edited by DIANA PABST

Changing the Culture of Science in Research Universities

In August the Clinton administration sent a message to the scientific community: Link your work more closely to the country's economic and social well-being or risk losing public support.

Another message in the report, *Science in the National Interest*, calls for academic research institutions to renew their basic mission of education, to "produce the finest scientists and engineers for the 21st century" and "raise the scientific and technological literacy of all Americans."

Late last month AAAS hosted a weekend forum in Washington for 50 deans and administrators who oversee undergraduate science programs at the nation's major research universities, to discuss changing needs and priorities. Common concerns included how to attract and retain students from diverse backgrounds, reward faculty for good teaching, better educate non–science majors, and train future science teachers.

New York University's Alice Huang, one of the organizers, said the Science Deans' Colloquium—funded by the National Science Foundation—was intended to fill an information gap. There's an organization for deans of engineering schools but no similar group for science deans, she noted.

"We're all reinventing the wheel," said Harry Morrison of Purdue University. "We rush to communicate research results, but we aren't communicating about undergraduate education programs that work."

Attendees heard about some initiatives underway:

■ Purdue's School of Science has an outreach program, modeled on the agricultural extension system, that provides discipline-based support to K–12 science teachers. Paid coordinators reduce the administrative burden.

■ Georgia Tech sponsors a vast network of programs for precollege teachers and students through its Center for Education Integrating Science, Mathematics, and Computing.

■ Concerned about failure and attrition rates of its freshmen, Carnegie Mellon's College of Science started an early intervention program last year. Dean Susan Henry said results so far are encouraging; freshmen on probation in the 1993 fall semester shrank by half and those on the dean's list doubled.

■ Penn State revamped some sections of freshman calculus for students at risk of failing, using the standard syllabus and exams but limiting class size to 30 and assigning the most experienced teachers. After those students did academically better than their counterparts in large sections and reported greater satisfaction, the concept was expanded to other basic science courses, according to dean Gregory Geoffroy.

Deans from Purdue, Carnegie Mellon, and the University of Minnesota said there's growing demand from liberal arts faculties on their campuses for interdisciplinary science courses with lab experiences. Cornell University's Peter Bruns said for science majors, integrated lab classes that stress broad problem-solving are a good model for the teamwork required in modern research.

But classroom labs are expensive. And rigid departmental boundaries work against collaborative teaching. "Faculty are excited by all the new stuff in their field and are committed to the old stuff, and they have trouble letting go," said Paul Magee of Minnesota's Twin Cities campus.

Being a good researcher and a good teacher isn't fundamentally inconsistent, the deans agreed. But in practice, many acknowledged, a chasm exists. "We constantly send the message that we reward research first," said the University of Michigan's Joseph Marino. He said his division now awards about 10% of faculty bonuses each year based on quality of instruction. Doyle Daves of Rensselaer Polytechnic Institute said his office reserves up to a quarter of the money for raises to recognize teaching excellence.

Given the uncertainties of research funding—and the need to have more scientifically trained leaders in all sectors of society—educating science students for broader career options was of interest. Another challenge: how to steer more students to pre-college teaching. "What needs to take place," said Luther Williams of NSF's education directorate, "is bringing deans of science and deans of education together."

He described a new NSF grant program for junior science faculty to spur their involvement in K–12 school reform issues such as curriculum design and technology instruction.

Williams, echoing a statement from M.R.C. Greenwood of the White House Office of Science and Technology Policy, told the deans their schools must break from primarily serving science majors "and providing a second-order experience for everyone else."

There was consensus that a regular mechanism for communication is needed. A group volunteered to plan another meeting to discuss some of the issues in depth.

For information, contact Jerry Bell at AAAS. Phone: 202-326-6786. E-mail: jbell@aaas.org.

Center to Expand Links with Congress

Through a new center established officially this month, AAAS will expand its work of providing members of Congress and their staffs with nonpartisan, up-to-date information on science and technology issues.

The Center for Science, Technology, and Congress is housed in the Directorate for Science and Policy Programs, headed by Al Teich. It builds on congressional activities being done by the directorate and takes over those of the Carnegie Commission on Science, Technology, and Government.

Senior program associate Bonnie Bisol Cassidy said, "When the commission completed its work, it sought a new home for the program. AAAS was the obvious choice because of its mission and experience."

Funding is provided by a two-year, $470,000 grant from the Carnegie Corporation of New York.

Among its activities, the center will publish the newsletter *Science & Technology in Congress*, write issue briefs and special reports, and hold seminars and orientations for congressional staff.

