

# HERITAGE DAY HONORS

Awards given to four who have strongly  
**IMPACTED** the chemical enterprise

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**RESEARCHERS** and entrepreneurs working at the interface of chemistry and biology and on making scientific knowledge more accessible were in the spotlight at Heritage Day 2007, the Chemical Heritage Foundation's daylong awards ceremony, which was held in Philadelphia in May.

CHF honored four luminaries who have made an indelible impact on the scientific endeavor. Nobel Laureate Thomas R. Cech, president of Howard Hughes Medical Institute (HHMI), was awarded the Othmer Gold Medal. Another Nobel Laureate—Phillip A. Sharp, Institute Professor at Massachusetts Institute of Technology—received the Chemists' Club's Winthrop-Sears Medal. George M. Whitesides, Woodford L. & Ann A. Flowers University Professor at Harvard, was the recipient of the American Institute of Chemists' (AIC) Gold Medal. Eugene Garfield, father of citation indexing and founder of the Institute for Scientific Information, garnered CHF's only endowed award, the Richard J. Bolte Sr. Award for Supporting Industries, which is named after the first (last year's) winner of the award.

The Othmer Gold Medal is presented annually to recognize multifaceted contributions to chemical and scientific heritage. And its latest awardee certainly is "a man of multifaceted talents," said CHF President Arnold Thackray in his introduction of Cech. He added that Cech is "an independent thinker, capable of original, brilliant moves" and "someone with the ability, quite obviously, to keep many, many balls in the air."

In 1982, Cech and his coworkers discovered that RNA, an information-carrying molecule, also can act as a catalyst, cleaving and rejoining chemical bonds much as enzymes do. This finding has "opened the

way to new medicines and elicited fresh ideas about the origins of life," Thackray said. Cech later ventured into biotechnology and started a company, Ribozyme Pharmaceuticals, that "evolved into one that was purchased by Merck last year for a little over a billion dollars," Thackray noted.

In his remarks, Cech highlighted the importance of chemistry in his own biological research. For example, using simple chemical reactions to modify biomacromolecules in specific ways can yield a lot of insights, he said. "Knowing a little bit of chemistry

gives you a foothold where a lot of the more biologically trained people just are not able to tread."

More generally, "the reason chemistry has been important in the biology that I've done in the lab is the way that a chemist thinks about problems, which is really quite different from some-

one with just a biological training," Cech continued. Chemists tend to think quantitatively, in terms of rate constants and equilibrium constants, and "we know about free energies and how to measure them," he noted. "And I think this gives a way of dissecting a biochemical reaction which is really very special."

Cech also commented on HHMI's latest initiatives, such as its national competition

to identify as many as 50 promising early-career scientists, who will be collectively supported with \$600 million (C&EN, April 16, page 14). HHMI solicited applications directly from interested researchers, rather than leaving it up to their institutions to nominate them, as HHMI did in the past. The intent was to open up the competition to a broader range of interested researchers and "get away from university politics," Cech said. "We're also hoping that this will open up the positions" to many more women scientists.

MIT's Sharp, like Cech, is a chemist by training who's made a big splash in molecular biology. Sharp's landmark achievement was the discovery of RNA splicing in 1977. This work provided one of the first indications that genes in mammalian cells contain segments that are edited out by the cells in the course of utilizing genetic information. This discovery is important in understanding the genetic causes of cancer and other diseases. Sharp's research opened a new area in molecular biology and "forever

changed the field," according to Joel W. Jones, president of the Chemists' Club.

Sharp has played a key role in the emergence of MIT and of Cambridge, Mass., as centers of molecular biology and biotechnology. In Cambridge, he cofounded Biogen (now Biogen Idec) and Alnylam Pharmaceuticals (see page 8), a biotech company that is developing therapeutics based on RNA interference, which is currently the focus of Sharp's research.

It is, in fact, Sharp's role as an entrepreneur that garnered him the Winthrop-Sears Award, which recognizes individuals for their entrepreneurial contribution to the vitality of the chemical industry and the betterment of humankind. "I think this is the first award I've received for entrepreneurship, and I'm really honored," Sharp said.

**IN LOOKING BACK** to the establishment of Biogen in 1978, Sharp observed that, "at the time, I recognized that what was being created in biotechnology was something that I called 'synthetic biology'—the use of genes and other biological agents to create new organisms with useful therapeutic or other properties. He recognized that the new field would have long-term implications for society.



**WINNERS** Garfield (from left), Sharp, Cech, and Whitesides received honors at the Chemical Heritage Foundation.

DOUGLAS A. LOCKARD



The major biotech goal Sharp had in mind back then (besides making pharmaceuticals) was to design organisms to produce valuable chemical intermediates or to produce energy from biomass and other materials. "That effort was premature, and we were not successful," he told his listeners.

