

year that are helping the group strengthen its base and diversify its activities.

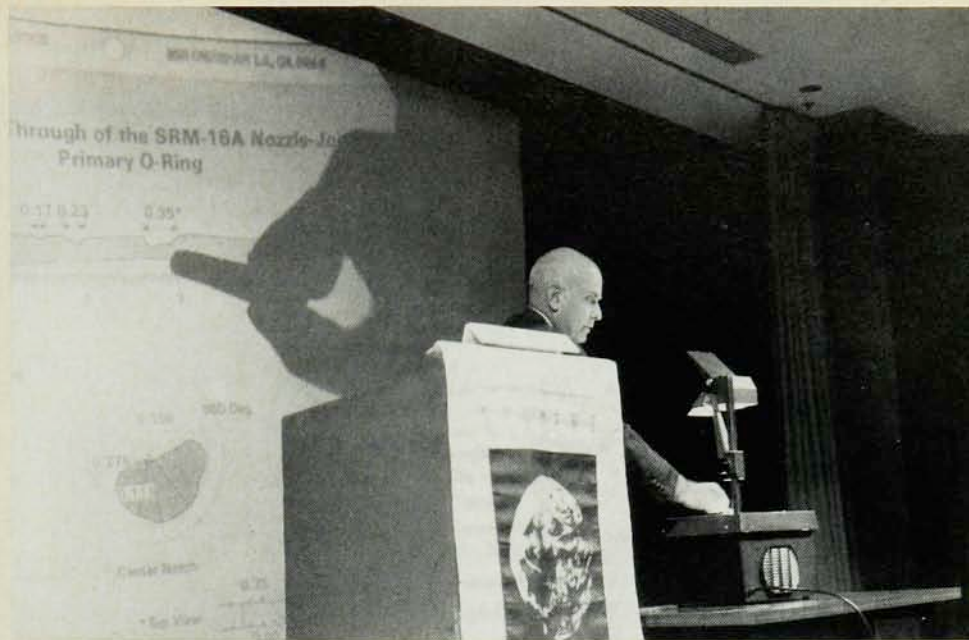
In December of 1986 the organization was awarded a three-year, \$300 000 grant from the MacArthur Foundation. The Carnegie Corporation of New York presented a similar, \$100 000 grant to Student Pugwash in April. This September, Apple Computer contributed hardware and software worth \$25 000 for use in the Student Pugwash Washington, DC, headquarters and in chapter centers. The six terminals, a laser printer and modems will facilitate publication of newsletters and will increase communication with the 30 chapters in universities throughout the nation.

The new grants from MacArthur and Carnegie will enable Student Pugwash to increase the number of university chapters and to broaden their regional distribution. Most chapters are currently in the Northeast and on the West Coast. The added resources will also fund a variety of speeches and colloquiums that are given yearly at Student Pugwash chapters and allow the publication of an alumni directory that goes to press next month.

The grants also will enable Student Pugwash to expand on existing activities. The group has been actively disseminating employment information to university students in the past few years. The *Technology and Society Internship Directory* offers students a list of public sector opportunities in Washington, DC. "Alternative" job fairs have been sponsored by local chapters at MIT, Cornell and Caltech. The fairs attract non-defense-oriented companies and a large number of students. According to Scott Saleska, chapter coordinator in the Washington office, over 500 students attended the last MIT job fair. A "new careers program" is also being formed. "This program," says Ben Austin, Student Pugwash's conference coordinator, "will recruit a smaller number of students for more selective internship opportunities."

Background. Student Pugwash USA was founded in 1979 (see *PHYSICS TODAY*, September 1985, page 71). Run by students and recent graduates, its primary purpose is to stimulate interest in public policy issues associated with science and technology among students worldwide. By comparison with the elder Pugwash, the younger group is interested in a more varied set of issues and does not confine itself to arms control topics.

