archetypal characters, its invocation of Christian and pagan mythology, its perfectly choreographed universal dances of all things not human, its A-B-A architecture silently preaching the Eternal Recurrence, its superbly executed and controlled animation, its occasionally breathtaking visual beauty, and its despairing subliminal consciousness of the implacable onrush of World War II"—carried "the force of a sledgehammer" (p. 178) and has battered the defenses of hunters ever since.

Where does Cartmill's argument lead? He concludes by insisting that since boundaries between humans and animals are cultural, not natural, constructs, they are subject to redefinition and must be redefined when they lose intellectual credibility. Just as hierarchical distinctions between masters and slaves and men and women collapsed, so with distinctions between human beings and animals. In the instance of ideologies of male and white supremacy, Cartmill writes, "A heavily marked status boundary ultimately had to be given up because it was intellectually indefensible. And if the cognitive boundary between man and beast, between the world of history and the world of nature, is equally indefensible, we cannot defend human dignity without extending some sort of citizenship to the rest of nature—which means ceasing to treat the nonhuman world as a series of means to human ends" (p. 223).

Cartmill's argument is bound to command attention. Some will wish for more data refuting the hunting hypothesis. I, for one, wish the author had addressed in greater detail conservation-based arguments that regard hunting as an ethical and environmentally sound means for controlling population imbalances among some species. These arguments, articulated by Aldo Leopold and several generations of wildlife managers, deserve more attention if only because they have laid the basis for specific state and federal wildlife policies and illustrate the power of institutions to translate philosophical and science-based positions into practice and to shape popular belief systems. The chapter on the "Bambi syndrome" might have been accompanied by a chapter on the intellectual underpinnings of wildlife policies at the state and federal level. But this matter aside, *A View to a Death in the Morning* is a razor-sharp analysis that succeeds in raising doubts about deeply rooted and widely shared assumptions concerning the position of human beings in nature. Like Keith Thomas's *Man and the Natural World*, this book will interest anyone curious about what it means to be human and how, as Cartmill puts it, we can reconcile our universalistic principles of equal rights with eating sausage for breakfast.

"Happy forest animals celebrating the end of the human race in Hugh Harman's 1939 cartoon *Peace on Earth*." Produced "during the same dark closing months of 1939" as *Bambi*, the "oddly parallel" film "opens with two baby squirrels asking their grandfather what 'men' were. He explains that they were 'uniformed monsters' who were continually at war with one another. After he tells his grandchildren the story of how men fought each other to extinction, the cartoon ends with the cute forest animals frolicking through a landscape of rusting weapons and bullet-ridden helmets." [From *A View to a Death in the Morning*; Turner Entertainment Co.]

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The Origins of Plagues

Emerging Viruses. STEPHEN S. MORSE, Ed. Oxford University Press, New York, 1993. xxiv, 317 pp., illus. $39.95 or £32.50. Based on a conference, Washington, DC, May 1989.

In early June of this year, reports appeared in the news media about a mysterious illness that had caused deaths among the Navajo nation in the four-corners area of the southwest United States (including parts of Arizona, Colorado, New Mexico, and Utah). Investigations by epidemiologists from state health departments and the Centers for Disease Control and Prevention (CDC) revealed the causative agent to be a hantavirus. Hantaviruses are endemic in rodents in many areas of the world. Throughout Asia and central Europe, they cause hemorrhagic fever with renal syndrome in humans. But the type of hantavirus found in the Southwest had not been previously recognized, and no hantavirus anywhere in the world had been associated with a clinical syndrome like the one seen among the Navajo.

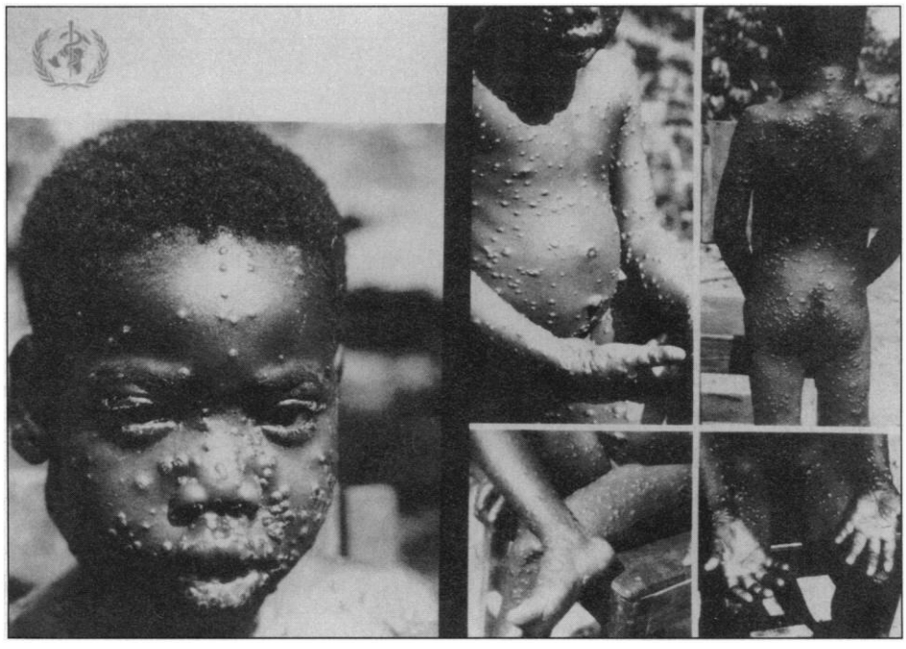
The contributors to *Emerging Viruses* would find the events in the Southwest neither mysterious nor surprising. Indeed, the outbreak confirms their thesis that new diseases caused by viruses can emerge anywhere and should be anticipated. Originating in a landmark conference that was "the first to consider the question of emerging viruses," the book begins with several chapters that place viral emergence in historical context. It goes on to provide basic information on virus-host interaction and discusses methods for detecting and tracking emerging viruses. Case studies of monkeypox, seal plague, and canine parvovirus—three animal viruses that recently crossed species—are presented, followed by several chapters on viral evolution. Finally, prospects for the future are addressed. Resisting the temptation to present a doomsday scenario, the contributors have achieved a well-balanced account. The book is scholarly, thoughtful, and well written, and scientific jargon has been kept to a minimum, making it easy and enjoyable reading even for those with a limited background in biology.

