Media Advisory

Health in the Headlines. The Stories Behind the Stories. STEPHEN KLAIDMAN. Oxford University Press, New York, 1992. viii, 249 pp., illus. $24.95.

President Bush's recent statements urging Americans to lower their health risks confirm the hold exerted by preventive medicine today. Yet how does anyone gather information about which risks are best avoided and which are tolerable? One candidate is the news, the focus of this book by journalist and ethicist Stephen Klaidman. Through seven case studies—contamination of food by the pesticide EDB, radon, nuclear power, global warming, AIDS, cholesterol, and the linkage of cigarette smoking to lung cancer—Klaidman depicts the complicated and varied ways in which politicians, journalists, physicians, scientists, and (occasionally) citizens move the scientific question of risk into the public and political space of the news.

Refreshingly, this is not a book in which the author berates journalists for oversimplifying the complexities and nuances of scientific inquiry and scientists for stooping to "sell" their findings to the general public. Instead Klaidman, who is well aware of the difficulties of health journalism and also sees the many benefits of simplicity for communicating risks to the public, adeptly traces the impacts from outside journalism on health news. He suggests that the media are best understood as a battlefield, with an instrumental rather than a participatory role, and in light of the inevitable constraints on reporting he includes some valuable tips to help the audience decode health news.

I am not as willing as Klaidman to let journalism off the hook. His accounts provide numerous examples of reporters becoming advocates for particular scientific positions. Sometimes they are convinced of the veracity of one side, as in Jane Brody's crusade in the *New York Times* on the dangers of cholesterol for otherwise healthy individuals. More commonly, reporters unwittingly gravitate toward particular sources and storylines because of the built-in, seemingly neutral definitions of newsworthiness. Since journalists generally agree upon such rules of thumb, the news as a whole is far from unbiased.

Klaidman is reluctant to generalize from his seven cases, but they do clearly show which health risks have and which have not made news. Given that journalists have limited resources to explore a complex topic and must come up with a fresh daily quantity of news, it is not surprising that they usually rely upon sources "in a position to know," usually governmental officials or industry spokespersons, to create newsworthy events, as by press conferences to announce new findings. It is worth noting that sources with the most access to the press do not always have the most reliable evidence; contrast the easy access of the smoking industry's scientific experts with the near-blackout of gay activists at the start of the AIDS crisis. Alternatively, reporters await accidents that reveal unanticipated risks. But here, finding the apparently most clear-cut, immediate, and easily described possible threats to the lowest-common-denominator "general public" results in oddities, as in the early '80s when several cyanide-laced Tylenols occasioned more coverage than the early phases of the AIDS epidemic, apparently limited to isolated groups. Above all, as Klaidman has noted in previous writings, the journalistic passion for hard-and-fast factuality makes risk assessment into a far less tentative business than it actually is, given how scientific admissions of unknowability call the very enterprise of the news into question.

At his best, Klaidman reveals the unpredictable snowball effects of the interactions among political actors, journalists, and scientists, all with their own agendas and concerns. A particular gem is his description of how two entrepreneurial young senators in search of catchy "new ideas" pushed NASA scientist James Hansen toward ever more dramatic statements on global warming; journalists in turn downplayed the leaps of inference underlying Hansen's statements in order to get the headlines and lead the news. Yet Klaidman ends up hedging his bets on today's interpenetration of politics and science. Given that the scientific sources most relied upon, such as the Surgeon General or the director of NIH, are simultaneously scientists and political appointees and that medical and scientific research is extraordinarily dependent on government financing, how helpful is Klaidman's admonition (p. 232), "Do not confuse politically motivated characterizations of health risks with science?"

As Klaidman argues, journalistic effects are crucial not merely because the public relies upon the news for risk assessment but because the media establish a context in which political and scientific decisions about risk and health take place. But Klaidman unfortunately stops short of discussing how the media affect the very process of science itself. Scientists themselves have a stake in the news coverage of their objects of study, which could affect not just public awareness but their ability to garner the resources necessary to continue doing science. Likewise, as a recent study published in the *New England Journal of Medicine* revealed, scientific attention to findings, as measured by journal citations, is sensitive to the press coverage thereof. Little wonder, then, that scientists and physicians devote increasing energy to managing their press in order to gain favorable publicity not just with the public but among their peers, to downplay dissent and to shore up their own authority against challenges inside and outside of science. In the wake of AIDS activism and patients' rights, these disputes should become increasingly public, and the interconnections of science, politics, and the news should only grow stronger. Thus, instead of Klaidman's unconvincing separation of politics and science in health news, perhaps we would be better off with his later advice (p. 234), "Assume that there are no disinterested parties."

