

BOOK REVIEWS

**COPING WITH METHUSELAH:
THE IMPACT OF MOLECULAR BIOLOGY
ON MEDICINE AND SOCIETY**

Edited by Henry J. Aaron and William B. Schwartz.
296 pp., illustrated. Washington, D.C.,
Brookings Institution Press, 2004. \$48.95 (cloth); \$19.95 (paper).
ISBN 0-8157-0040-7 (cloth); 0-8157-0039-3 (paper).

COPING WITH METHUSELAH IS AN IMPORTANT book about the future of the human lifespan, the possibility of a revolution in longevity (i.e., a significant extension of life), and the social and economic consequences that would result from living much longer lives than we do today.

The book is the product of the collaborative efforts of 17 scholars, including three medical scientists (Drs. William B. Schwartz, John T. Potts, and Alan M. Garber); a large team of reputable economists, most of whom are from the Brookings Institution; an ethicist, Alexander Capron, from the University of Southern California; and a journalist, Nicholas Wade, of the *New York Times*.

To transform the diverse expert opinions into a coherent book, two meetings among the contributors were organized: a planning meeting, which was held at Stanford University in 2001, and a conference, which was held at the Brookings Institution in Washington, D.C., in 2002. In addition to these efforts to harmonize the experts' opinions, the editors have provided six of the book's seven chapters with accompanying detailed comments (which are sometimes as long as the chapters they complement). These have been written by other experts — in most cases, former discussants and opponents at the earlier meetings — which makes for particularly interesting and useful reading because of the diversity of opinions.

The book consists of two parts: one on the likelihood of a revolution in longevity, which is very interesting to read and which I would recommend to everyone, and a larger and more specialized part written by economists that addresses the crucial question "Can we afford longevity?" These are complex issues that relate to the changes in health care, the labor market, and the financing of Social

Security, Medicare, and Medicaid — all very important topics — that nonetheless may be challenging for noneconomists to understand.

The authors admit that there are no simple solutions to the forthcoming socioeconomic problems caused by an aging population, and, therefore, they consider several different scenarios and strategies to cope with the economic and health consequences of a further extension of life. The book suggests that life extension will not necessarily lead to economic disaster and a bankruptcy of the social support systems if society has properly prepared for the anticipated revolution in longevity by a gradual increase in the retirement age. This increase could be achieved in a gentle way by the creation of economic and other incentives for later retirement and by the establishment of a working environment that is friendlier to seniors. Contrary to common wisdom, the age at retirement is not written in stone; instead, it has changed dramatically in recent history. For example, the rate of participation in the U.S. male labor force at age 65 declined in the 20th century, from 75 percent in 1910 to 30 percent in 1990; now this trend seems to have reversed, as demonstrated by Gary Burtless in his chapter, "Labor Market Effects of Dramatic Longevity Improvement."

The most enjoyable part of the book is the editors' 15-page introduction, which nicely summarizes the major ideas and findings and clearly spells out the possibility of a revolution in longevity. Aaron and Schwartz conclude the introduction by writing, "We think that the scenario addressed in this book — a world in which living to a hundred or even beyond will one day be common if not typical — is a reasonable extrapolation of the revolution in molecular biology that is only now gaining momentum."

Also enjoyable is chapter 1, "The Impact of the Revolution in Biomedical Research on Life Expectancy by 2050," by Potts and Schwartz. This chapter, which is followed by reinforcing comments by Wade, describes the forthcoming arsenal of scientific methods and techniques in regard to regenerative and anti-aging medicine; these methods and techniques lead many scientists to believe that a healthy extension of life is not a fantasy any longer,

but a feasible scientific project. This chapter may be a good starter for students and physicians.

"The Changing Face of Health Care," by Alan M. Garber and Dana P. Goldman, is followed by a different perspective in John B. Shoven's chapter, "The Impact of Major Improvement in Life Expectancy on Financing of Social Security, Medicare, and Medicaid." Whereas Shoven provides an optimistic scenario on the basis of current favorable trends of declining disability rates among seniors, Garber and Goldman present alarming data showing that disability rates are increasing for all adults under the age of 60. Obesity, diabetes, and asthma are on the rise, and this fact could destroy the hope that the current decline in disability rates among seniors will continue in the long term.

All physicians, no matter how busy, should take a look at the introduction and the first chapter of this important book. There is no doubt that it will be extensively cited and used in all subsequent debates on the future of medicine and sustainable health care.

Leonid Gavrilov, Ph.D.

National Opinion Research Center at the University of Chicago
Chicago, IL 60637
gavrilov@longevity-science.org

**BIOMEDICAL PLATFORMS:
REALIGNING THE NORMAL
AND THE PATHOLOGICAL
IN LATE-TWENTIETH-CENTURY
MEDICINE**

(Inside Technology.) By Peter Keating and Alberto Cambrosio.
544 pp., illustrated. Cambridge, Mass., MIT Press, 2003. \$55.
ISBN 0-262-11276-0.

THIS BOOK IS A STRAIGHTFORWARD before-and-after narrative history. Before the 1970s, leukemias and lymphomas were diagnosed by morphologic means, by inspecting stained blood smears microscopically and estimating the developmental stage of the cells. The presence of a large number of early-stage cells meant a fast-growing tumor and a bad prognosis. From about the mid-1970s onward, flow cytometry and the fluorescence-activated cell sorter entered the picture, at first as an experimental system and then gradually as the centerpiece of a new vantage point from which to quantify maturing cells by immunophenotyping and to assess their numbers at key stages of the disease. In

this system, cell-surface markers, defined as molecular entities and detected by labeled antibodies flowing through a nozzle past a counter, took the place of the stains, the oil-immersion lens, and the pathologist's experienced eye. Authors Peter Keating and Alberto Cambrosio call this a new biomedical platform.

They discuss the transition from the use of antiserum, which is raised in rabbits and carefully absorbed to increase specificity, to monoclonal antibodies of exquisite specificity. Along with such antibodies, the flow cytometer evolved from a big, expensive, virtually homemade machine to the neat black box of the later bench models. The authors discuss the transition from the pathology laboratory to the specialist department and the problem of handling museum collections of reference slides of leukemia and lymphoma cells. They also delve into the emergence of a new concept of cell membranes as a kind of undersea garden that is alive with waving fronds, the "clusters of differentiation," or CD markers, that can be detected by the new cytometric system.

The authors provide data from Britain, Canada, France, and the United States, with the use of interviews, archives, technical information, and sociological analysis. *Biomedical Platforms* is the result of many years of research and is so packed with technical, social, and philosophical detail that virtually every line represents a research project and an insight. It reminded me of the *lectio continua* of the Bible in a Benedictine monastery: every evening, a little bit to meditate on overnight.

The sightlines run all the way from the molecular biology of normal cellular maturation to pathology, technology, institutions, biotechnology companies and instrument makers, standardization, and the clinic. The authors inquire about whether there is such a thing as a pathologically specific marker or whether all markers are normal but have altered quantitative relations. It is interesting to note that the book says very little about the acquired immunodeficiency syndrome, in which the cellular markers derived from flow cytometry defined the disease in the early 1980s, before tests for the virus were established. In this case, there was no pre-existing morphologic technique to push aside, no before and after. A finding of a low number of CD4 T cells defined the disease; there was no pathological specificity, only a quantitative change from the normal.

Whom will this book interest? That is not easy