America ill-prepared for superconductor race: Ashcroft

The United States is in danger of being an also-ran in the international race to develop and commercialize recently discovered high-temperature superconducting materials, according to a physicist who studies the new compounds.

Physics Professor Neil W. Ashcroft said general physics in the United States is in a slow decline, with only about one physicist per 1,000 people. This trend is likely to continue unless new government policies encourage students to become scientists and provide funding for the many creative areas of physics research, he predicted. With such new policies, however, he believes the country could rise to take the lead in the new technology of superconductors.

Ashcroft testified at a Republican Task Force on High Technology and Competitiveness on April 30.

The recent discovery of new superconducting materials promises to revolutionize technologies used in medicine, computer transportation, and power generation and transmission. Their importance lies in the fact that they offer no resistance to the flow of electricity at temperatures far higher than those previously achieved.

For example, the highest-temperature superconductor so far loses its resistance at around 97 degrees Kelvin above absolute zero. This means that cheap liquid nitrogen could be used instead of the more expensive applications as high-voltage power lines, computer chips or superconducting magnets.

The first of the new ceramic compounds of barium, lanthanum, copper and oxygen was made at an International Business Machines Corp. laboratory in Zurich, Switzerland, drawing on research by French chemists. The new materials later were improved upon by scientists at the University of Tokyo, the University of Beijing, the University of Houston and AT&T's Bell Laboratories. Scientists in the United States, Japan, West Germany, France, England and the Soviet Union have mounted major research programs to develop and commercialize the new materials.

The U.S. effort to commercialize the new superconductors is being hindered by the lack of attention to science education that begins in grade schools, Ashcroft told the task force.

"Bright students notice the sagging sup- port for careers in science and opt out early," he said, referring to the phenomenon as "premature scientific euthanasia."

"And even if a student does continue on in science and takes the large step into graduate school, he or she is stepping out of the mainstream of America," said Ashcroft, noting that the huge scientific meeting on superconductors held in New York last March was dubbed a "Woodstock for nerds."

Those who finally become researchers today find themselves hampered in a web of funding contracts and requirements that seem to stifle creativity, Ashcroft said.

"The bureaucratic overlay that has deve- loped leads to incremental, cautious approaches to science," he asserted. "They are impediments to inventiveness. The attitude is, 'The familiar worked last time, so let's try it again.'"

To speed the pace of scientific discovery, Ashcroft proposed funding more individual researchers to do "table-top" science, a reference to small-scale laboratory research. Funds also are needed for new intermediate-sized instruments such as neutron scattering sources, synchrotron radiation sources and high-voltage electron microscopes, as well as organized programs to bring students into research programs.

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New vice provost anticipates challenges ahead

Cornell's newest academic executive believes changes must be made nationally in the financing of education, and he called on Cornell to be the nation's leading university in providing an undergraduate education that prepares students for life in the 21st century.

Professor of Law Larry I. Palmer, a nationally-recognized specialist in family, medical and criminal law, warned that families cannot be expected to pay more and more to send their children to college.

Palmer, 42, will become vice provost for academic programs on July 1 with broad responsibility for coordinating the university's undergraduate program and support services.

Palmer's appointment, announced by Provost Robert Barker, is subject to approval by the Board of Trustees at their meeting in late May.

A limit to the rise in tuition

"I think we are going to be looking at alternate ways of financing higher education," Palmer said in an interview in his office this week.

"I don't know what those are. But, as a society, we've got to come up with a better solution than constantly increasing the debt load on students and their families."

"That pendulum has swung pretty far and it's clear that Cornell and other universities are impediments to inventiveness. The attitudes is, 'Let's try it again.'" he added.

"Many students I've talked with say that they're here to get into medical school, not to get an absolutely first-class education that will prepare him or her for life." he said.

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— Physicist Edwin E. Salpeter on the feasibility of directed energy weapons.

"What is most spectacular is that 17 people with different political views unanimously agreed on one, single report."  
— Physicist Edwin E. Salpeter on the "Star Wars" feasibility report by an American Physical Society panel, of which he was a member.

Rhodes proposes U.S. industrial extension system

A plan to make the benefits of university research more widely available to enhance the competitiveness of American business, big and small, was endorsed in congressional testimony last week by the President’s Task Force on Industrial Innovation.

"An industrial extension system such as I propose can help make us faster than our foreign competitors through innovation and productivity, and this will provide our industrial society with the better protection than import quotas, tariffs and other protection measures," said Rhodes.

