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## Book Reviews

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# The uneven frontier of American science

by Warren J. Hamerman

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### Frontiers in the Chemical Sciences

ed. by W. Spindel and R.M. Simon

The American Association for the Advancement of Science (AAAS), Washington, D.C., 1986  
592 pages with index, \$17.95 paperbound, \$29.95 hardbound

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### Biotechnology, the Renewable Frontier

ed. by D.E. Koshland, Jr.

AAAS, Washington, 1986  
384 pages with index, \$17.95 paperbound, \$29.95 hardbound

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### AIDS

ed. by Ruth Kulstad

AAAS, Washington, 1986  
653 pages with index, \$19.95 paperbound, \$32.95 hardbound

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Each of these three books consists of article reprints first published in *Science*, the official journal of the American Association for the Advancement of Science (AAAS), between 1982-85 and therefore gives a snapshot of how the American scientific establishment evaluates the research advances in the areas of chemistry, biology, and AIDS research during these critical years.

Of the three scientific domains covered, I was surprised to discover that the *Chemical Sciences* anthology presents the most dramatic and exciting research because it was the most "tuned in" to the modern laser age. Physical chemists studying the dynamics of chemical reactions have experienced a revolution by using lasers and other precisely tuned coherent radiation sources. Laser pulses can create initial chemical reaction states which additional laser pulses can

"interrogate" or probe. For example, high-power ultraviolet lasers can generate large numbers of fast hydrogen atoms which can be studied as they collide with simple molecules. Lasers have also been used to study the dynamics of single molecules in the gas phase. Short-pulse lasers down to the range of femtoseconds (or a tiny fraction of a second which is one second divided by  $10^{15}$ ) open new doors for study. Other broad areas discussed include chemical analysis, theoretical chemistry, chemical catalysis, organic synthesis, the chemistry of life processes, and the chemistry of new materials. Among the new materials discussed are bioglass (surface-active glass), conducting organic solids, microelectronics, and new polymers with extraordinary physical properties.

In contrast, unfortunately, the volume on *Biotechnology* lacks both an insightful scientific orientation and a breadth of scientific selections off the narrow tight-wire of molecular biology. Instead, the book is deluged with pieces on molecular biology technique, technologies, and engineering to the imbalance of basic science itself. Topics covered include immunology, developmental biology and cancer, hormones and metabolism, food and pharmaceutical applications, virology, plant sciences, and behavior and sensory phenomena. For some inexplicable reason, the editor chose to ignore rich areas of research where biology and physics intersect, such as magnetic resonance and particle imaging, bioelectromagnetics, laser research of living systems, basic photobiology research into photosynthesis, and the geometry of DNA and other key biological molecules.

The third volume on AIDS, ironically, which one would have suspected to have the broadest interest, is, in fact, the most narrow and straitjacketed scientifically. This reflects the fact that we have not mobilized a crash scientific effort to conquer this virus. This also reflects the fact that the articles and areas of research which the journals *Science* and its British counterpart *Nature* allowed to be published in their tightly controlled referee system were selected so as not to deviate from the predetermined official line of the day.

Thus, the book will certainly be a reference on the shelf of specialists, but of more limited value otherwise. The anthology documents how a hyper-specialized "in-group" of molecular biology cancer researchers and specialists in abnormal viruses isolated, characterized, and broke the genetic code of the AIDS-causing virus in record time. Yet, after fully cracking the 9,100-plus nucleotide sequence in the code perfectly, the researchers were seemingly more in the dark than before. Using variations of basically similar approaches, science has fallen further behind the tricks of the virus, the more that molecular biology learns. A breadth of fresh approaches on research is what we urgently require from such areas as: studies of mitosis, the magnetic field and resonance properties of living tissue, and the functioning interface between the brain and neurological and immunological systems. One hopes that future research anthologies will not seem so ingrown.