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Book Review

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Book Review

Erratum

The citation for this review is *3 RISK 259 (1992)* in most commercial databases.

THE CODE OF CODES: SCIENTIFIC AND SOCIAL ISSUES IN THE HUMAN GENOME PROJECT. (Daniel J. Kevles & Leroy Hood, eds., Harvard University Press 1992) [397 pp.] Contributors, figures, index, notes, preface, selected bibliography, tables. LC 91-38477, ISBN 0-674-13645-4. [Cloth \$29.95. 79 Garden Street, Cambridge MA 02138.]

This collection of essays is in three parts: (1) "History, Politics, and Genetics," (2) "Genetics, Technology, and Medicine," and (3) "Ethics, Law, and Society." In the preface, the editors begin by noting that a mere 1% difference between our and ape genomes is much of the "grail of human genetics" and end by stating the objective of stimulating thought about the human genome project.

The first essay should be of wide interest. It describes how initial attempts to apply genetics to humans led in the U.S. to, e.g., sterilization laws¹ and later to the Holocaust. This, in turn, led to increasing scientific hostility and so tarred human genetic research that only slowly have these associations been overcome by work, e.g., on sickle cell anemia. It also recounts how, following identification of the structure of DNA and an invention allowing the isolation and the determination of functions of single human genes, it became possible to sequence the entire human genome. One of the more interesting aspects of this chapter, is its discussion of the mid-1980's origins of the project within the Department of Energy and turf battles with the National Institute of Health (NIH) that resulted, in 1991, with NIH receiving the lion's share of funding and the task of human genetic mapping.

Following a chapter on the technological history of gene mapping and sequencing, the second part the book describes what is necessary to determine our "genetic blueprint" with about three billion DNA base pairs. Three discrete phases are needed to reach that goal: breaking all of the chromosomal DNA into fragments for physical mapping, sequencing of all base pairs of the chromosomes, and, finally, understanding the function of each gene. It is estimated that these phases will require, respectively, one hundred, three to ten thousand, and one million person-years each.

¹ These were upheld in *Buck v. Bell*, 274 U.S. 200 (1927). At 207, Justice Holmes, writing for the majority, opined that "Three generations of imbeciles are enough."

The second part concludes with an essay by the initial project director, James Watson, in which he extols the project's potential for understanding and curing conditions such as Alzheimer's disease, cystic fibrosis and alcoholism — as well as its cost-effectiveness compared to the cost of the developing palliatives. Watson also expresses his inability to reconcile patenting of DNA sequences with world-wide needs. Ultimately, of course, patenting DNA sequences became the center of NIH controversy and sparked his resignation.²

Watson's essay thus serves as a good lead into a final set of papers that explore potential ethical and social consequences of the genome project. As those papers reveal, the project has potential not only to yield technological solutions for pressing problems but also to outstrip our ability to regulate the technology. For example, it does not take much imagination to envision a genetic underclass created by our capacity to predict but not prevent various conditions, its members being, e.g., shunned by insurers, employers and others.*

Although papers tend to repeat basic information, this well-documented book is highly recommended for its introduction to the technical and social aspects of an important and rapidly-evolving field.

Bradley J. Olson[†]

² See, e.g., Leslie Roberts, *Why Watson quit as project head*, 256 *SCIENCE* 301 (1992).

Ironically, Dr. J. Craig Venter, having a technique for identifying thousands of genes per month, subsequently left NIH to set up his own laboratory. See, e.g., Gina Kolata, *Biologist's Speedy Gene Method Scares Peers But Gains Backer*, *New York Times*, July 28, 1992, at C1, col. 2.

* See, e.g., the review of *RISKY BUSINESS...*, *infra* at 267 (ed.).

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