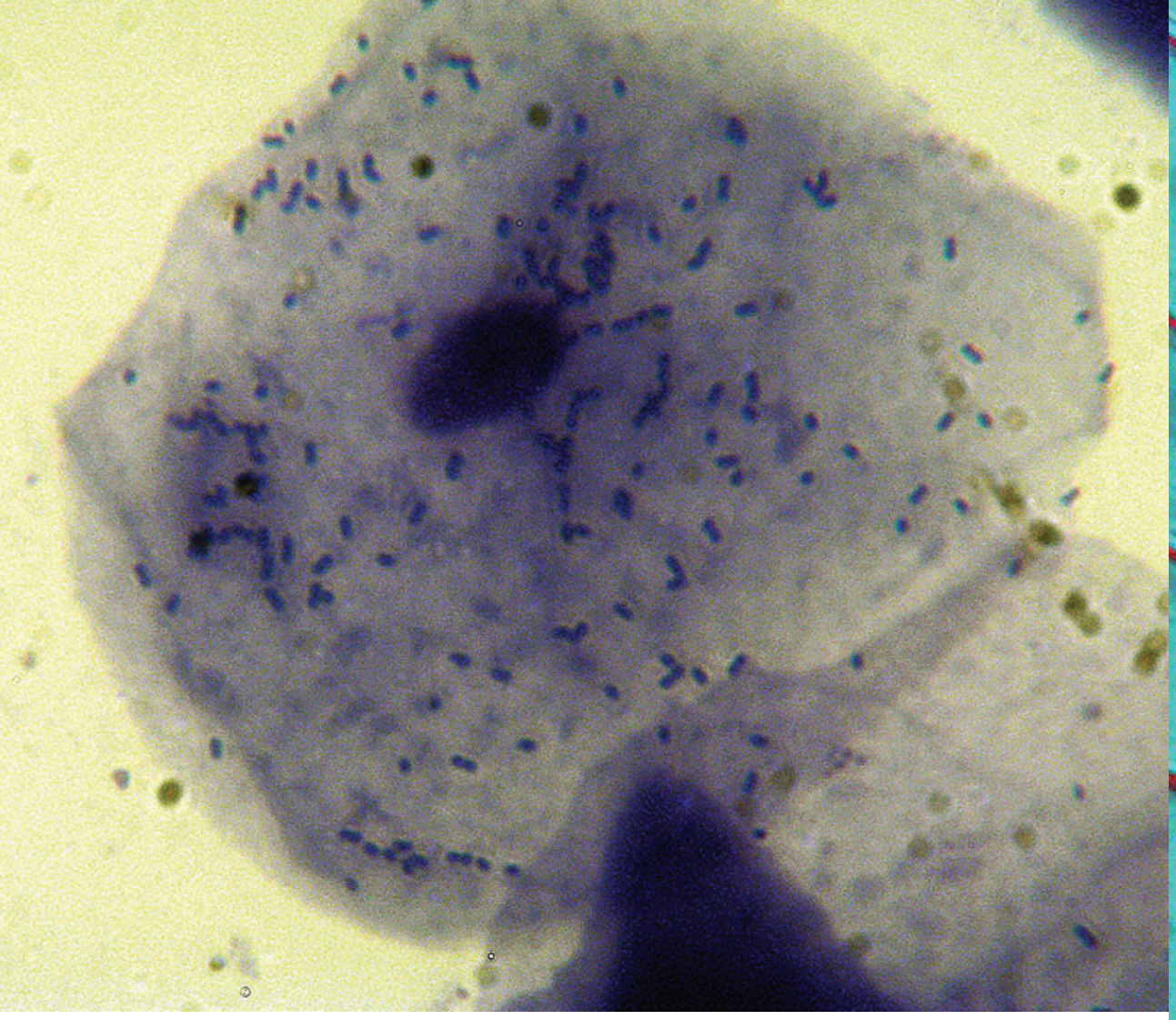

Figure 1. Epitheilial cheek cells x40.

