ing both the treatment and the control. Communities may not retain a stationary state for the duration of long experiments—which, however, is also a problem for observational studies.

The key conceptual constructs in *Untangling Ecological Complexity* draw on A. J. Lotka's comparison of populations with an ideal gas in a container, where the actual space occupied is settled by the tension between the internal pressure to expand and the constraining external pressures. This research program becomes ambitious, because its aim is to predict the sizes of geographic ranges from species' demographic characteristics. Though I find it difficult to reconcile species' range dynamics with thermodynamic principles (given the limited mobility of individuals in most species), Maurer's perspective leads to analyses of continental species-area and distribution-abundance relationships that have merit. He shows how sampling alone cannot explain the patterns in the distribution of species. More successful is a model of structured geographic ranges—that is, species having dissimilar range sizes and

EXHIBITIONS: DISEASES

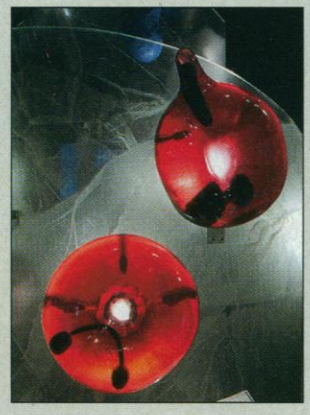
Magical Microbe Mystery Tour

Epidemic! The World of Infectious Disease
Rob DeSalle, curator

At the American Museum of Natural History, New York City, through 6 September 1999.

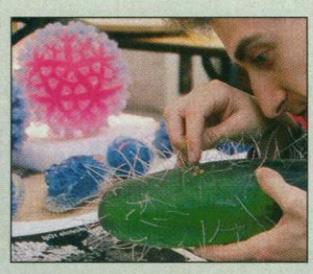
It is 1993. In a dusty cabin inhabited by the scurrying shadows of deer mice, a flickering television screen carries news bulletins about the inexplicable deaths of several young Navajo in the remote southwestern United States from a respiratory illness. Fast forward six months, and the bulletins tell us how this medical mystery was finally solved and the culprits (deer mice carrying hantavirus) identified. So begins *Epidemic! The World of Infectious Disease*, the latest exhibition at the American Museum of Natural History. Three years in the planning, this sophisticated show is a masterpiece of creativity. The visitor journeys through different sections where dioramas, interactive touch-screen computer displays, videos, and text explain the biology of microbes, how they infect us, and how a local outbreak of an infectious disease can quickly escalate into a pandemic.

The highlight of the exhibition is the "Microbe Gallery" graced by exquisite three-dimensional models of microbes that took 25 modelers 5 months to make. (Top right, a green *Shigella* bacterium nears completion, with a finished pinkish-blue HIV particle in the background). Iridescent green globes of flu virus hover overhead, their surface convolutions mimicking the topography of the glycoprotein markers that distinguish different strains of the virus. Red blood cells infected by malaria parasites prepare to release their cache of merozoites that will invade new erythrocytes (center). The sinister pork tapeworm, *Taenia,* leers at visitors over a plexiglass wall, and *Giardia* parasites lurk like enemy space shuttles ready to invade their human hosts.



Floating spheres of HIV and flu virus lead visitors on to a section showing the different ways that microbes infect the human body. White spandex shrouds evoke mucosal membranes in the mouth—an entry site for flu virus. In a huge cross-sectional model of a T cell, the steps of HIV infection—invasion, reverse transcription, DNA integration, protein production, virus assembly, and budding—are illuminated in sequence. Nearby, visitors can choose to be a microbe or the host immune system in a computer game where the protagonists battle to the death.

The part of the exhibit devoted to the study of microbes is noteworthy for its landscape of contrasts. A handheld 17th-century microscope designed by van Leeuwenhoek sits near a model of an electron microscope. A bank of interactive computer displays allow visitors to carry out virtual diagnostic tests—an ELISA assay, a Western Blot, or a PCR reaction—for different microbes. A model of a Biosafety Level 4 laboratory with a scientist in a sealed life-support suit stands close to microscopes through which visitors can view slide preparations of deadly microbes.



The segment of the exhibition devoted to epidemics displays a number of imaginative dioramas. An air-conditioning pipe rumbles overhead signifying the 1976 outbreak of Legionnaire's disease in a Philadelphia hotel, which resulted in 30 deaths and was finally traced to *Legionella* contamination of the hotel's cooling system. There is a model of the Broad Street pump that John Snow identified as the source of contaminated water, the cause of a cholera outbreak in London in 1854. Ropes tethering a merchant ship in a Venetian port provide the perfect escape route for stowaway rats carrying bubonic plague, which decimated the population of Venice in 1347.

The exhibition's organizers do not shy away from presenting one of the greatest plagues of this century: AIDS. In a simple diorama, a series of disembodied arms pass around a blood-stained needle and syringe, making clear the ease with which HIV can be transmitted through sharing contaminated needles. In "Talking about AIDS," the closing part of the show, familiar settings—a subway platform, a park bench, a newspaper kiosk—project audio information about the latest AIDS statistics, bringing home the presence of AIDS in everyday life.

Accompanying *Epidemic* are a series of eight lectures on the biology of infectious diseases and their impact on public health, an AIDS symposium, and a series of documentaries and films about microbes. Those unable to make the trip to New York City may still enjoy a virtual version of the exhibition at http://www.amnh.org/exhibitions/epidemic/, and the exhibit is set to tour the United States after its run in New York.

Epidemic is a fitting sequel to *The Exhibition Illustrating the World's Work Against Tuberculosis* mounted by the Museum in 1908, which drew nearly a million visitors during its limited 6-week run. The goal of that exhibit was to educate the public about tuberculosis, an incurable disease rampant among the poor immigrants of New York City's overcrowded tenements. Ninety years later, the Museum continues its commitment to education and public health with *Epidemic*, which should reach an audience of many millions more than its predecessor.

—ORLA SMITH

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