

Instead we have a fairly conventional account of the historical development of cosmology from antiquity to modern times. This account is up-to-date, including such developments as the preliminary release of data from the Wilkinson Microwave Anisotropy Probe and the latest observations of distant supernovae, and is accompanied by some nice illustrations. It is, for the most part, quite well written, but there is too much repetition, some of the diagrams are incomprehensible, and the text is peppered with unnecessary and distracting footnotes.

There may be a place for footnotes in a scholarly monograph, but in a popular book they are usually signs of sloppy writing. If they say something important they should be incorporated into the text, otherwise the casual reader may miss something vital. If they are not essential, they should be left out for fear of muddying the water.

An example from this book relates to Arthur Eddington's eclipse expedition of 1919 to the West African island of Principe, where he made the first measurement of the deflection of light by the Sun, predicted by Einstein's general theory of relativity. Afterwards, Eddington wrote a poem containing the phrase "light has weight". In a footnote, Seife claims that this is misleading because light "does not actually have mass". In everyday language, mass and weight are more-or-less synonymous, but any high-school physics student knows that these terms have quite different meanings in the language of classical mechanics. Eddington knew the difference too. In newtonian language, weight is a measure of the gravitational force on a body. A massive body can be weightless, if it is in freefall or in a region without a gravitational field. On the other hand, in Einstein's theory, massless particles such as photons can feel the effects of gravity, so it is reasonable to describe them as having weight. No poetic licence is required, and I'm not sure Eddington possessed one anyway.

This may seem a pedantic objection, but my grumble is less about the fine distinction between the concepts of weight and mass as about the pointlessness of raising the issue in the first place. Besides, errors of fact are even less forgivable than errors of judgement: the famous eclipse mentioned above happened on 29 May 1919, not 26 March, as stated by Seife.

I can offer a useful general tip about popular-science books: stop reading immediately when you come across the word 'mind-boggling'. This is the point where the author admits defeat, so it's only fair for the reader to do likewise. Applying that principle to this book will get you about half-way or, on a scale from alpha to omega, about as far as mu. ■

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Science in culture

Pixels and piety

The digital collection at the Museum of the History of Science in Florence.

Martin Kemp

Many museums have spent large sums of money embracing the digital age, often to no great effect. Online access to images and information is certainly valuable in extending the audience of any museum, but most of the projects go no further than archiving, and make little creative use of the potential of digital imaging. Likewise, most of the on-site digital access that museums provide for their visitors relies on low-level interactivity conceived by middle-aged curators who hope that touching a computer screen will transform the museum experience for 'young people'.

Happily, a few museums are now moving on to a more creative level to enhance their interaction with both real and virtual visitors. No museum has a more ambitious programme in this respect than the Museum of the History of Science in Florence, Italy, whose director, Paolo Galluzzi, is developing an imaginative range of digital access (as the site map at galileo.imss.firenze.it testifies). The most ambitious of the projects, galileo/thek@, will, when it is completed in February 2004, provide the most comprehensive set of images, primary sources, interpretative materials and animations for any historical figure. Animations, of which there are several on the museum's website, are particularly important, as they provide an immediate and dynamic insight into the working of instruments that sit as inertly as sports trophies in their sealed museum cabinets.

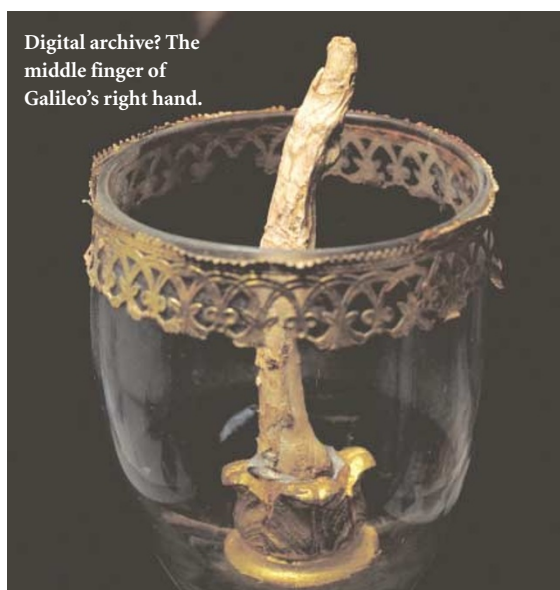
In Florence, the latest technologies are blended with extraordinary levels of traditional reverence for Galileo, the 'god' of Tuscan science. Alongside hard-nosed information about galilean astronomy and dynamics, scholarly information about manuscripts and editions, and extensive secondary literature, are some extraordinary memorabilia of the Italian scientist, presented with a piety that is at least the equal of any found in a church. The most sanctified relic is the shrivelled middle digit of Galileo's right hand — the medium of which is laconically listed in the museum catalogue as "finger"!

When Galileo's remains were transferred to the main body of the Florentine church of Santa Croce on 12 March 1737, the antiquarian, Anton Francesco Gori, took the opportunity to detach the finger as if it were a revered fragment from the corpse of a saint. For many years, the relic was exhibited in the Biblioteca Laurenziana, having acquired its elaborate eighteenth-century mount

and inscription, before passing in 1841 to the new Tribuna di Galileo in the Museo di Fisica e Storia Naturale on the via Romana in Florence, and eventually to its current resting place.

The flavour of such piety is embodied in another Galileo reliquary now housed in the same museum. This contains the objective lens used by the astronomer in 1610 to discover the moons of Jupiter, which he designated the 'Medicean Planets'. Mounted in a florid ivory frame by Vittorio Croster in 1677, it was for years part of the cherished collections of the Medicean Grand Dukes of Tuscany in the Galleria degli Uffizi, alongside the masterpieces of Leonardo, Michelangelo and Raphael.

Digital archive? The middle finger of Galileo's right hand.



One of the Latin inscriptions on the mount of the lens captures perfectly the tone of adulation: "The sky, opened by the lynx-like mind of Galileo with this first lens of glass, showed stars never before seen, rightly called Medicean by their discoverer. The knowing mind masters even the stars, indeed." The animal allusion is to the Accademia Nazionale dei Lincei, the pioneering scientific academy of the 'lynx-eyed', of which Galileo was the brightest luminary. The academy celebrates its 400th anniversary this year (*Nature* **422**, 467–468, 2003).

The finger may be dry and withered, and the lens cracked beyond even rudimentary utility, but the relics maintain their potency. They are, as they say, the real thing. At the end of the day, this possession of the authentic item provides the enduring strength and fascination of museums. Digitization is a potentially vivid means of enhancing the relationship between the museum object and the curious visitor. But it is not an end in itself.

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