

## [ SCIENCE ]

WORDS BY CLAIRE O'CONNELL

# Through a glass brightly

Microscopes are becoming ever more powerful, but scientist Brian J Ford feels that the earliest models can give a greater insight into the wonder of life on a cellular scale

**A**BOUT FOUR CENTURIES ago, Galileo and others turned telescopes on the heavens and concentrated their focus on stars, planets and moons in the firmament.

It's a step that's often cited as a major advance for human knowledge, but Brian J Ford isn't so convinced.

"We always knew stars were there – pigeons know stars are there," he says. "Telescopes allow you to take beautiful, captivating images, but how the universe began has no effect on how we live our daily lives."

No, for him, a far more important shift came with glimpses through different lenses: the first microscopes, which offered a view into a whole new realm of the tiny.

"There was a universe of microscopic living things that no one knew about," says Ford. "If you look at objects through one of those lenses an entirely new world opens up."

He argues that the pioneers of microscopy in the 17th century got it right early on, and that as we train microscopes today to look at ever finer details, we could learn some valuable lessons by stepping back, taking in a broader view of cells and structures, just as those early microscopists did.

Ford, who is an author, broadcaster, visiting professor at Leicester University and president of the Cambridge Society for the Application of Research, has been looking at those early efforts, using some of the earliest technology to see biological material in clear detail.

And last month in the Science Gallery in Trinity College Dublin he spoke about recreating the dawn of microscopy at the Microscopical Society of Ireland's annual meeting, hosted by the Centre for Research on Adaptive Nanostructures and Nanodevices (Crann).

There he presented the types of views those early microscopes were capable of offering: drops of lake water teeming with life and fine details of insect eyes and hairs.

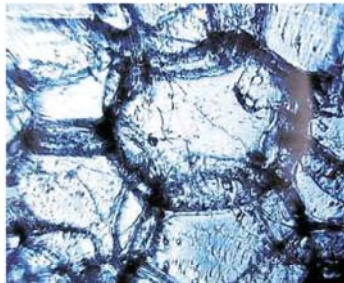
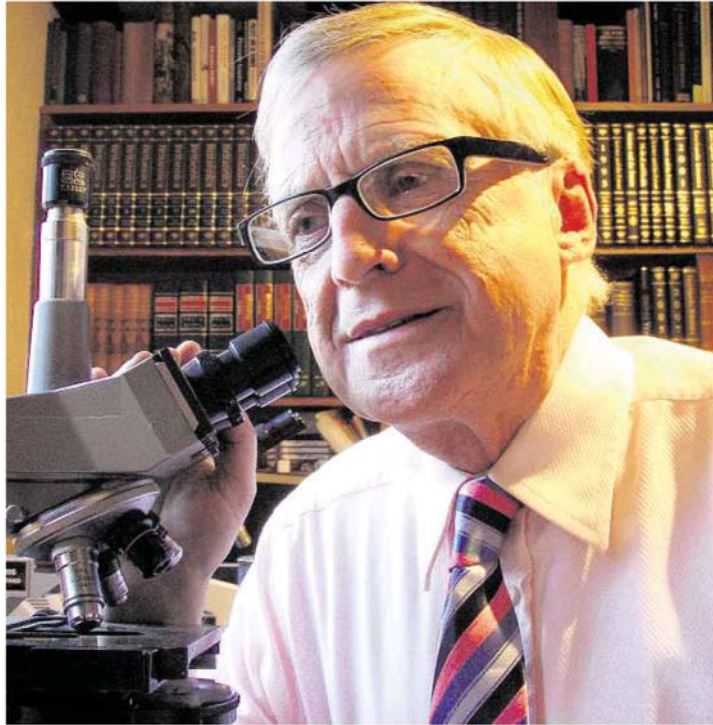
Ford has a particular interest in Dutch draper Antonie van Leeuwenhoek, who fashioned hundreds of early microscopes from metal and glass.

"He was the first person to ever see living cells," says Ford, who describes how, even as an elderly man in his 80s, Leeuwenhoek was still using his microscopes, looking for traces of gold in sands from the South Sea.

"Yet on his 40th birthday, Leeuwenhoek hadn't ever looked through a microscope as far as we know – so don't believe innovation is only the province of the young."

Ford has been looking to recapture the kinds of images these early microscopists could have seen, and he argues that the early single-lensed instruments in particular had the capacity to make many of the discoveries that were to come from light microscopes in the following centuries.

Yet today, despite what can be learned from such views, the focus is on looking at ever smaller components of cells, notes Ford.



Above: Brian J Ford with one of his classic microscopes. Right: Cells from an elder stem, as seen through an original Antonie van Leeuwenhoek microscope made around 1690

analysing scrambled eggs and hoping it will tell you about bird life."

Instead, Ford chooses to look at whole cells, and has previously described them as "autonomous, sentient and ingenious".

"It really is time to step up and look at what whole cells do," he says. "I have got a video of a ciliated cell hunting another cell and pouncing on it, and it's like a cat pouncing on a mouse. I put up images of living cells in talks to academic audiences, who work with bits of cells all the time but they never work with whole cells, and their jaws drop open."

So what about the future of microscopy? What comes next?

"We don't need any next – we have more than enough instrumentation," says Ford, who notes that while high-throughput and digital systems are useful for scanning, more generally we need to use microscopes to look more at whole cells, and to make people more aware of what they are.

"It should be illegal to get to the age of 12 and not have looked through a light microscope and seen the cells we are made of." ■