thereby developed modern statistical mechanics. Einstein and Planck constructed the basis for proving the existence of atoms and for undercutting classical mechanics. Correspondingly, under the influence of modern string theory, maybe the physics of our own day is also ready to undergo a radical transformation. Some of the fundamental constants and natural laws seem to be losing their solidity. "Constants of nature" are in part being replaced by "running couplings," varying with distance and perhaps other environmental elements. The very structure of our laws of nature might be the accidental result of falling into one among a huge class of possible ground states. Perhaps we will soon face a major restructuring of our view of the physical world, even one comparable to the quantum revolution that started one century ago.

Scientifically, after Boltzmann's great work in the 1870s, the remainder of his life was postscript. Toward the turn of the century, he moved away from theoretical physics and began to work on the philosophy of science. This shift was partially an attempt to defend and discuss the point of view that he had developed many years before. The attempt was not successful, and its failure perhaps contributed to his eventual despondency and suicide.

In the above, I have mostly given Lindley's story. His rendition is not always flattering to Boltzmann, who is presented as creative but intellectually limited. A different story is told in Carlo Cercignani's recent biography, *Ludwig Boltzmann: The Man Who Trusted Atoms* (Oxford University Press, 1998), which offers a detailed description of Boltzmann's science in his own time and follows his contributions into recent work. Cercignani describes a towering individual with a very deep mind, who had magnificent achievements, and who has been underappreciated by posterity. Lindley does not paint such a larger-than-life figure. *Boltzmann's Atom* does not reach for the scientific scope and detail of its predecessor, but it is nonetheless quite satisfying. Appropriate for a nonspecialist yet scientifically cultured audience, Lindley's well-crafted account gives a believable, human-scale picture of Boltzmann and his science.

NOTA BENE: EXHIBITS

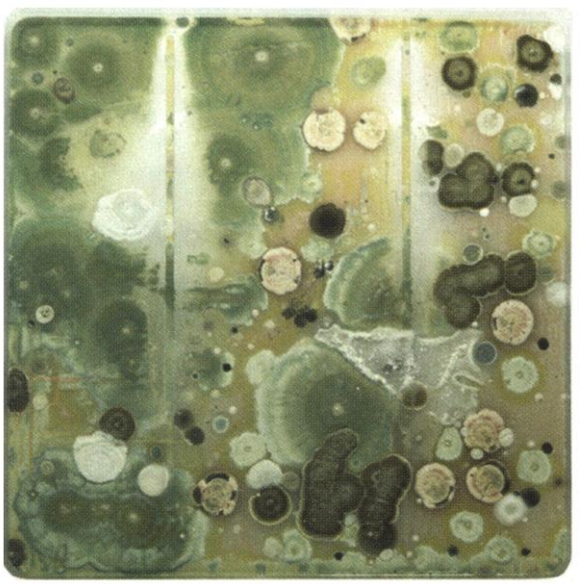
Microbial Resolution and Reality

Growth and Form Biomedical Images—Awards and Interpretations
Denna Jones, Curator

The Wellcome Trust, Two10 Gallery, London. 22 February to 4 May 2001. www.wellcome.ac.uk/en/1/misexhtwo.html

Sucked into the foyer of the Wellcome Trust's headquarters on Euston Road in London by a set of revolving doors, visitors are confronted by three immense square dishes containing what at first sight appear to be leopard skin rugs. These resolve into a mesmerizing patchwork of subtly colored fungal colonies, the progenitors of which originated in samples of London air captured by artist Rachel Chapman. Entitled *Breathe*, the piece (part of which is shown here) not only dramatically conveys the unseen horrors of air we inhale, but also its aesthetic potential. It is far and away the most arresting piece in the exhibition *Growth and Form*, which juxtaposes 22 scientific images selected from the Wellcome Trust's Biomedical Image Awards 2001 with work by nine contemporary artists and designers inspired by biological research.

Unfortunately, the Two10 Gallery is cramped and its space is interrupted by pillars and a stairwell. Thus, for some of the larger pieces it is hard to judge their merits at arms' length. Apart from such obstacles, the impression left by the images inevitably depends on the visitor's background and interests. For me, an erstwhile microbiologist, several of the artworks imparted an awkward sensation, whereas the uninterpreted micrographs were far more successful and the beauty of their reality spoke for themselves. You can judge for yourself on the exhibit's Web site.



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Some of the art pieces are thought-provoking. For example, *Nine Landscapes* by Rebecca Birch comprises tiny paintings on canvas. The pictures are ostensibly meant for microscopic examination, but when inspected by microscope they disappear into the topography of the paint surface. This idea is echoed in the video presentation *Minutiae* composed by Mat Tizard. Here, the artist compiled a series of scanning electron micrographs of various organisms at a range of magnifications. After overcoming the post-modernist trick of reading the descriptors backwards and realizing that viewing the video required standing in the stairwell, the effects of loss and recovery of resolution at the extremes of magnification were absorbing.

Other pieces were simply irritating to me as a scientist, mostly because they are unadventurous departures from reality and inappropriately borrow jargon. Sally Gould's *We All Fall Down* consists of an ironic assembly of the kind of white ceramic tiles that used to line Victorian hospital wards; sections of botulism-toxin motifs had been fired into the surface of the tiles. Annoyingly, the artist comments that "the new glaze reacts with the original glaze, like a virus attacking the body." *Germlights*, by Sue Withers, positions two dozen glowing paintings within translucent domes, where they look like three-dimensional renderings of microbiological cultures within Petri dishes. Although they make an attractive assemblage, they are poor cousins to the real things. And, contrary to the artist's expectations expressed in the catalog, to me they did not succeed in evoking sensations of either beauty or disgust.

Despite feeling irritated by several of the artworks, I was attracted to Serge Negre's *Fungteria*, a series of platinum prints depicting patterns formed by the fungus *Aspergillus flavius* growing inside old books. Their modest sepia record of subtle forms needed no other message or explanation.

Through its sponsorship of contemporary arts and artists, the Wellcome Trust is making a valiant attempt to bridge the current gap between art and science. Perhaps some of my disappointment comes from the enterprise trying too hard to find inspiration in objects that need no filter to tell the observer they are beautiful or provocative.

—CAROLINE ASH