

Baby love

Cruel experiments on monkeys showed that infants need affection.

Love at Goon Park: Harry Harlow and the Science of Affection
by Deborah Blum
Perseus/Wiley: 2002/2003. 336 pp. \$26/£17.99
Alison Jolly

"You cried and cried and cried, and I wanted so much to comfort you, and I knew that I just mustn't pick you up and hold you. That's what they told me, so I believed them." That was a mother in my own family, apologizing decades later to her adult daughter. The mother still suffered because she had not dared to comfort her baby.

In *Love at Goon Park*, Deborah Blum tells the extraordinary story of Harry Harlow. It is a nuanced and brilliant evocation of a major figure in psychology who dared to challenge the orthodoxy of his time. Harlow said that babies need love, that they are born needing love, and that without contact, comfort and social responsiveness, primates, including humans, grow up as incomplete beings — if they live to grow up at all. But memories are short. Those who remember Harlow now mostly have memories of him as a man who tortured baby monkeys by removing them from their mothers and giving them surrogate wire or cloth dummies with bicycle-reflector eyes. Yes, Harlow's experiments were cruel. Yes, he knew they were cruel; he shoved that in people's faces. But he did them to show the appalling cruelty of the prevailing dogma on how to treat human children.

Blum reminds us of that dogma. John B. Watson, the founder of behaviourism, proclaimed in *Psychological Care of Infant and Child*, his best-selling childcare book of 1928: "You will soon be ashamed of the mawkish, sentimental way you have been handling your child." Behaviourists thought that we are born blank slates, formed only by conditioned reward and punishment. Milk was the reward; the baby simply learned to associate his mother with milk. Over-mothering was thought to produce over-dependent offspring. With the dawning of an understanding of hygiene, human contact was seen as passing dangerous germs. In families there was usually some compensation, but in hospitals and orphanages, babies could be kept in solitary confinement, away from care-takers and each other. Mysteriously, the infants seemed to lose interest in life, and many died. The remedy prescribed was ever more sterile isolation.

In England, the revolt against this view was led in the 1950s by John Bowlby and James Robertson. Many psychologists, though, saw the campaigners as soft, sentimental and unscientific. It was Harlow's hard science that broke the barriers of doubt. He showed conclusively that baby rhesus monkeys could not be conditioned to love a wire mother, even if she was the one equipped with a milk bottle — they clung to warm cloth instead. They would work to open a window just for a glimpse of their cloth 'mother'. They ran to the cloth mother if they were terrified by something new, such as a wind-up toy bear banging on a drum, and were comforted by 'her' presence. Monkeys raised in isolation, without contact, grew up insane, unable to deal with other monkeys. Some were unable to mate unless fastened in what Harlow, with characteristic bluntness, called a 'rape rack', and then they were likely to abuse or murder the resulting child. Of course it is obvious now. It just wasn't obvious then.

Who should read this book? Anyone working with small children, and many who are raising a small child — and anyone interested in authority in science. They should do so not just because it is beautifully and intelligently written, with a journalist's verve and a professional's attention to source and detail, but because of the questions it raises. How could the people who preceded Harlow have been so wrong? How could the antidote be a man who drove monkeys insane? Science is often blamed for its service to evil societies, Nazi eugenics or the hydrogen bombs of the Cold War, but this is a story of science unconstrained, creating its own

perversions. As Harlow put it in 1953: "It is my belief that if we face our problems honestly and without regard to, or fear of, difficulty, the theoretical psychology of the future will catch up with, and even surpass, common sense." Let's hope he was right. ■

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Immunology tomorrow

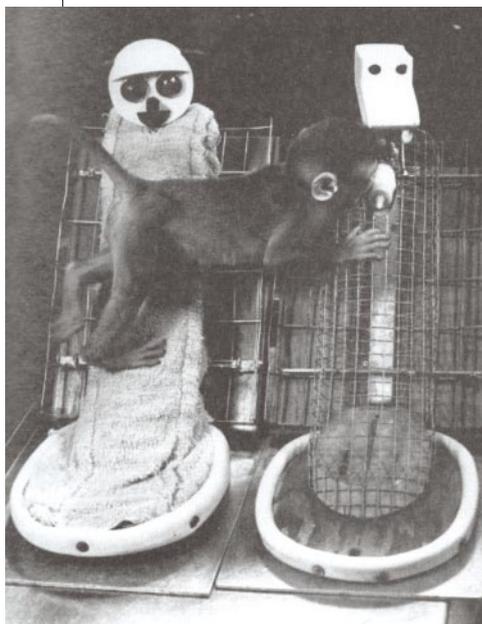
Immunology and Evolution of Infectious Disease
by Steven A. Frank
Princeton University Press: 2002. 352 pp.
\$75, £52 (hbk); \$24.95, £17.95 (pbk)
Franziska Michor & Martin A. Nowak

It was Charles Darwin who observed: "It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change." In the ever-changing world of the immune system, neither size nor complexity of a parasite counts, but adaptability.