During the last few years, I have also been part of an organisation known as the University of the Third Age (u3a). Founded in 1982, u3a is a UK-wide movement of regional "educational co-operatives" that provide a wide range of opportunities for retired people to meet, learn and have fun. Members explore new ideas, skills and activities together in various small-group activities that range from art, astronomy, photography, history, philosophy and science, through to such subjects as music, jazz, card games, table tennis, walking and cycling - in fact anything you can think of.

One of the key ideas u3a is based on is the principle of "self help" and might best be described as those who learn shall also teach. Each interest group has a good deal of autonomy in setting its own agenda and learning styles in accordance with what best suits both the subject and the participants.

When I first joined Northampton u3a there were over one hundred different activities to choose from, but sadly no microscope group. After some discussion with the organising committee, I was given the go-ahead to set up a microscope group which in fact turned out to be the first one in the country. It quickly attracted a number of members, keen to learn new skills and some to add to their existing knowledge and experience of microscopy gained whilst in full-time employment. However, one initial problem encountered was not just recruiting new members, but also finding a suitable place to

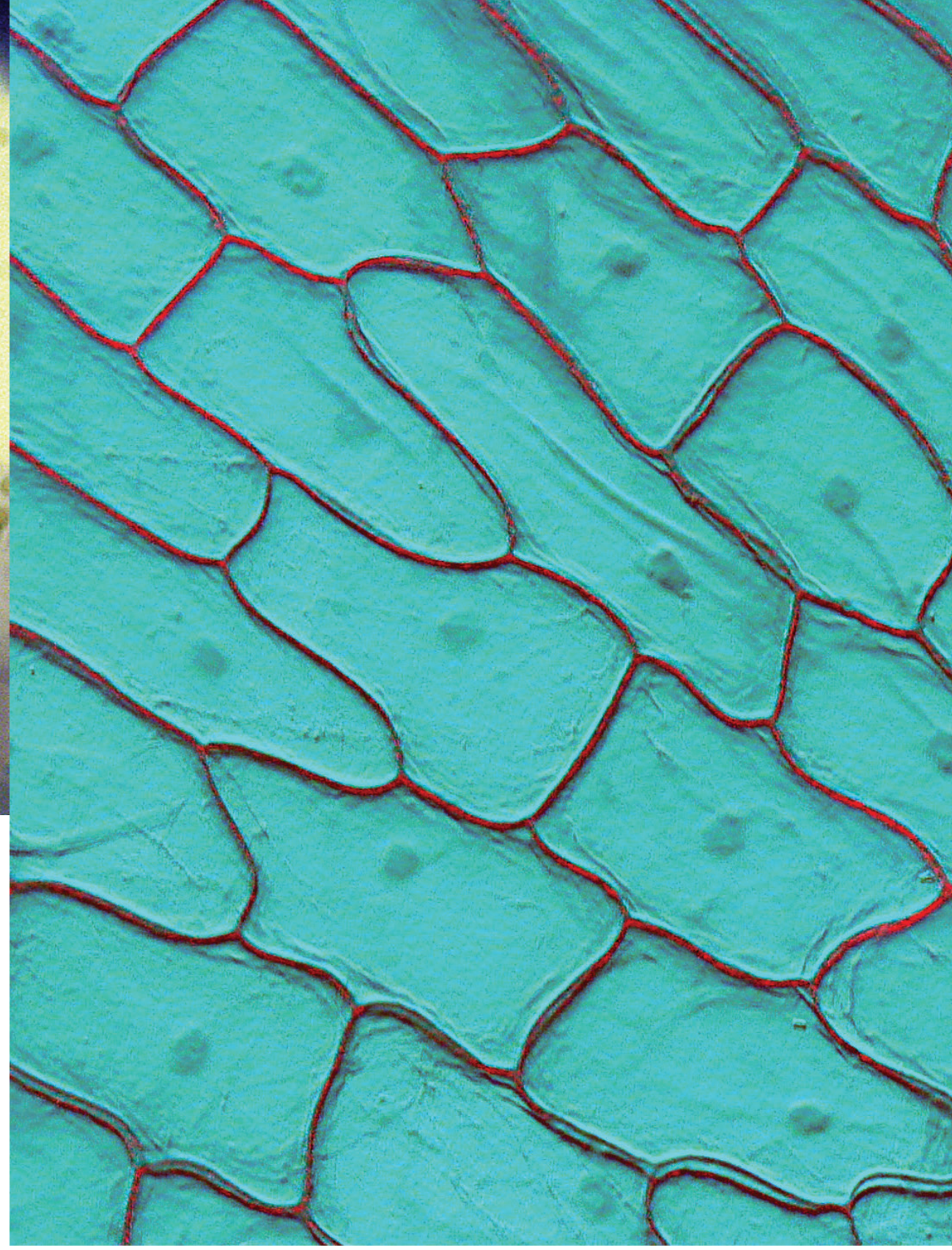

Figure 2. Onion cells.

Figure 3. Tracheid element.

meet. Fortunately, as I was already a member of our local Northamptonshire Natural History Society, we were able to use their rooms, facilities and microscopes for our monthly meetings.