For more information, contact Bonnie Cassidy by phone at 202-326-6798 or by e-mail at bcassidy@aaas.org.

Call for Council Resolutions

The next meeting of the AAAS Council will take place during the AAAS Annual Meeting at the Atlanta Marriott in Atlanta, Georgia, on 19 February 1995. Individuals or organizations wishing to present proposals or resolutions for consideration by the Council should submit them in written form to AAAS Executive Officer Richard S. Nicholson by 15 November 1994.

Items should be consistent with AAAS's objectives and appropriate for consideration by the Council. Resolutions should be in the traditional format, beginning with "Whereas" statements and concluding with "Therefore be it resolved."

The Committee on Council Affairs will hold its open hearing on submitted items at 2:30 p.m., 18 February at the Atlanta Marriott. Late proposals or resolutions delivered to the Executive Officer before 18 February will be considered if they deal with urgent matters and are accompanied by a written explanation of why they were not submitted by the deadline.

Summaries of the Council meeting agenda will be available during the Annual Meeting at the AAAS headquarters office and the information desk. The full agenda also will be available.

AAAS Members Distinguished for Contributions to Science

In September the AAAS Council elected 297 members as Fellows of AAAS. These individuals will be recognized for their contributions to science at the Fellows Forum to be held on 18 February 1995 during the AAAS Annual Meeting in Atlanta, Georgia. The new Fellows will receive a certificate and a blue and gold rosette pin as a symbol of their distinguished accomplishments. Presented by section affiliations, they are:

Agriculture, Food, and Renewable Resources

Charles J. Arntzen, Texas A&M Univ. • Thomas E. Fenton, Iowa State Univ. • John E. Foss, Univ. of Tennessee • Shu Geng, Univ. of California, Davis • Clare I. Harris, Silver Spring, Md. • Gary H. Heichel, Univ. of Illinois • Andrew O. Jackson, Univ. of California, Berkeley • Jerome J. Jurinak, Utah State Univ. • David E. Kissel, Univ. of Georgia • Dan E. Purcifull, Univ. of Florida • Robert C. Riley, U.S. Dept. of Agriculture • Monkombu S. Swaminathan, Centre for Research on Sustainable Agricultural and Rural Development, Madras • Kenneth P. Vogel, U.S. Dept. of Agriculture

Anthropology

Geoffrey W. Conrad, Indiana Univ. • Richard H. Meadow, Harvard Univ. • Michael F. Moseley, Univ. of Florida • Nancy Jean Parezo, Univ. of Arizona • Barbara L. Stark, Arizona State Univ.

Astronomy

Robert D. Gehrz, Univ. of Minnesota • John P. Huchra, Harvard-Smithsonian Center for Astrophysics • Lee Anne M. Willson, Iowa State Univ.

Atmospheric and Hydrospheric Sciences

Mark A. Cane, Lamont-Doherty Earth Observatory • Margaret Anne LeMone, National Center for Atmospheric Research • John W. Miles, Univ. of California, San Diego • Kevin E. Trenberth, National Center for Atmospheric Research • Gunter E. Weller, Univ. of Alaska