In *Immunology and Evolution of Infectious Disease*, Frank's multidisciplinary approach to infection dynamics brings together population ecology, immunology and evolution. He links evolutionary change of parasites to molecular details of immune recognition and to genetic variation of the host population. Newcomers are offered a comprehensive introduction to basic questions of immunology, as well as a synthesis that cuts across large areas of biology. Specialists will find detailed discussions of specific infectious agents from a highly original, evolutionary perspective, and inspiration for future research.

The structure of the book shows how different subjects must be integrated for comprehensive understanding of parasite variation. First, it gives a general introduction to vertebrate immunity and antigenic variation. There follows a discussion of molecular processes of immune recognition and parasite escape. Frank then focuses on the dynamics of a single infection and examines genetic variation within populations of hosts and parasites. Finally, he discusses methods to study the evolutionary dynamics of antigenic variation. As the book progresses, the complex issues of evolutionary change are related back to the structural and biochemical properties of molecular recognition introduced earlier in the book.

Antigenic variation benefits parasites by



Creature comforts: baby monkeys held on to the cloth mother (left) whenever they could.



Egon Schiele died from Spanish 'flu in 1918, days after painting *Die Familie*, which includes a self-portrait. A shift in antigen enabled the influenza A virus to evade the immune system, killing 20 million people.

allowing a longer period of infection within an individual host and by facilitating re-infection of hosts with immune memory. It also increases the abundance of parasites within an infected individual and thereby enhances infectivity. The human immunodeficiency virus (HIV) is discussed as a primary example of a parasite that evolves within a single host. Antigenic variation of HIV leads to escape from cytotoxic T cells and neutralizing antibodies. It augments viral load and thus accelerates the destruction of CD4 cells. There is a highly dynamic balance of power between HIV and the immune system, which is slowly shifted as a consequence of virus evolution to allow the virus to escape from immune recognition and to reproduce more efficiently in a broader range of different cells. Thus, virus evolution within individual hosts may well be the cause of disease progression, as was first proposed some ten years ago.

Parasites in general have found an amazing diversity of processes by which they can escape immune recognition. Mechanisms of generating antigenic variation include baseline mutation during replication, hypermutation of antigenic loci, and switching between archival variants. The analysis of infection dynamics within individual hosts includes hepatitis C virus (HCV), human T-cell leukemia virus (HTLV), and the malaria parasite *Plasmodium falciparum*.

Frank examines variability in parasites and hosts across entire populations, discussing genetic differences among hosts in their immune responses and immune memory profiles. The overview of the methods for studying evolutionary change is exceptional. Immunological and phylogenetic classification of virus variants provides evidence for selection in genetic data of influenza A virus and HIV. Experimental evolution of foot-and-mouth disease virus is discussed, as well as selection for escape from cytotoxic T cells.

This book considers the natural history of antigenic variation at the molecular, population and evolutionary level. Through its novel way of integrating all factors that affect antigenic variation in pathogen biology, it provides new insights into the evolution of infectious disease. It is a rich source of ideas for scientists working in immunology and molecular biology as well as evolution. Frank defines the key problems for the future study of parasite variation and escape from host recognition. For example, he suggests studying experimentally the relations between infection length, parasite abundance and transmission success to learn how selection shapes antigenic variation within hosts.

To determine whether antigenic selection shapes phylogeny, mathematical models can clarify the relations between antigenic and

phylogenetic classifications. Comparison of parasites in different hosts or geographical locations can reveal the effects of MHC diversity on antigenic variation.

The book brings home the point that the immunology of tomorrow will greatly benefit from making contact with structural, genomic, evolutionary and mathematical techniques. Academic institutions and granting agencies worldwide have started to predict such a multidisciplinary future for the whole of biology. Read this book and 90% of your multidisciplinary grant on any topic of infectious disease is already written. ■

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A drink to
your health!

Wine: A Scientific Exploration
edited by Merton Sandler & Roger Pinder
Taylor & Francis: 2002. 336 pp. £65, \$65

John Mowbray

In a mildly puritanical culture, where indulgence in alcohol causes twinges of guilt, there is a particular delight in finding that a much-used recreational drug may confer health benefits. The critical evaluation of the beneficial and possible deleterious effects of wine and alcohol consumption on humans is one theme of this multi-authored compilation on wine.

The second theme is the scientific basis and evolution of viticulture and wine production. The tale of the infection of European vines by the American phylloxera aphid and the reluctance of the French central authorities to accept the findings of compatriots from the Midi region, as well as the continuing problems with this infestation, make fascinating and instructive reading.

The currently controversial role of biotechnology in wine production and the possible benefits and limitations of genetic engineering are discussed clearly, as is the revolution in identifying the parentage and identification of vine species. The scattered contributions linking the properties of wine to its medicinal effects are covered by chapters on the production and physiological roles of polyphenols and flavonoids in the grape, and by an illuminating and succinct history of wine as a medicine.

Regarding the medical benefits of imbibing wine, there is epidemiological evidence that moderate alcohol intake protects against coronary heart disease, and possibly