MATERIAL WITNESS

KEEPING ART ALIVE

PHILIP BALL

The current exhibition of the artworks of Leonardo da Vinci at London's National Gallery offers an unprecedented view of his oeuvre, including nine of the 15 paintings attributed to him. The negotiations behind the loans are said to have been hugely delicate and fraught; in general these depend on a borrower's ability to demonstrate that it can comply with international regulations on the preservation of art materials. These typically specify, for example, that works must be displayed at temperatures no greater than about 21 °C and a humidity of no more than 50 per cent, with barely any fluctuations.

But many of these rules and guidelines were laid down decades ago, sometimes to safeguard works relocated during wartime. Today we know much more about the responses of materials to environmental conditions, and have more sensitive and versatile means of monitoring changes. Yet this new understanding does not necessarily feed into art-conservation standards, which are bound by past principles that have hardened into an accepted, almost inviolable tradition rather than anything rooted in science.

That point has been making headlines following the recent call by the director of the UK's Tate galleries, Nicholas Serota, for these rules to be reconsidered. Serota's suggestion that excessive air conditioning and heating in art museums is contributing unnecessarily to global warming could easily seem faddish, given how negligible the contribution of galleries to total carbon emissions is. But on the contrary this call for a reconsideration of the rules makes a valid point that touches on the role of science in the preservation of cultural heritage.

This isn't a new story. Some conservators have been protesting for years that normal practices are largely divorced from a modern scientific appreciation of how materials are aged and affected by their environment. Conservation tends towards conservatism — 'this is how we've always done it' — rather than seeking to pose and answer scientific questions. Given the nature of the objects under consideration, this attitude is understandable. But it can end up making art museums unnecessarily energy-hungry and dimly lit, reducing the enjoyment of visitors while raising costs in a time of diminishing funds.

Serota has been part of the debate for some time. In 2008, he and Mark Jones, former director of London's Victoria and Albert Museum, convened a meeting of conservators to review the preservation guidelines of British museums. "Different objects have different requirements", Jones said. Ceramics, for example, are very tolerant, whereas metals need to be kept reasonably dry. "It is time", Jones concluded, "for museums and funders to stop imposing standard environmental conditions" — and also for more research to be done on how materials respond.

The UK National Museum Directors' Conference agreed, stating that conservation standards need to be made more intelligent and flexible, geared towards reducing carbon footprints and to acknowledging the value of smart building design, such as the use of passive air circulation and localized microclimate control in different spaces. These ideas are now being discussed at an international level, for example at a meeting called Rethinking the Museum Climate held in Boston in 2010. There's still a way to go, but the conservation of art is gradually becoming more of a science. ❐

QUANTUM DOTS

A charge for blinking

No accepted description of luminescent blinking in quantum dots is currently available. Now, experiments probing the connection between charge and fluorescence intensity fluctuations unveil an unexpected source of blinking, significantly advancing our fundamental understanding of this baffling phenomenon.

Todd D. Krauss and Jeffrey J. Peterson

Fluorescence intermittency, or, more humbly, blinking, refers to the discontinuous and random emission of light from single fluorescent sources, and is ubiquitously observed in emitting dye molecules, polymers, biomolecules and nanoparticles[1]. In spite of 15 years of intense investigations, its microscopic origin for nanoparticles has eluded detailed understanding and thus continually hampered efficient utilization of these objects. Now, in a Letter recently published in *Nature*, Christophe Galland and co-workers report exciting observations that demonstrate an unexpected diversity