Rhodes said this service should be a prototype for a national system.

The two graduate engineers in the project helped a small household products company improve its injection-molding machinery, and a faculty member helped a small agricultural producer in Ohio develop a new method of producing feed for pigs.

A plan to involve more academic disciplines in the university’s diverse outreach effort, which Rhodes proposes, was endorsed by the 17-member panel of distinguished physicists, chemists, economists, and space research experts.

The panel of scientists concluded that although substantial progress has been made in many technologies, "significant gaps" remain in the scientific and engineering understanding of issues associated with directed energy weapons.

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Use tariffs against Japan as a gambit: Rosecrance

President Reagan’s tariffs against Japan and congressional plans to force reductions in the United States’ trade deficit are important elements in a strategy that could bring the trade deficit down. But trade restrictions remained in force without concessions from the Japanese and Europeans, they could contribute to a trade war and to global recession, according to Richard Rosecrance, a visiting scholar at the Institute for Policy Studies and a fellow at the Woodrow Wilson Center in Washington, D.C.

Rosecrance and other scholars at the Wil- son Center have argued that one of the main reasons for the trade deficit is the United States’ failure to protect its domestic industries from Japanese and European products. “We have to put the Japanese and Euro- peans to work,” Rosecrance said. “We have to give them something to do other than send their goods to the United States.”

The United States’ options to redress its $150 billion trade deficit, especially in relation to Japan, are limited, Rosecrance said. Additional deliberation of the dollar will slow the world economy, and increased productivity and reductions in the U.S. budget deficit will not be enough to reverse the import-versus-export figures. “The United States accounts for about 40 percent of Japan’s exports of consumer goods,” Rosecrance said. “They won’t stand by while we shut off their goods. They’ll open their markets to American products.”

The Japanese might respond to American restrictions by threatening to open their markets to the United States, but that “can’t be taken as a serious threat,” Rosecrance said. “Japan and the United States remains the best place for the Japa- nese to invest their excess money,” Rose- crance said.

“I’m in favor of tough restrictions, but only as a bargaining gambit,” he added. “They have to work.”

Mark Evry

Alternative farming techniques urged to ensure profitability

A Cornell scientist has joined forces with some of the nation’s top experts in organic farming and environmental conserva- tion to urge the establishment of a research program to develop low-input agri- culture to boost profitability for American farmers.

Brian F. Chabot, associate director of the university’s Department of Life Sciences and associate director of the Agricultural Experiment Station at Ithaca, told a conference last week that a research and development program is needed to aid American farmers in the depression from 1873 to 1879, 1929 to 1933, the Great Depression, and the destruction caused by World War II. “The nation’s farmers have been severely affected by overproduction, loss of foreign markets, costs of production exceeding selling prices, and resulting increases in bank- ruptcies,” Chabot said.

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The goals of the proposed program were outlined in a written statement submitted to the Johnson School of Management and to Chabot and Chabot, and to the Cornell Agricultural Experiment Station in Ithaca, a conference on innovative ideas for research and development.

Chabot also advocated providing pro- grams for the Department of Life Sciences. “We are seeking to enhance the competitiveness of our researchers and scientists,” Chabot said. “We seek not only to expand our markets but also to improve the efficiency of our operations.”

Chabot told the House Commit- tee on Agriculture that the program would be established to help American farmers. “It is our hope that the Johnson School will involve individual scientists in new research opportunities,” Chabot said. “It will create jobs for people who have been laid off and for people who have not had the opportunity to participate in research.”

“Will we train our people to stick labels on products and inventions made in other countries, or will we train them in science and training from an early age to become our own scientific future?” he asked. “We have the scientific potential to stay competitive, but we certainly won’t be able to do that if we don’t have an adequate program.”

Mortey

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Mortey, 46, was vice president for finance and administration at the University of Wash- ington from 1978 until coming to Cornell. Before then, he was vice president for finance at the University of Rhode Island College (1977-78), comptroller at Syracuse University (1972-77), and assistant football staff (1969-70) and with the consult- ing group (1971-72) at Ernst & Ernst in New York City and with the accounting firm of KPMG. Currently a resident college in the U.S. Marine Corps, Mortey was on active duty in the Marines from 1962 to 1967.

He received a bachelor’s degree in engi- neering from the University of Delaware in 1962 and a master’s degree at Syracuse in 1969.