The authors use the term "emerging" to describe viruses that either have just appeared in a population or have expanded their range, with a resulting increase in the incidence of

disease. As Morse points out in chapter 2, viruses may emerge by any of three basic mechanisms: introduction to a species from another species, evolution of a new variant, or dissemination from a smaller to a larger population. Although many people assume that new diseases are the result of viral evolution (as with influenza), in recent times they have more often been due to existing viruses that have gained access to new hosts. The four-corners virus, for example, which appears to be endemic in deer mice, has probably caused sporadic disease among humans in the past. The recent outbreak is very likely a result of some change in ecological conditions that has led to more frequent interaction between the rodent hosts and humans. Argentine hemorrhagic fever, Bolivian hemorrhagic fever, and hemorrhagic fever with renal syndrome are described in the book as examples of diseases that emerged owing to changes in agricultural practices that facilitated transmission of arenaviruses from the rodent hosts to agricultural workers. Rift Valley fever in Africa and Oropouche in South America are cited as examples of disease outbreaks that occurred because of the development of ecological conditions that favored an increase in the number of insect vectors.

Human immunodeficiency virus is another example of a virus that probably is not a new variant but has gained access to new populations through medical technology (blood transfusion), sexual transmission, and contaminated hypodermic needles. Describing the AIDS pandemic in chapter 20, Temin remarks, "With the changes in urbanization, enormous population increases in Africa, freer lifestyles in North America, and jet travel, a major new pandemic occurred. If anything the surprise might be that there has been only one new pandemic" since World War II.

In "Are we prepared for a viral epidemic emergency?," based on discussions at a meeting of the American Society of Tropical Medicine and Hygiene in Honolulu in December 1989, Legters *et al.* describe a hypothetical "super-Ebola" pandemic to which the United States and the global public health community are ill-prepared to respond. A series of fictitious interviews clearly lays out the basic reasons for the pandemic and our failure to detect the virus earlier. This meeting and the conference on which this book is primarily based were major stimulants for a study on emerging diseases undertaken by the Institute of Medicine. The resulting 1992 report, "Emerging Infections: Microbial Threats to Health in the United States," recognizes our vulnerability to new or emerging bacterial, parasitic, and viral diseases and makes specific recommendations for the development and implementation of strategies that would strengthen state and federal efforts in national and international surveillance.



"Monkeypox recognition card. Adapted from the smallpox recognition card used for surveillance during the Intensified Smallpox Eradication Programme of the World Health Organization, this card, in color, illustrates the clinical features of a typical case. It helped greatly in surveillance for cases of human monkeypox in Zaire." [From F. Fenner's paper in *Emerging Viruses*; courtesy of the World Health Organization]

Joint planning is now under way by the CDC, the National Institutes of Health, the Food and Drug Administration, the Department of Defense, and other state and federal agencies.

Implementation of these plans will be a major challenge. Budgeting for events in the future is far more difficult than budgeting for situations that are facing us now. Yet *Emerging Viruses* provides strong justification for improving our national and international capabilities for detecting and responding to emerging infectious diseases before they become public health crises.

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Extracellular Organizers

Molecular and Cellular Aspects of Basement Membranes. DAVID H. ROHRBACH and RUPERT TIMPL, Eds. Academic Press, San Diego, CA, 1993. xx, 448 pp., illus. $115 or £87. Cell Biology.

Once viewed as merely a histologic curiosity, the basement membrane is now appreciated as a dynamic extracellular organizer with diverse and highly complex functions. Basement membranes provide a directional anchor for cells and a scaffolding that guides tissue morphology. They lay out a migration pathway for development and healing and constitute a selective filter essential for hemodynamic and renal function. More than just making up a continuous connective-tissue sheath separating organ parenchyma cells from the stroma, they act as an autocrine solid-phase differentiation agent, a breadboard for axonal network regeneration, and a storage depot for soluble factors. Basement membranes may even play a role in transfer of information across tissue boundaries. *Molecular and Cellular Aspects of Basement Membranes* weaves material on cell biology and physiology with information on the expanding catalogue of basement membrane–associated proteins. With the synthesis of structure and function that is reflected in this book we can begin to understand a number of pathologic conditions that can now be considered diseases of the basement membrane.

Populations of cells in tissues are organized into specialized communities through two major regulatory forces: cell-cell interactions and cell-matrix interactions. The extracellular matrix that stays in direct contact with the formative cells is made up of basement membranes. Found in virtually all members of the animal kingdom, basement membrane proteins first appear at the two-cell embryo stage. Branching epithelial morphogenesis, which establishes the architecture of many embryonic tissues, is tightly regulated by basement membranes, which can be produced by cells