A biennial international conference is the keystone activity of Student Pugwash. The conference provides a forum for intergenerational and inter-



Roger Boisjoly, a former Morton Thiokol engineer, shows a transparency about the Challenger's O-ring seals to participants in this summer's Student Pugwash conference.

disciplinary exchange of ideas and perspectives on issues involving science, technology, society and ethics. According to Austin, the biennial event is nonpartisan and does not endeavor to resolve any of the questions it tackles.

The fifth biennial Student Pugwash International Conference was held at Stanford University from 28 June to 4 July. Participants included 50 senior delegates and 100 students from 23 countries. The senior panelists who attended this year represented a wide spectrum of professions. Participants included corporate leaders, scientists from both the public and private sectors, military experts, politicians and activists. Students of highly diverse educational backgrounds and interests, both within and outside of the sciences, were invited to the colloquium. The theme for the week-long dialogues was "Choices for our generation: Ethics and values at the cutting edge of technology."

The keynote address was on the ethical dimensions of Morton Thiokol's role in the space shuttle Challenger disaster. In that address, says Austin, Roger Boisjoly, a former engineer at

Morton Thiokol and senior scientist in charge of the booster seal program, described the struggle between staff and management at the corporation over the use and safety of the O-ring seals. Boisjoly presented the original transparencies used to depict to management the engineering group's dissatisfaction with the seals. The preceding night Sidney Drell of the Stanford Linear Accelerator Center had discussed the conflicts between industry and academia.

The biennial conference, originally funded completely by the National Science Foundation, has gained financial support from a coterie of foundations as NSF has gradually curtailed its assistance. Sponsors for this year's event included the Sloan Foundation, the Pew Charitable Trusts, Cray Research Inc and the Exxon Education Foundation. The MacArthur and Carnegie Corporation grants are primarily for non-conference activities.

For information on Student Pugwash activities and programs write to Student Pugwash USA, 505-B 2nd Street NE, Washington DC 20002.

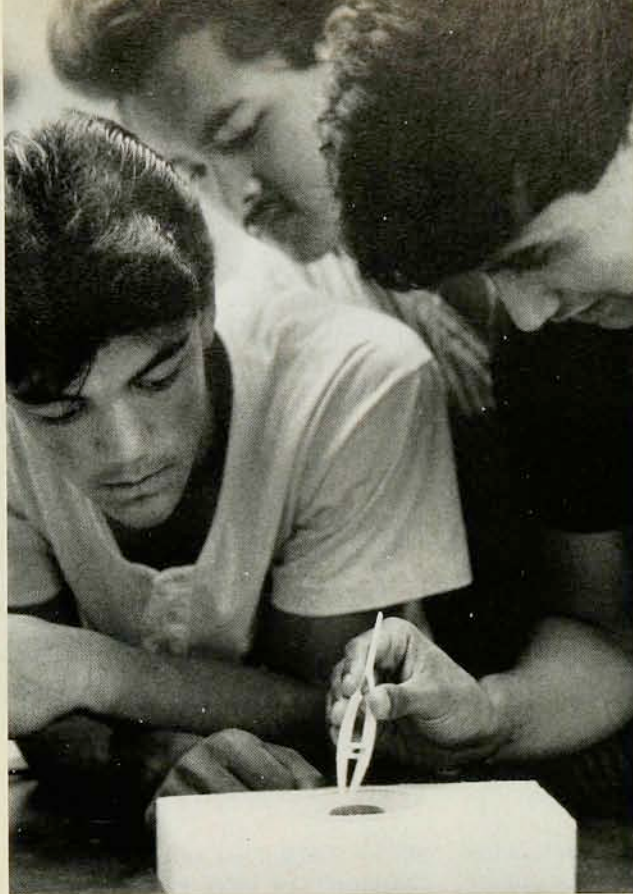
—RICHARD HART

High-school students make $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$

Long famous for its production of a substance with unusual and interesting properties, namely garlic, Gilroy, California, now is becoming known in the physics community for its use of another substance with unusual and

interesting properties—yttrium barium copper oxide.