From the outset we emphasised that this is a beginners' group and therefore no previous experience or knowledge was necessary; the essential idea was to discover, learn and have fun.

Currently there are between twelve and sixteen regular participants, many of whom now own their own microscopes - some new and others bought second hand on eBay and elsewhere. Our varied programme includes a mixture of practical activities, discussion, and slightly more formal lecture-style presentations, including where appropriate, online videos covering a range of microscope-related topics. Even during the last 18 months of Covid and lockdown the group managed to keep going with meetings online. In the last year alone, we've managed to incorporate into the programme such topics as "indoors and outdoors with your microscope", "making slides and mounting methods", and "forensics and the microscope". In April through to July this year some of the members have participated in a citizen science "Nenescape project", sampling and recording microscopic life found along various stretches of the River Nene, around Northampton.

When using our microscopes, recording what we do and see is important and therefore it's not surprising that photography features in many aspects of practical work. Although some of us use fairly sophisticated photographic equipment, quite good results have been obtained by members just using their mobile phones in afocal mode either fixed or hand-held and positioned over the microscope eyepiece.

I've included here a selection of some of the photographs that have been taken in our studies and practical work over the last couple of years.

Fig 1 shows a photograph from our earliest work looking at squamous epithelial cheek cells and

Figure 4.TS Pine stem with resin duct NEG3x40obj.