TIMOTHY E. COOK
Department of Political Science, Williams College, Williamstown, MA 01267

Questions about Parasitism

Parasite-Host Associations. Coexistence or Conflict? CATHERINE A. TOFT, ANDRÉ AESCHLIMANN, and LIANA BOLIS, Eds. Oxford University Press, New York, 1991. x, 384 pp., illus. $72. From a congress.

Parasites, *sensu latissimo*, include not only the microorganisms (microparasites) and animals (macroparasites) of traditional parasitology but also plant pathogens and even many herbivorous insects. The literature on herbivore-plant interactions, with which I am most familiar, is largely divorced from the literature on parasitology, but many of the same ecological and evolutionary questions apply to both kinds of interactions. Among these are whether or not parasites limit host population densities and whether or not the associations are demographically stable. The evolutionary questions revolve around concepts of coevolution. Do parasites and hosts engage in indefinitely escalated "arms races?" Do these frequently lead to

extinction? If coevolution attains stability, what is its cause: impregnable host defenses, or the evolution of submaximal virulence by the parasites? Is it true, as parasitology traditionally held, that parasites evolve toward benign coexistence, and if so, is this brought about by traditional natural selection, group selection, or species selection (that is, the extinction of unstable, excessively virulent associations)? Is the evolution of host specificity in parasites attributable to selection against greater host range, because of fitness "costs," the nature of which is obscure, or simply to lack of selection for greater host range, owing to infrequent opportunity to colonize new hosts? Has host specialization enhanced the rate of diversification of parasites, relative to that of free-living organisms? Has parasitism influenced the evolution, in hosts, not only of defense systems but also of other features such as life histories and breeding systems?

This volume, composed mostly of papers stemming from a symposium at the Ninth International Congress of Comparative Physiology, represents an attempt to bring physiological parasitologists together with ecologists and evolutionary biologists in the hope of directing joint attention to such questions. Except for a chapter by Crawley and Pacala, who present a most interesting model of how even slight differences in resistance to insects among competing plants can determine coexistence or competitive exclusion, the volume treats only traditional parasite-host systems. (Toft includes some discussion of insect-plant systems in a chapter on diversity.) The contributions by physiologists, on which I am unqualified to comment, include a wealth of fascinating information on topics such as metabolic deficiencies and other physiological dependencies in parasites (Cheng, Crompton, Wang), alternative developmental pathways (Hawdon and Schad), immunological and other mechanisms of host defense (Bayne, Brossard *et al.*), the outlandish molecular defenses of trypanosomes against immune systems (Wang), and physiological changes during infection, which population models will have to take into account (Castro). The ecological and evolutionary contributions include models of population dynamics and population genetics (May; Godfray and Hassell), genetic considerations of coevolution (Dobson and Merenlander), and considerations of the evolution of parasite life cycles (Combes) and the impact of parasitism on hosts (Keymer and Read, Harvey *et al.*).

The symposium may have achieved its goal of fostering the interchange of concepts and information, but on the whole the volume illustrates the conceptual gap and the disparity of subject matter that persist between the two parties and the paucity of information and empirical research programs needed to answer the questions posed above. As May says, "The one thing that both theory and examples from the natural world make clear is that parasites do not necessarily evolve toward harmlessness and cooperation," but this seems still not to be universally appreciated in parasitology. Conspicuously absent from this book is any evidence that host-parasite systems evolve toward lower virulence over time; an obvious approach, that is, mapping host associations and degree of virulence onto a phylogeny of a group of parasites, has apparently not been attempted. Phylogenetic thinking, in fact, is poorly represented; for example, it would be critical to any attempt to determine, as does Toft, whether parasites have unusually high rates of diversification. (One way to do this, contrasting the diversity of parasitic versus free-living sister groups, has been adopted, in work as yet unpublished, by C. Mitter and his colleagues at the University of Maryland; they find little evidence of greater diversification rates in parasites.)

