

The microscope's coat of arms

...or, the sting of the bee and the moons of Jupiter.

Giovanni F. Bignami

Biologists and watchers of things small usually credit Anton van Leeuwenhoek (b. 1632), Marcello Malpighi (b. 1628) and Robert Hooke (b. 1635) as the first to put the microscope to scientific use, starting around the 1660s. But more than 30 years earlier, the school of Galileo, and in particular Francesco Stelluti, used the instrument to study the anatomy of insects, especially the bee. The beautiful drawings of Stelluti's *Melissographia* present the first micro-anatomical details of the bee, and are dedicated to Pope Urban VIII, in 1625.

Why the bee? One of Italy's oldest and noblest families, the Barberinis — who hail from the part of Tuscany that bears their name — date back to the time of Dante. Their original coat of arms featured three horseflies on a sky-blue background, but in the early 1600s, Maffeo Cardinal Barberini decided to introduce a touch of elegance, and the horseflies became honey bees, both sweeter and more socially acceptable.

The cardinal's motives became clear on 6 August 1623, when he was elected Pope Urban VIII. Now in a papal family emblem, bees became particularly important to the many seeking the Pope's favours. Gianlorenzo Bernini himself, the great baroque architect of the interior and colonnades of St Peter's in Rome, sculpted on his splendid Tritone fountain the Papal coat of arms, with bees so realistic that even today they still seem to be about to fly away. And the swarm of poets and literati around Pope Urban were themselves described as bees (*Apes Urbanae*) by the courtier Leone Allacci.

In the delicate relationship between church and science, Urban at first seemed to be well-disposed towards Galileo, as well as to Prince Cesi and his eclectic and elitist Accademia dei Lincei, the oldest scientific society in the world. What better moment, then, for the Lincei to study the detailed anatomy of the bee, and of course to dedicate their work to the Pope — especially as a new instrument had just started to become a scientific tool. Lens

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Creating a buzz: Stelluti's detailed drawings of bees represent one of the first uses of the microscope.

arrangements for magnification had been around since about 1590, but the Lincei were the first to put the instrument to serious scientific use, and to record and publish the results.

In Galileo's times, however, the optical instruments for looking at distant things or at very small things did not yet have accepted, universal names. Galileo called the instrument more seriously known as *specillum* or *tubus bilens* (a pipe with two lenses), his *occhiale*. Prince Cesi called it, aptly, *uranoscopio*. Around 1611, an agreement was reached on *telescopio*. Galileo's instrument was tiny compared with today's: it went just two magnitudes below the power of the naked eye. But with it he brought about a revolution in astronomy, cosmology and philosophy, starting with the moons of Jupiter, the revolutions of which were enough to shatter the old sky paradigms.

As for the other instrument, Galileo referred to it as "the small glass for spying things up close", but the term *enghiscopio* had also been proposed, as well as the contrived *ponoscopio*. In the end, it was Stelluti who, around 1625, introduced *microscopio*, a name that, luckily, stuck. Thus, the two great optical instruments of the scientific revolution were put to use, and also received their current names, within less than two decades, from 1611 to 1625.

To return to bees, the similarity of the frontispiece of Stelluti's *Melissographia* to the Barberini coat of arms is obvious. But here the three bees are shown in dorsal, ventral and lateral projections, and anatomical details are also shown separately, at the base of the image. The drawing renders a wealth of details in precise and vivid terms, and the Pope, who was very pleased, confirmed his benevolence to the academy — if not to Galileo, above whom the clouds of the Inquisition were gathering.

A few years later, Stelluti published his detailed and systematic *Description of the Bee*, including its body, its parts and organs, down to its "faceted eyes covered in fur" and its tongue "surrounded by four tonguelets". It represents probably the first — and one of the most stylish and complete — descriptions of what was actually observed through a microscope. Its method and its (Italian, rather than Latin) prose are reminiscent of Galileo's descriptions of the heavenly bodies he saw through his telescope. Stelluti's microscope was of modest magnification, not much better than the resolution of the naked eye. And yet it showed, for example, the bee's sting, never before seen clearly. It should thus rank, in the history of science, on a par with the moons of Jupiter. ■

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