Biological Sciences

Kathryn V. Anderson, Univ. of California, Berkeley • Mary Combs Barber, Science and Policy Associates • Lawrence W. Barnthouse, Oak Ridge National Lab. • Mina J. Bissell, Lawrence Berkeley Lab. • Hans R. Bode, Univ. of California, Irvine • John H. Campbell, Univ. of California, Los Angeles • Bruce M. Carlson, Univ. of Michigan • James T. Carlton, Williams College • Pierre Chambon, Institut de Chimie Biologique, Strasbourg • Ernest S. Chang, Bodega Marine Lab. • Andrew G. Clark, Pennsylvania State Univ. • Louise B. Clarke, Univ. of California, Santa Barbara • Tom Curran, Roche Institute of Molecular Biology • Thomas F. Deuel, Washington Univ. • Walton L. Fangman, Univ. of Washington • Elaine M. Faustman, Univ. of Washington • Alan Feduccia, Univ. of North Carolina • Walter M. Fitch, Univ. of California, Irvine • Bruce W. Frost, Univ. of Washington • Chandler M. Fulton, Brandeis Univ. • David T. Gibson, Univ. of Iowa • Richard Granger, Univ. of California, Irvine • Joseph L. Graves Jr., Univ. of California, Irvine • Neil Greenberg, Univ. of Tennessee • Peter Michael Gresshoff, Univ. of Tennessee • Mark T. Groudine, Fred Hutchinson Cancer Research Center • James E. Hall, Univ. of California, Irvine • Barbara A. Hamkalo, Univ. of California, Irvine • Earl Raymond Heithaus, Kenyon College • Susan A. Henry, Carnegie Mellon Univ. • George V. Hillyer, Univ. of Puerto Rico • Karen A. Holbrook, Univ. of Florida • Laura L. Mays Hoopes, Pomona College • Joel A. Huberman, Roswell Park Cancer Institute • Richard R. Hudson, Univ. of California, Irvine • Anthony A. James, Univ. of California, Irvine • James B. Kaper, Univ. of Maryland • Joan Priscilla Kilbourn, Consulting Clinical and Microbiological Lab. • Lisa A. Levin, Scripps Institution of Oceanography • K. June Lindstedt-Siva, ARCO • Judy L. Meyer, Univ. of Georgia • Charles B. Miller, Oregon State Univ. • Donald J. Nash, Colorado State Univ. • Eugene W. Nester, Univ. of Washington • Kenneth Dale Noel, Marquette Univ. • Michael L. Pace, Institute of Ecosystem Studies • Philip D. Reid, Smith College • Charles E. Ribak, Univ. of California, Irvine • James H. Schwartz, Columbia Univ. • James A. Shapiro, Univ. of Chicago • Kenneth Sherman, National Marine Fisheries Service • Stanwyn G. Shetler, National Museum of Natural History • Michael P. Shiaris, Univ. of Massachusetts • Charles A. Simenstad, Univ. of Washington • Martyn T. Smith, Univ. of California, Berkeley • Michael H. Smith, Savannah River Ecology Lab. • Leonard A. Smock, Virginia Commonwealth Univ. • Robert E. Steele, Univ. of California, Irvine • Roy A. Stein, Ohio State Univ. • Paul K. Stumpf, Univ. of California, Davis • Anne O. Summers, Univ. of Georgia • Andrea J. Tenner, Univ. of California, Irvine • Gary A. Toranzos, Univ. of Puerto Rico • David C. Van Essen, Washington Univ. • Judy D. Wall, Univ. of Missouri • John B. Waterbury, Woods Hole Oceanographic Institution • Robert A. Wharton Jr., Desert Research Institute • Robert F. Whitcomb, U.S. Dept. of Agriculture • David C. White, Univ. of Tennessee • Robert G. White, Univ. of Alaska • Luther S. Williams, National Science Foundation • Thomas Gordon Wolcott, North Carolina State Univ. • Richard T. Wright, Gordon College • Lily Y. Young, Rutgers Univ. • Stephen H. Zinder, Cornell Univ.

Chemistry

Arthur W. Adamson, Univ. of Southern California • John W. ApSimon, Carleton Univ. • Thomas W. Bell, State Univ. of New York, Stony Brook • Wesley G. Bentrude, Univ. of Utah • Joel G. Berger, Schering-Plough Research Institute • Steven L. Bernasek, Princeton Univ. • Michael T. Bowers, Univ. of California, Santa Barbara • Edwin A. Chandross, AT&T Bell Labs. • Robert N. Clayton, Univ. of Chicago • William F. DeGrado, DuPont Merck Pharmaceutical Co. • Michael P. Doyle, Trinity Univ. • John F. Endicott, Wayne State Univ. • Thomas F. George, Washington State Univ. • David G. Gorenstein, Purdue Univ. • Martha Greenblatt, Rutgers Univ. • Sandra C. Greer, Univ. of Maryland • Richard H. Himes, Univ. of Kansas • Darleane C. Hoffman, Lawrence Berkeley Lab. • William L. Jorgensen, Yale Univ. • Raoul Kopelman, Univ. of Michigan • Henry Linschitz, Brandeis Univ. • Claude F. Meares, Univ. of California, Davis • Daniel M. Neumark, Univ. of California, Berkeley • C. Dale Poulter, Univ. of Utah • Marvin L. Poutsma, Oak Ridge National Lab. • Dennis P. Riley, Monsanto Co. • Howard E. Smith, Vanderbilt Univ. • Edward I. Stiefel, Exxon Research and Engineering Co. • Galen D. Stucky, Univ. of California, Santa Barbara • Kathleen C. Taylor, GM NAO Research and Development Center • Donald G. Truhlar, Univ. of Minnesota • Francis A. Via, Akzo Central Research • Gershon Vincow, Syracuse Univ. • John C. Wheeler, Univ. of California, San Diego

Dentistry

Richard R. Ranney, Univ. of Maryland

Education

Angelo Collins, Florida State Univ. • Marcia C. Linn, Univ. of California, Berkeley • Shirley M. Malcom, AAAS • John Staver, Kansas State Univ.