Similarly, techniques of population biology that have proven useful in studies of insect-plant interactions await application to such problems as the host specificity of parasites and limits on their adaptation to host defenses. Schistosomes and some other helminths, at least, frequently enter nonhosts and die (Combes), raising the question why they have not evolved either the capacity for discrimination or adaptability to more hosts. A few studies show that parasites and hosts have genetic variation in properties affecting adaptation to each other (Dobson and Merenlander, Godfray and Hassell), but apparently no one has tested for negative genetic correlations indicative of "trade-offs"

Vignettes: Gustatory Excursions

We knew that the killer bee had indeed become America's favorite pop insect when Killer Bee Honey appeared on the market a few years ago. This product was marketed by a journalist (call him Ed), who has made a minicareer out of the bees. When our team was working in French Guiana in 1976, Ed first visited us as a reporter for *Rolling Stone* . . . . Like many of the reporters who came to French Guiana, Ed was impressed with his own bravery at putting "his life on the line to learn the *truth* about the killer bees," as he modestly put it in his article's headline. One of our favorite journalist-baiting routines in those days was passing out samples of honey from our hives and suggesting that someone could make a "killing" by bottling and marketing killer bee honey. Ed took this idea seriously. About a year later . . . Killer Bee Honey hit the market. It sold for almost a dollar an ounce and came with a brochure that enjoined the consumer: "As you taste this honey, remember the lives it has cost. And then enjoy it. If you can." Ed went around the country in a beesuit and veil, promoting the product, but the novelty quickly wore off. One food critic described the honey as having "the taste of molasses and silage or hay in a country barn." Killer Bee Honey was a failure.

—Mark L. Winston in *Killer Bees: The Africanized Honey Bee in the Americas* (Harvard University Press)

Back to the here and now with the promised guidance for cooking heart, either what you have left over from your anatomical explorations or if you want to eat cheap red meat without worrying about your own heart or coronary arteries. . . .The basic culinary problem isn't the muscle, it's the other main structural component of heart, a protein called *collagen*. . . .

This ropey material . . . is the very essence of toughness. Roast or grill heart, and you've got a jaw-wearying product. You have to do a mild version of what the gluemakers do, solubilizing the fibers by chopping up the long molecules. This process is termed *acid hydrolysis* since it amounts to inserting water molecules at break points under acidic conditions. . . .The choice of acids is more cultural than critical, with vinegar, lemon juice, and tomato sauce as common contenders for the task.

—Steven Vogel, in *Vital Circuits: On Pumps, Pipes, and the Workings of the Circulatory System* (Oxford University Press)

in adaptation or explored molecular or other mechanisms that might cause trade-offs. Trade-offs are central to current thinking not only about specialization and the limits to coevolution but also about the persistence of genetic variation in parasite-host interactions (Godfray and Hassell).

This volume may not fully reflect the state of its subject: for example, only May raises (and does not fully explore) the important point (taken up elsewhere by authors such as D. S. Wilson, P. Ewald, and H. Bremermann) that if many genotypes of a parasite infect individual hosts, the evolution of greater virulence is to be expected, unless it is strongly opposed by group selection (a term not found in this book). Overall, this volume strikes one as a typical symposium proceedings: a highly uneven, heterogeneous conglomerate, to be mined for the conceptual and empirical nuggets from which an evolutionary parasitology may yet be melded.

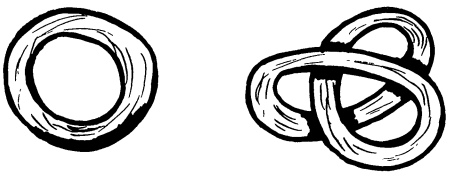
DOUGLAS J. FUTUYMA
Department of Ecology and Evolution, State University of New York, Stony Brook, NY 11794

Topological Ramifications

Knots and Physics. LOUIS H. KAUFFMAN. World Scientific, Teaneck, NJ, 1991. xii, 538 pp., illus. $65; paper, $34. Series on Knots and Everything, vol. 1.

During the last eight years a combination of excitement and bewilderment has enveloped much of the world of academic mathematics. In the beginning, V. F. R. Jones discovered a very simple but totally new way of associating a polynomial to any link of ordinary loops of string. That contribution to topology and knot theory was interpreted in terms of statistical mechanics, extended via the representation theory of algebras, and then amplified through the use of the methodology of quantum field theory and the language of differential geometry to produce results in the theory of manifolds. All these diverse subjects were thrown into a common turmoil with repercussions in many other parts of mathematics and theoretical physics.