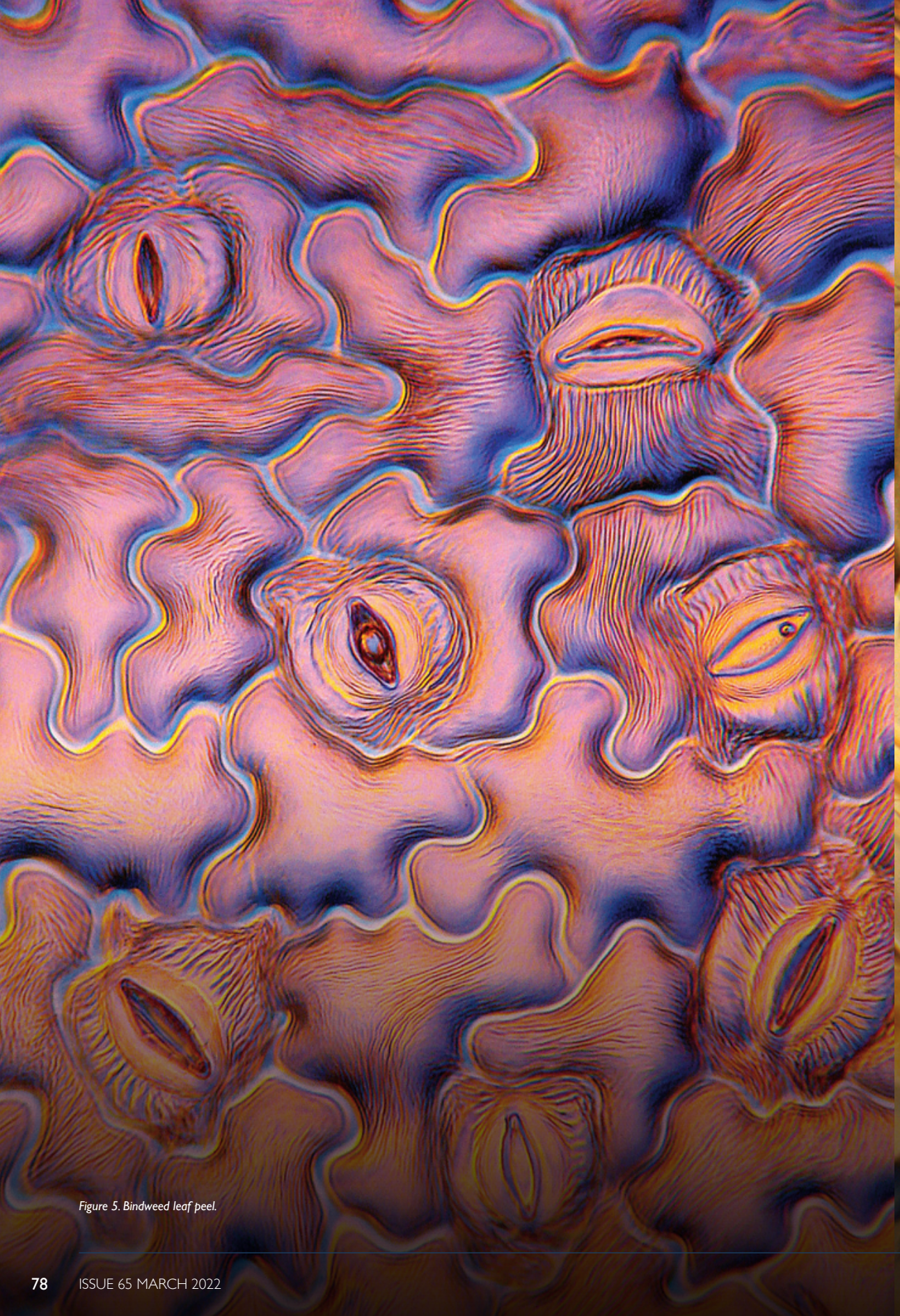

Figure 5. Bindweed leaf peel.