Engineering

Mihran S. Agbabian, Univ. of Southern California • Melvin L. Baron, Weidlinger Associates • R. P. Caren, Lockheed Corp. • Thomas Kirk Caughey, California Institute of Technology • Delores M. Etter, Univ. of Colorado • Kenneth F. Galloway, Univ. of Arizona • Thomas K. Gaylord, Georgia Institute of Technology • Elmer G. Gilbert,

Univ. of Michigan • Gretchen Kalonji, Univ. of Washington • Reuven R. Levary, St. Louis Univ. • William W. Middleton, St. Davids, Pa. • Richard Skalak, Univ. of California, San Diego • Edward J. Smith, Brooklyn, N.Y. • Lawrence Talbot, Univ. of California, Berkeley • David Keith Todd, Berkeley, Calif. • Won T. Tsang, AT&T Bell Labs. • Max L. Williams Jr., Univ. of Pittsburgh • Paul A. Witherspoon, Univ. of California, Berkeley • Aaron D. Wyner, AT&T Bell Labs.

General Interest in Science and Engineering
Sharon Dunwoody, Univ. of Wisconsin • Gerald J. Iafrate, U.S. Army Research Office

Geology and Geography
Thomas J. Ahrens, California Institute of Technology • David W. Folger, U.S. Geological Survey • Charles G. Groat, Louisiana State Univ. • John P. Grotzinger, MIT • Robert M. Hazen, Carnegie Institute of Washington • Dana J. Isherwood, Lawrence Livermore National Lab. • Andrew H. Knoll, Harvard Univ. • Malcolm C. McKenna, American Museum of Natural History • Louis C. Peltier, Bethesda, Md.

History and Philosophy of Science
Richard M. Burian, Virginia Polytechnic Institute and State Univ. • John C. Burnham, Ohio State Univ. • Lindley Darden, Univ. of Maryland • Philip J. Pauly, Rutgers Univ. • Edith Dudley Sylla, North Carolina State Univ.

Industrial Science
William R. Dill, Cumberland Foreside, Maine

Information, Computing, and Communication
Paul Baran, Atherton, Calif. • Bruce I. Blum, Applied Physics Lab. • Jack Dongarra, Univ. of Tennessee • Albert L. Hopkins Jr., Danbury, N.H. • Susanne M. Humphrey, National Library of Medicine • Joyce Currie Little, Towson State Univ. • Kurt L. Loening, Topterm-North American Div.

Linguistics and Language Science
Kenneth L. Hale, MIT

Mathematics
Elliott H. Lieb, Princeton Univ. • Richard M. Schoen, Stanford Univ. • Frederic Y. M. Wan, Univ. of Washington • Frank Warner III, Univ. of Pennsylvania

