

## Genome: The Autobiography of a Species in 23 Chapters

by Matt Ridley

Harper-Collins, \$26.00, ISBN: 0-060-19497-9, 1999

Reviewed by Terence Kealey

Department of Clinical Biochemistry,  
University of Cambridge, Cambridge CB2 2QR, UK

Matt Ridley is an Oxford-educated zoologist who has turned to general science writing. His first book, *The Red Queen*, was an account of the work of William Hamilton, George Williams and others in modelling the influence of sex on the evolution of human nature. His second book, *The Origins of Virtue*, is recognized as a classic, and its description of the evolution of human altruism and of other complex drives has influenced policy-making, literature and general culture to a degree that few science books achieve. In his latest work, entitled *Genome*, he tackles molecular biology, and does so with characteristic wit—each chapter is dedicated to one chromosome pair. There are indeed 23 chapters in the book, but because each chromosome contains its fair share of genes, and because genes interact, Ridley selects modern molecular biology's best 23 stories without too literal an attachment to any particular chromosome.

The book starts at a rapid pace with the discovery of DNA: the story of its isolation by Friedrich Miescher from the pus-soaked bandages of wounded German soldiers in 1869, Oswald Avery's 1943 observation that DNA could transform *Pneumococcus* from an uncoated to a coated phenotype, and the immortal events of 1953 provide an exciting and even thrilling read. Ridley knows what to include. Who would have guessed that, in a letter to his uncle, Miescher himself had speculated that DNA might convey inheritance “just as the words and concepts of all languages can find expression in 24–30 letters of the alphabet” or that Avery had to undersell his nucleotide message for

fear of upsetting the then-dominant protein paradigm?

But the heart of *Genome* does not lie in history; rather, it lies in the contemporary. Literature from 1999 is referenced, and the range is remarkable—from the last universal common ancestor to the roundish flat worm to ribozymes. Also described, each with a dedicated chapter, are such topics as CAG repeats and Huntington disease; intelligence; the conflicting genetic explanations for homosexuality; Hox genes; the genetics of body odour; Tay-Sachs disease;  $\alpha$ -integrins and learning; p53, cancer and apoptosis; the genetic link between atherosclerosis and Alzheimer disease; and prions, Creutzfeldt-Jakob disease and bovine spongiform encephalopathy. And that is only a partial list.

The language is accessible, the metaphors are illuminating, and the tale is enlivened with anecdotes from the worlds of clinical medicine, zoology and evolutionary biology. Key researchers are described, and their motives, intriguingly outlined. The description of the science is accurate and informative, yet the implications are discussed in a wide context, as evidenced by a random selection from the index: Heisenberg W, Hill A, Hiroshima bombing, Hitler A, HIV, Holland B, Holmes O, Homeobox. Some of the chapters provide essays on important themes. We learn about the many hundreds of copies of reverse transcriptase genes that infest the human genome, as well as the many thousands of human endogenous retroviruses, LINEs, Alu elements, other transposons, microsatellites and other parasitic bits that make up to one-third

of our genome. Ridley uses these elements to discuss molecular parasitism within the context of parasitism in general.

James Watson described this book as “a lucid and exhilarating romp through our human chromosomes,” and he is right. This is the book to give to an intelligent person who knows something about life science, even if that knowledge is outdated or rudimentary, and who would enjoy accessing modern molecular biology without struggling through northern blots or X-ray diffractions. I gave a copy to an old classmate of mine, now an orthopaedic surgeon, and he loves it. But *Genome* also carries a deeper social message, which may explain why Ridley has critics; he is a libertarian in a genome community that contains many statisticians. The modern science of genetics may seem benign, but we often forget that it emerged out of a shameful past—eugenics—under the auspices of which over 100,000 individuals were compulsorily sterilized by the United States government, and in the service of which laboratories such as Cold Spring Harbor were created. In today's corporate world of huge government-funded grants and labs, many would like to forget that in Hitler-era Germany, more than half of all academic biologists joined the Nazi Party—a higher proportion than that of any other professional group—largely because of that party's support for genetics.

With a keen eye on the doctrine that knowledge is power, Ridley casts the enemies in *Genome* as those who would use the state to restrict individuals' access to their own genetic information and those who would exploit the state to control gene research or therapy. The heroes are voluntary organizations like the Wellcome Trust or the Committee for the Prevention of Jewish Genetic Disease, which has done much to eliminate Tay-Sachs disease and cystic fibrosis among Jews by premarital screening. Ridley is no mad anarchist, but a thoughtful libertarian who demonstrates that throughout history the balance between the powers of the state and those of the individual has been tipped too often, even within democracies, in favour of those with the big guns. Modern genetic research represents humanity's ‘cutting edge’ and is therefore inevitably political, despite what its practitioners might wish. For all the possible dangers of genetic determinism, in this remarkable book, Ridley demonstrates that social determinism is worse. □

