

The Next Ninety Years

Proceedings of a Conference Sponsored by the Office for Industrial Associates at the California Institute of Technology

California Institute of Technology

Reviewed by Irving S. Bengelsdorf, science editor, *The Los Angeles Times**

From the oracle of Apollo at Delphi in ancient Greece, through astrologers and crystal-ball gazers, to modern-day electronic computers, man always has been interested in techniques to foretell the future.

Ten years ago, in a nationwide series of lectures presented before American industrial leaders, three faculty members of the California Institute of Technology, Pasadena, presented their evaluation of the future of man—"an effort to forecast the future of our scientific-technological-industrial civilization."

The 1957 talks, delivered by Drs. Harrison Brown, professor of geochemistry; James Bonner, professor of biology; and John Weir, associate professor of psychology, were collected and published as a book entitled *The Next Hundred Years*.

In March 1967, the three Caltech professors met again to discuss the future and to evaluate the predictions they had made 10 years earlier.

At this second conference on mankind's future, sponsored by Caltech's Office for Industrial Associates, Brown, Bonner, and Weir were joined by two additional Caltech faculty members—Drs. Norman H. Brooks, professor of civil engineering, and Thayer Scudder, associate professor of anthropology.

With funds made available by the Camille and Henry Dreyfus Foundation, Inc., Caltech now has published the stimulating and provocative proceedings of this "10 years after" conference as a book entitled *The Next Ninety Years*.

This second book, now available from Caltech, not only presents the five talks given by the Caltech professors but also contains the lively roundtable discussions that followed each presentation.

Additional speeches were given by two non-Caltech guest speakers—Drs. Athelstan Spilhaus, dean of the Institute of Technology, University of Minnesota, and J. George Harrar, president of the Rockefeller Foundation—also are included.

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Unfortunately, an excellent and witty talk dealing with the funding of scientific and technological research projects in America, presented at the conference luncheon by Dr. Arnold O. Beckman, chairman of Caltech's board of trustees, was omitted.

How is the world of today significantly different from the one predicted a decade ago?

Dr. Brown notes two major surprises. One surprise is the fantastically rapid growth of world population. He summarizes the situation: "We now are experiencing rates of population growth which greatly exceed those which were imagined even by the gloomiest pessimists 10 years ago."

Another important surprise has been the onrushing acceptance of nuclear energy to generate electricity. Brown continues, "It is a major revolution in the world energy picture, brought about largely by rapidly decreasing costs of nuclear power."

And there have been two major disappointments. One involves agriculture and the worldwide food problem. Brown adds, "Agricultural production has increased far less rapidly than we had hoped, with the result that hunger is far more widespread in the world today than it was 10 years ago."

What is even more disturbing is the ever increasing economic gap among nations. Brown explains, "Although we in the more technologically developed West are getting richer even more rapidly than we thought possible 10 years ago, the poorer nations of the world are not sharing significantly in this bounty."

In an evening banquet speech, Dr. Harrar again focused on the overwhelming problem of overpopulation. He warned, "While the debate (on population) rages, wave after wave of new citizens join our ranks at the current rate of 65 million per year.

"Although millions upon millions of these individuals are unwanted and unplanned for and cannot be properly fed, clothed, housed, or provided with educational and other opportunities, we have thus far been unable to stem the tide. Unless we do succeed, however, survival may well become our chief concern, with attendant degradation of the human condition.

"It would be a melancholy paradox if all of the extraordinary social and technological advances that have been made by man were to bring us to the point where society's sole preoccupation becomes survival rather than ful-

fillment."

The Next Ninety Years should be required reading for high school, college, university, and adult education classes. Only if we are aware of the problems facing us in 1967, may we be able to do something about the world of 1977.

Basic Principles of Chemistry

by Harry B. Gray and Gilbert R. Haight, Jr.

W. A. Benjamin, Inc.\$9.75

Reviewed by Fred C. Anson, associate professor of analytical chemistry

This new textbook is designed to provide an introduction to modern chemistry. It does so in quite a different way than is familiar to the legions of Caltech graduates who learned their freshman chemistry from Linus Pauling's classical text. Gray and Haight consider the old categories of physical, organic, inorganic, and analytical chemistry to have merged into oblivion and set out to treat the subject by considering the three main categories of current research in chemistry as proposed in the Westheimer Report: structural chemistry, chemical dynamics, and chemical synthesis. The result is a book containing very little of the descriptive material familiar to readers of freshman texts. There are, for example, no chapters titled "Group VI Elements," "The Halogens," or "The Transition Metals." Instead one finds an array of eclectic chapters which strive to present an integrated picture of chemical knowledge and how it is obtained. Heavy stress is placed on structural topics and chapter titles include "Concepts and Models of Molecular Structure: A Classical View," "Modern Theory of Atomic Structure," "Atomic Properties," "Chemical Bonds," "Molecular Orbitals," "Bonding in Condensed Phases," and "Coordination Chemistry: Structure, Reactivity and Equilibrium."

This book is impressively packaged and lively reading. It will certainly help to convey to beginning students the challenge and excitement in modern chemical research.

The book is amply supplied with sets of "Questions" and "Problems." A typical problem gives a good example of the book's verve: "Find someone who has not studied chemistry or physics, but who has a little number sense, and try to convince him that the evidence for the existence of atoms is sound."