Last spring, a Gilroy science teacher named David Prybil and nine high-school students produced pellets of $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ and used them to dem-



Gilroy students attempt a demonstration in which a homemade pellet of yttrium barium copper oxide levitates above a magnet.

onstrate superconducting magnetic levitation in class. They did all the work to produce the pellets themselves, using materials and tools borrowed, begged or bought locally, with technical advice from Paul M. Grant, a research scientist at the nearby IBM Almaden Research Center. As Grant has noted in an article on the demonstration, photographs of such levitation experiments have been published widely in popular magazines in the United States. Indeed, a version of the experiment recently turned up in the nationally syndicated comic strip "Bloom County," wherein a proud father is bragging about his genius son's breakthrough in "super duct-work activity" ("it's all the rage with the brainy types"). The son, holding a superconducting pellet, is shown suspended above the floor, upside-down.

Grant points out that the ingredients for yttrium barium copper oxide, Y_2O_3 , $BaCO_3$ and CuO , are fairly readily available and do not need to be extremely pure, though transition metal impurities should be avoided. Many or most high-school art departments have kilns capable of baking the materials at 900–950 °C, and machine shops usually are equipped with hydraulic presses capable of exerting pressures of 15 000–18 000 pounds per square inch. Grant says that the trickiest part of the production process, after the materials have been baked in air, reground and

baked again in flowing oxygen, is cooling them very slowly, especially in the crucial range from 700 °C to 400 °C, so that the x in $YBa_2Cu_3O_{7-x}$ is kept as close to zero as possible.

As Grant sees it, the first important application of the new higher-temperature superconductors already has been made—namely in education—and perhaps the first person to make the application was Grant's daughter Heidi, who performed a levitation experiment in her eighth-grade class last April. Details about her "shake and bake" method of producing $YBa_2Cu_3O_{7-x}$ can be obtained by writing to her in care of her father at IBM Almaden.

—WILLIAM SWEET.

Goldberger is new director of Institute for Advanced Study

Marvin L. Goldberger, former president of Caltech, took over as director of the Institute for Advanced Study in Princeton, New Jersey, in September. Goldberger succeeds Harry Woolf, a science historian, who will join the institute as a member of the permanent faculty following a year of study at Churchill College of Cambridge University. The institute currently has 22 professors and about 160 visiting fellows.

Goldberger, a particle theorist, re-

ceived his BS from the Carnegie Institute of Technology in 1943 and his PhD from the University of Chicago in 1948. After a year as a research physicist at the University of California's Radiation Laboratory in 1948–49 and a year at MIT in 1949–50, Goldberger joined the physics faculty at Chicago, where he became a professor in 1955. From 1957 to 1977 he was Higgins Professor of Mathematical Physics at Princeton University, serving as chairman of the physics department from 1970 to 1976. He was named Joseph Henry Professor of Physics at Princeton in 1977 and became president of Caltech in 1978.

Goldberger served as a member of the President's Science Advisory Committee from 1965 to 1969 and as chairman of the National Academy of Sciences committee on international security and arms control from 1980 to 1986. Goldberger is succeeded at Caltech by Thomas E. Everhart (see next story).

Everhart is Caltech president, succeeding Goldberger

Thomas E. Everhart took office on 1 September as the new president of Caltech, succeeding Marvin L. Goldberger.

Everhart, an electrical engineer, received a BA from Harvard University in 1953, an MSc from the University of California, Los Angeles, in 1955 and a PhD from Cambridge University in 1958. He was a member of the technical staff at Hughes Research Laboratories from 1953 to 1955. He joined the faculty of the University of California, Berkeley, in 1958 and became a professor of electrical engineering there in 1967. From 1972 to 1977 he was chairman of Berkeley's department of electrical engineering and computer science.

Everhart served as dean of the college of engineering at Cornell University from 1979 to 1984, when he became chancellor of the University of Illinois at Urbana-Champaign. He is the fifth chief executive officer of Caltech.

in brief

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