

Book Reviews

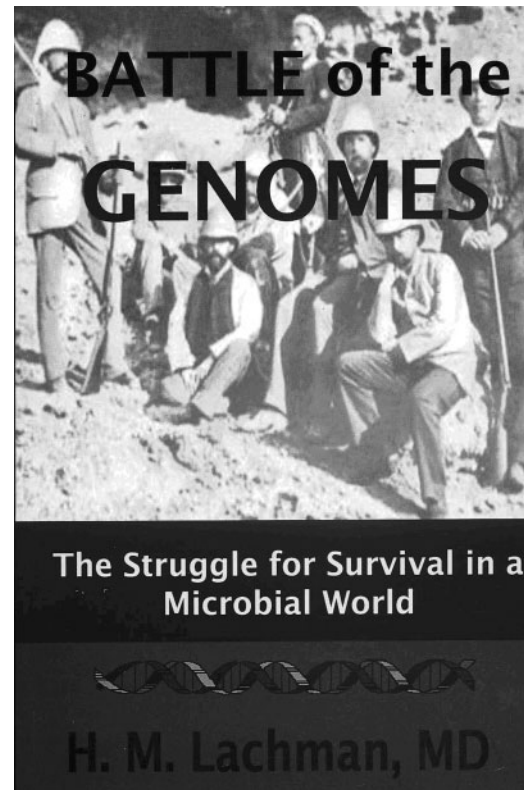
Battle of the Genomes: The Struggle for Survival in a Microbial World. *HM Lachman* Enfield, New Hampshire: Science Publishers, 2006, pp. 334, ISBN 1-57808-432-6.

'Battle of the Genomes' presents us with what, at times, seems like a rather traditional history of infectious disease—Hippocrates, Galen, Koch, Pasteur, Snow, Fleming, Jenner—all make their customary appearance. However, the book interlaces this conventional narrative with observations on molecular pathogenesis and the co-evolutionary struggle between humans and their parasites. The author extends the history of medicine to include the recent birth of molecular genetics, from the discovery of the double helix to the sequencing of human genome, and introduces the reader to the way in which our understanding of infectious disease has been advanced by an appreciation of genetics, evolution and molecular biology.

Starting with a brief overview of human microbiological flora and their impact on global health, the book takes time to introduce the basic concepts of DNA, genomes and gene expression, then goes on to describe the normal operation of the human immune system. Given the evolutionary advantages that micro-organisms have: short generation time, large population and high mutation rate, it becomes obvious that the immune system needs to employ evolutionary strategies (in antibody and T-cell receptor production) as well as barriers, toxins and memory, to fight back.

The chapters which follow focus on a number of major infectious diseases in turn, consider their history and pathogenesis, and discuss examples of genetic change, in both human and pathogen, that have shaped these stories. The book recounts the colourful history of malaria from Sumerian texts, till the medical discoveries of the modern world. The profound selection pressure of malaria is illustrated by the emergence of human genetic variants (each given a chapter) such as glucose-6-phosphate dehydrogenase deficiency, blood groups and sickle cell trait. The book goes on to consider gastrointestinal infections such as diarrhoeal disease, polio, cholera and typhoid, explaining the roles of blood group and HLA type, and the theory that mutations in the CFTR gene (responsible for cystic fibrosis) may have provided protection from fatal fluid loss. The book also focuses on HIV and the role played by the 32bp deletion of the CCR5 gene in disease progression, discussing the evidence for a possible selection pressure (plague or small pox, both of which have their own chapter) that has led to it becoming common in peoples of European origin.

Towards the end of the book the author considers the development of recombinant DNA technology, particularly the assistance, ironically, that bacteria and viruses have been in providing molecular tools, such as restriction enzymes, plasmids, bacteriophages and reverse transcriptase. This section describes the recent history of molecular genetics, focusing on events such as the race to clone the CFTR gene, the



public–private competition over the human genome and an alleged scientific fraud case at MIT. The book concludes by discussing the current progress being made in genetics, with the first tentative steps towards gene therapy, and the completion of the human, plasmodium and anopheles genomes. We are left with the optimistic view that useful interventions for infectious disease should soon arise from these approaches.

The book is stimulating, moving rapidly from historical accounts to current theories on molecular pathogenesis. In addition the book's central theme—that understanding genetics, particularly evolution, is critical to our understanding of infectious disease—is both valid and timely. Contemplating the big picture of infection and immunity, the field is replete with examples of evolutionary processes: bacterial resistance to antibiotics, HIV and antiretroviral therapy, mosquito adaptation to insecticides, immunoglobulin production in B cells, and the long-term evolutionary selection of human mutations that confer resistance to infectious disease.

However, this reviewer had a few frustrations with the book. The reliance on conventional historical narratives (lone heroes, great leaders and epic conflict) to describe past medical discoveries, although entertaining, seems an uncritical approach

to history. The application of similar tropes to 18th, 19th, 20th and 21st century research obscures the complex changes in scientific culture over that time. The author also seems compelled to pack in facts, both historical and biological, which unfortunately means the book sometimes reads like an undergraduate textbook (the segment on antibody subtypes is a good example: all five subtypes (A, D, E, G and M) are each introduced, their standard biological functions explained and then they are never mentioned again). Often I wanted the author to pause, leave out the next cluster of facts, and to explore the subject in hand. Many interesting ideas are touched on briefly but never expanded—what are the social and political implications of race for sickle cell research in the United States? What are likely to be the long-term consequences of the human genome being completed in part by private initiatives? On what time scale should we realistically expect molecular technologies to revolutionize the fight against infectious disease, given that many conventional

technologies (e.g. bed nets, hand washing) are available and underutilized?

Some medical historians (particularly those without a medical training) would find the book interesting and appreciate the chance to learn more about the 'biology of history'. However, the book is best recommended for medical and graduate students studying epidemiology, infectious disease or human genetics. These are audiences likely to benefit from revisiting their molecular biology, while learning about what John Snow did to the Broad Street pump.

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The Political Economy of Health Care. A Clinical Perspective.

Julian T Hart. The Policy Press, 2006, £14.99. ISBN 1861348088.

In Fahrenheit 451, Francois Truffaut's movie adaptation of Ray Bradbury's novel set in a future totalitarian state, where books are banned and burnt (451°F being the temperature at which paper starts to burn), members of the underground resistance each have the task of remembering one book, so that its content is kept alive and passed on for the future, to help the way to better times.

This book serves such a purpose. Written for students of health and caring professions, but also for anyone with an interest in the NHS, Julian Tudor Hart tells a story with a past, a present and a future—where the NHS has come from, what it has achieved, the threats to its future, and what that future might be. As he approaches 80, Julian Tudor Hart has lost little of his intellectual energy, passion or vision.

A contemporary, pioneering general practitioner, John Coope of Bollington, commented that one of Julian's talents was his nose for what mattered in the published literature, and in this book it is on display—an amazing range of pertinent references, collated over a professional lifetime, as general practitioner, epidemiologist, researcher, social advocate and polymath, committed to the appliance of science in the National Health Service. It is inconceivable that Google could assemble such a mix.

The book is worth reading for its footnotes alone—90 of its 264 pages of text are taken up by a glorious mixer of sources, illustrations, anecdotes, opinions and asides—an NHS miscellany—which the editors have had the good sense to leave alone.

That leaves 174 pages of text and argument, 'as slanted as a mountain slope, and exhilarating as a ski run down it.' The central thesis is clear. The NHS is a social institution based on

mutuality and trust, which cannot be understood or managed simply on financial or commercial terms. At its heart, the NHS produces social value, as a result of encounters between patients and professionals, to which both make an essential