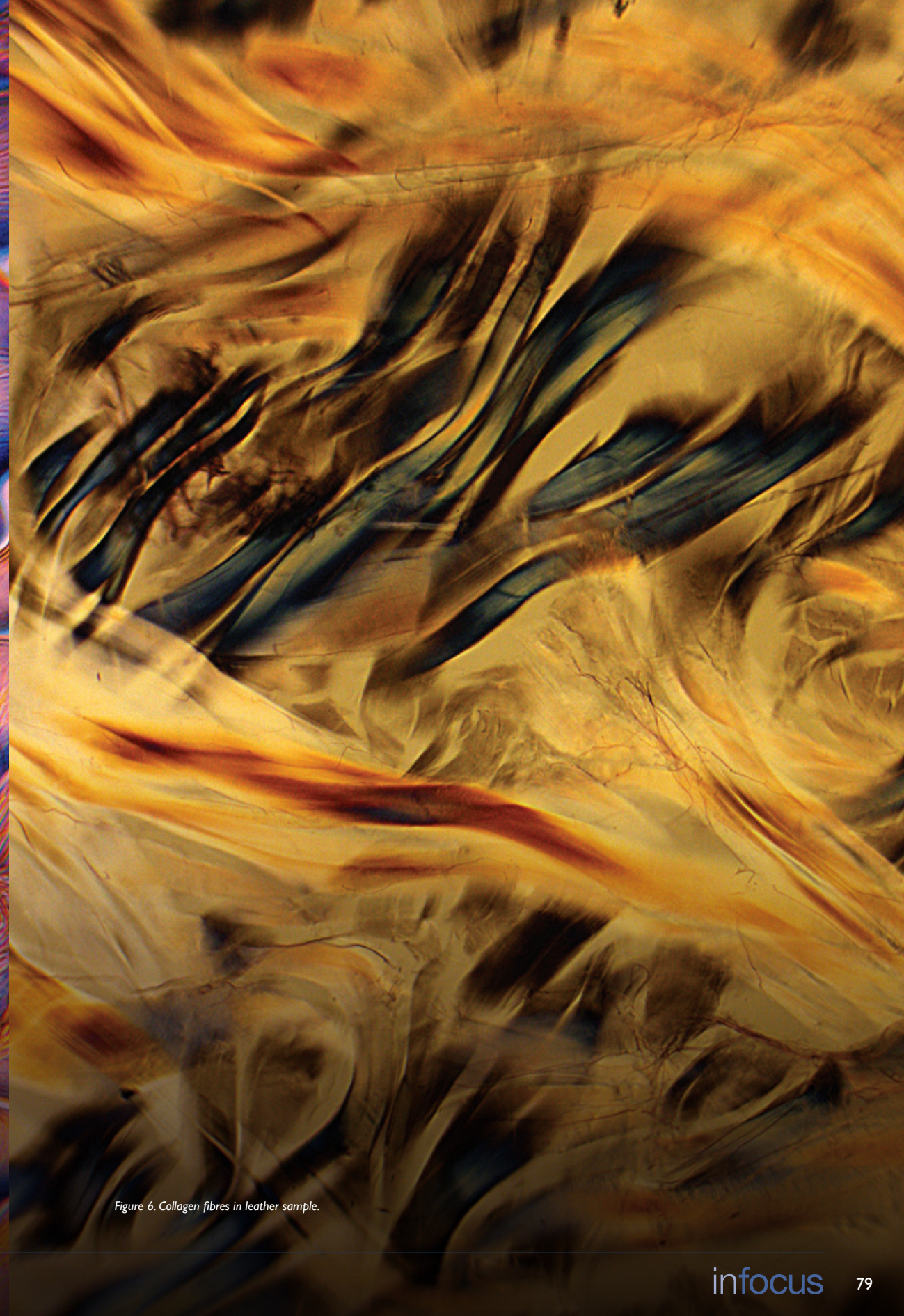

Figure 6. Collagen fibres in leather sample.