Medical Sciences
Itamar B. Abrass, Harborview Medical Center • Roy E. Albert, Univ. of Cincinnati • Henry A. Anderson, Bureau of Public Health, Madison, Wisc. • Marjorie E. Anderson, Univ. of Washington • William Ames Atchley, International Bioethics Institute • J. Thomas August, Johns Hopkins University • Robert L. Barchi, Univ. of Pennsylvania • J. Richard Baringer, Univ. of Utah • Clyde F. Barker, Univ. of Pennsylvania • Claudio Basilico, New York Univ. Medical Center • Gilbert W. Beebe, National Cancer Institute • Katherine L. Bick, Bethesda, Md. • Paul H. Black, Boston Univ. • Edward N. Brandt Jr., Univ. of Oklahoma Health Sciences Center • Peter H. Byers, Univ. of Washington • Antonio Cao, Univ. of Cagliari • Sterling K. Clarren, Children's Hospital and Medical Center, Seattle • Max D. Cooper, Univ. of Alabama • Pelayo Correa, Louisiana State Univ. • Lucio G. Costa, Univ. of Washington • Norman Davidson, California Institute of Technology • Robert W. Day, Fred Hutchinson Cancer Research Center • Erik De Clercq, Katholieka Univ., Leuven • Roger Detels, Univ. of California, Los Angeles • David L. Eaton, Univ. of Washington • Nelson Fausto, Brown Univ. • Peter J. Fischinger, Medical Univ. of South Carolina • Theodore Friedmann, Univ. of California, San Diego • Murray B. Gardner, Univ. of California, Davis • Thomas D. Gelehrter, Univ. of Michigan • Philippe Grandjean, Odense Univ. • Robert G. Grossman, Baylor College of Medicine • Jeffrey B. Halter, Univ. of Michigan Hospitals • Herbert A. Hauptman, Medical Foundation of Buffalo • David D. Ho, Aaron Diamond AIDS Research Center • Waun Ki Hong, Univ. of Texas • Michael M. Kaback, Children's Hospital and Health Center, San Diego • C. Ronald Kahn, Joslin Diabetes Center • Stephen M. Krane, Massachusetts General Hospital • Martin J. Kushmerick, Univ. of Washington • John A. H. Lee, Fred Hutchinson Cancer Research Center • John D. Loeser, Univ. of Washington • Herbert A. Lubs, Univ. of Miami • Ronald V. Maier, Harborview Medical Center • Alfred F. Michael, Univ. of Minnesota • Walter L. Miller, Univ. of California, San Francisco • Norman Karle Mottet, Univ. of Washington • Daniel W. Nebert, Univ. of Cincinnati Medical Center • William E. Paul, National Institutes of Health • Arthur L. Reingold, Univ. of California, Berkeley • Clayton Rich, Kirkland, Wash. • Robert M. Schmidt, California Pacific Medical Center • Larry J. Shapiro, Univ. of California, San Francisco • William S. Sly, St. Louis Univ. • Arnold L. Smith, Children's Hospital and Medical Center, Seattle • Thomas J. Smith, Harvard School of Public Health • Louise C. Strong, Univ. of Texas • G. Marie Swanson, Michigan State Univ. • David B. Thomas, Fred Hutchinson Cancer Research Center • Harold E. Varmus, National Institutes of Health • Peter C. Whybrow, Univ. of Pennsylvania • Robert W. Wissler, Univ. of Chicago

Pharmaceutical Sciences
Ronald T. Borchardt, Univ. of Kansas • Lawrence L. Fleckenstein, Univ. of Iowa • Robert P. Hanzlik, Univ. of Kansas • Kuo-Hsiung Lee, Univ. of North Carolina • Gerald S. Marks, Queen's Univ. • Arthur A. Patchett, Merck Research Labs. • Lance R. Pohl, National Heart, Lung, and Blood Institute

Physics
Wolfgang J. Choyke, Univ. of Pittsburgh • James J. Duderstadt, Univ. of Michigan • Stephen E. Harris, Stanford Univ. • William L. Kraushaar, Univ. of Wisconsin • Berndt Mueller, Duke Univ. • Jay Orear, Cornell Univ. • Richard F. Post, Lawrence Livermore National Lab. • Thomas D. Rossing, Northern Illinois Univ. • Jonas Schultz, Univ. of California, Irvine • H. Eugene Stanley, Boston Univ. • Robert H. Swendsen, Carnegie Mellon Univ. • Alvin V. Tollestrup, Fermi National Accelerator Lab. • Richard F. Wallis, Univ. of California, Irvine • Michael S. Witherell, Univ. of California, Santa Barbara

Psychology
Edward H. Adelson, MIT • John C. DeFries, Univ. of Colorado • Carl R. Gustavson, Arizona State Univ. • Frances Degen Horowitz, City Univ. of New York • Raja Parasuraman, Catholic Univ. of America • George Vincent Rebec, Indiana Univ. • Daniel Reisberg, Reed College • Richard J. Rose, Indiana Univ. • Walter Schneider, Univ. of Pittsburgh • Joseph L. Young, National Science Foundation

Social, Economic, and Political Sciences
John Bongaarts, The Population Council • Robert T. Michael, Univ. of Chicago • Julian L. Simon, Univ. of Maryland • Paul C. Stern, National Research Council • Teresa A. Sullivan, Univ. of Texas

Societal Impacts of Science and Engineering
Arthur L. Caplan, Univ. of Pennsylvania • Susan E. Cozzens, Rensselaer Polytechnic Institute • Penny J. Gilmer, Florida State Univ. • Andrew N. Rowan, Tufts School of Veterinary Medicine • Vivien Weil, Illinois Institute of Technology

Statistics
Jonas H. Ellenberg, National Institute of Neurological Disorders and Stroke • Mitchell H. Gail, National Cancer Institute • William Michael O'Fallon, Mayo Clinic • C. Ramakrishna Rao, Pennsylvania State Univ. • Terence Paul Speed, Univ. of California, Berkeley • Jon A. Wellner, Univ. of Washington