In this book Louis Kauffman tackles all of this, and more besides, starting from very little indeed. So formidable a task is made possible by his cheerful approach of studied informality. His aim is to communicate and to teach; clearly he has had a lot of fun working in this area, and he is happy to pass on his enthusiasm. The first impression, on opening the book, is that it is awash with neat diagrams drawn with a thick pen. Not numbered, they form part of the text, often part of a sentence. But then the subject of discussion is usually how to combine, mathematically, little two-dimensional pieces of geometry; so why not draw them? The result is a very readable introduction to recent research on the interaction between mathematics and mathematical physics. The approach may, at times, seem elementary to those who already know much about the subject in hand. However, devotees of dreary sequences of symbols might reflect upon the fact that it was by manipulating little pictures that Kauffman was able both to produce the most stunning of the few known applications of the Jones polynomial (the solution of one of the 19th-century conjectures of P. G. Tait about ways of drawing alternating knots) and to discover one of its generalizations.



Two unknots. "For topology, the mathematical advantages of the closed form are overwhelming. We have a uniform definition of a knot or link and correspondingly, a definition of **unknottedness**. A standard ring, as shown [above left] is the canonical unknot. Any knot that can be deformed to this ring (without tearing the rope) is said to be unknotted." [From *Knots and Physics*]

Trefoil and its mirror image. "I wish to emphasize the advantages of the closed loop form in doing experimental topological work. For example, one can form both the trefoil T . . . and its mirror image T^* . . . . The trefoil T **cannot** be continuously deformed into its mirror image T^*. It is a remarkably subtle matter to prove this fact. One should try to actually create the deformation with a model—to appreciate this problem." [From *Knots and Physics*]

The first part of the book describes combinatorial knot theory and ways of associating polynomials to knots and links together with some applications. Physics begins to appear with states models for these invariants, with Feynman diagrams, and with discussion of the Yang-Baxter equations. Wherever possible a diagrammatic interpretation of a tensor is used, and that approach extends even to a description of the Drinfeld quantum-double method of solving those equations. The three-manifold invariants of E. Witten are described in a section entitled "Integral heuristics" that features the Chern-Simons operator used as a Lagrangian. The Temperley-Lieb algebra makes frequent appearances; it is used to give a very elementary proof of the existence of those three-manifold invariants ($SL(2)_q$ case only) and later, in part 2, to establish the Turaev-Viro invariants using an extremely palatable version of the quantum $6j$ symbols. Here the presentation could have been improved had the book waited a few months; that is the drawback of writing on material so close to the frontiers of research.

Part 2 claims to be "devoted to all manner of speculation and rambling." It is, in a way. The $6j$ symbols appear as an ingredient of generalized Penrose spin networks. There are also detailed instructions for constructing, from cardboard and string, a machine to demonstrate the nature of the quaternion group; a discussion of the chromatic polynomial of a graph and its relationship to the Potts model of thermodynamics; some words about the efficacy of hitches for securing a horse with real rough rope; and a discussion of the relevance of knots in the theory of DNA and in dynamical systems. This peculiarly provocative potpourri betrays its conception in the form of individual lectures; it is fairly easygoing and is a rich source of ideas for student projects or tea-time conversation.

The book contains a few mistakes; it has a fine set of references with abysmal nomenclature; and it contains considerable idiosyncrasy. Nevertheless it succeeds in telling the story, in a way that maximizes its accessibility, of how knots and physics have recently come together.

W. B. R. LICKORISH
Department of Pure Mathematics and Mathematical Statistics, University of Cambridge, Cambridge CB2 1SB, United Kingdom

Books Received

Additive Number Theory of Polynomials Over a Finite Field. Gove W. Effinger and David R. Hayes. Clarendon (Oxford University Press), New York, 1991. xvi, 157 pp., illus. $45. Oxford Mathematical Monographs.

Advanced Wastewater Treatment and Reclamation. J. Kurbiel, Ed. Pergamon, London, 1991. xii, 294 pp., illus. Paper, $105. Water Science and Technology, vol. 24, no. 7. From a conference, Cracow, Poland, Sept. 1989.

Analogue Electronic Circuits and Systems. Amitava Basak. Cambridge University Press, New York, 1992. xiv, 361 pp., illus. $89.95; paper, $34.95. Electronic Texts for Engineers and Scientists.

Antigen Processing and Recognition. James McCluskey. CRC Press, Boca Raton, FL, 1991. viii, 257 pp., illus. $139.95.

Arctic Ecosystems in a Changing Climate. An Ecophysiological Perspective. F. Stuart Chapin III *et al.*, Eds. Academic Press, San Diego, CA, 1992. xviii, 469 pp., illus. $95. Physiological Ecology.

Banach Spaces for Analysts. P. Wojtaszczyk. Cambridge University Press, New York, 1992. xiv, 382 pp., illus. $89.95