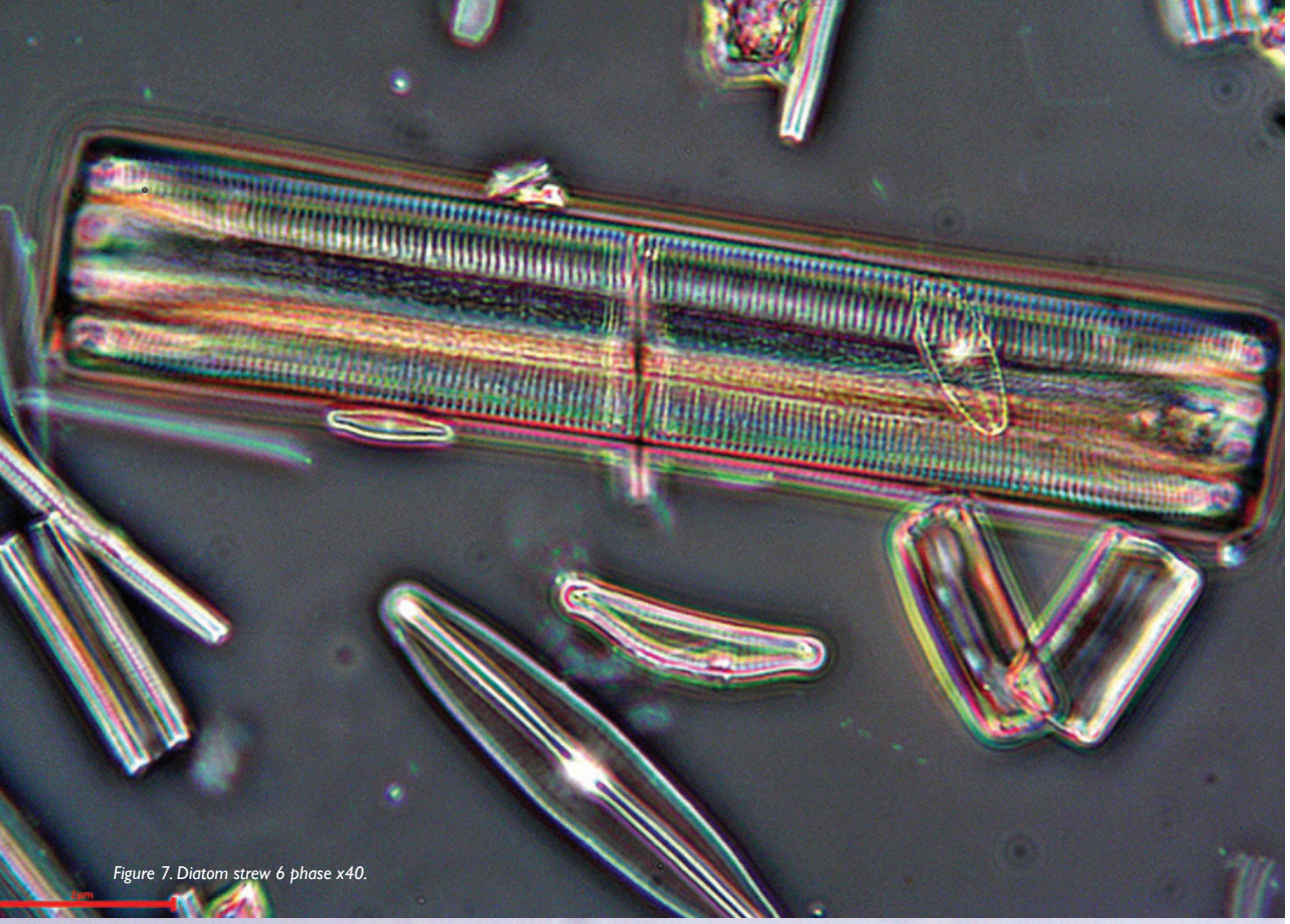

Figure 7. Diatom strew 6 phase x40.

Figure 8. Cladophora x40.

making simple slides with methylene blue. In this example using a x40 objective lens, it was possible to make out the plaque bacteria that often form as a biofilm on the cell membrane. This led onto further work by some of our members in making their own bacterial slides from yoghurt.

In Fig 2 we managed to get a very good Low-mag image of onion cells, here stained with ordinary food colouring.

Fig 3 is an image from a macerated sample of toilet tissue showing a single xylem element found amongst the wood fibres stained again with food colouring.

Fig 4 shows part of a pine stem in transverse section illustrating one of the resin ducts from a prepared Biosil slide. In Photoshop we experimented with the original brightfield image to produce this effect in negative that is reproduced here.

In one session we had great fun making leaf peels which is a relatively simple technique using clear nail varnish painted over part of the leaf surface. Once dry, the varnish is peeled off using Sellotape and mounted onto a slide. Fig 5 shows the final result with the underside of a Bindweed leaf seen here with Rheinberg illumination.

Two years ago, before the pandemic and lockdown, we were approached by the museum of leathercraft in Northampton, requesting us to photograph and catalogue many of their microscope slides. Here in Fig 6 is a photograph using cross polar illumination showing the collagen fibres in a prepared sample of leather from their collection.

Finally, I've included further images from our collaboration this year with the lottery-funded Nenescape Project ("What's in that Monster Soup?") involving some of our members in a survey of diatoms and other phytoplankton found along various stretches of the River Nene around Northampton (Figs. 7 and 8). This project was undertaken with help from members of the Quekett Microscopical Club.

Michael R. Gibson

Michael Gibson is a health educator and retired teacher with a lifelong interest in and involvement with microscopy. He belongs to several related societies including the Quekett, RMS, the Postal Microscopical Society and the Northamptonshire Natural History Society. He has written a number of articles on various subjects including photography, microscopy and health education. As an educator, Michael has a passion for making the invisible visible through the use of camera and microscope, and of helping others develop both their scientific knowledge and understanding of the scientific world in all its wonder and beauty as revealed by the microscope.