Today, with the increasing costs of energy and growing concerns about carbon dioxide emissions and global warming, Sharp thinks that "we're going to turn more and more" to synthetic organisms to produce the chemicals and energy that society needs. Synthetic biology, or "the chemistry of life forms," is something that the chemistry community should embrace and biological departments should think about integrating into their future research programs, he said.

During part of his career, Sharp remarked, he was close to his fellow CHF honoree Whitesides—the two lived across the street from each other in Boston for about 15 years. Whitesides was a chemistry professor at MIT for almost two decades before he moved to Harvard. Although Whitesides has pursued research projects that have a biological flavor, he is known for his pioneering work in a variety of challenging areas, including nuclear magnetic resonance spectroscopy, organometallic chemistry, molecular self-assembly, and nanotechnology. Currently, his interests include materials science, biophysics, complexity, and the origin of life.

On accepting the AIC Gold Medal, Whitesides discussed how chemistry might be able to contribute to the solutions for managing our planet, understanding what life is, and distributing resources to all of society's members. Each of these is a complex problem, with many interacting components, and "we don't understand the sum of its parts," he said. All of these problems have a large chemical component, Whitesides noted, but the solutions are far from clear. Chemistry offers hope to solve these problems, he suggested, but to do so, chemistry as a field and a profession will have to change into something different from what it is now. Biology changed from being a descriptive science and "physics changed from classical to quantum," so perhaps history can teach us where chemistry needs to go, Whitesides said.

History also was on the mind of Garfield, who was celebrated for creating new tools for information retrieval and indexing that changed the way scientists exchange information about scholarly works. In 1964,

Garfield began regular publication of the *Science Citation Index (SCI)*, a fundamental innovation in scientific communication and information science. SCI covered virtually all disciplines and fields of science, comprehensively indexing all types of sources. Most importantly, it uniquely indexed the references cited in the articles it indexed.

Garfield went on to create many more information tools, including *Index Medicus* and *Current Contents*. In 1986, he founded *The Scientist*, now a biweekly newspaper for research professionals.

In accepting the Bolte Award for Sup-

porting Industries, Garfield surveyed the growth of chemical and scientific information over the past 50 years. In 1955, he noted, SCI indexed about 125,000 articles per year. In 2005, that number had risen to 1.2 million articles per year—a 10-fold increase. This rise parallels the increase in the number of papers charted by *Chemical Abstracts* over 50 years, Garfield said. He also displayed curves reflecting the growth in the number of new compounds and chemical patents over the years.

Garfield stopped short of making any predictions, but if history is any guide, that growth is likely to continue. ■

## OFFICIAL REPORTS FROM THE JUNE BOARD MEETING

*Winners of the 2008 Priestley Medal and the ACS Award for Volunteer Service, chosen by the ACS Board during its June meeting in Baltimore, were reported, respectively, in C&EN, June 11 (page 11) and June 18 (page 72). Following are the reports of committees that were presented at that meeting.*

### GRANTS & AWARDS

The chair reviewed the goals of the newly established G&A Subcommittee on Canvassing & Selection. The subcommittee reported on the work that it has accomplished during the past month.

Acting under delegated authority, the committee voted to accept the recommendations of the ACS Petroleum Research Fund (PRF) Advisory Board (May 2007 meeting) for funding grants totaling \$11.6 million.

A program proposal for new directions for the ACS PRF was presented. The proposal consists of several programs in support of the agreed-upon vision/mission and direction of the fund to support career development, advanced scientific education, and research impact. The three major programs are New Investigator Grants, New Directions Grants, and Undergraduate Research Grants. Additional programs were identified, and study teams will be formed to consider how and whether to implement them.

Acting under delegated authority, the committee voted to endorse the implementation of the proposal for new directions for the PRF Grants Program as outlined in the proposal developed by the PRF Steering Committee and approved by the PRF Advisory Board on May 17, to continue the ACS PRF Supplements for Underrepresented Minority Research (SUMR) program, and to participate in the Astellas USA Foundation's awards program, which recognizes the achievements of individuals and institutions who have contributed significantly to the advancement of medical and related sciences.

The chair updated the committee on the status of "The Guidelines for Review of the National Awards," a draft document that outlines a process for the periodic review of the national honors.

The committee voted to make a recommendation to the chair of the board of directors for the appointment of three scientists to the ACS PRF Advisory Board.—ERIC C. BIGHAM, CHAIR

### PROFESSIONAL & MEMBER RELATIONS

In an interim action and acting under delegated authority, the Committee on Professional & Member Relations (P&MR) approved a request for nominal cosponsor-