

Where Science Meets the Public:

Remembering the Founders of the Field

By Wendy Pollock

Crowd-pleasing attractions are a part of the history and culture of science centers, going back to the Crystal Palace's dazzling displays of industrial innovation in 1841 and P.T. Barnum's American Museum in mid-19th-century New York. But the science center movement that gained momentum in the 1970s and ASTC, the first organization to represent the field, were in many ways a creation of the scientific community.

A legacy of war

First came the physicists, with their new-style teaching. Frank Oppenheimer of the Exploratorium has had the most enduring reputation. A Manhattan Project physicist during World War II, like his more famous brother, J. Robert Oppenheimer, Frank was blacklisted during the McCarthy hearings of the 1950s. Exiled from higher academics, he taught physics in high school, developing the experimental apparatus he would later use in building exhibits for his museum.

But there were others, like Harvey White of the University of California—Berkeley. White had taught a physics course on television in the early 1950s, when that medium was just emerging. He was tapped as founding director of the university's Lawrence Hall of Science, which opened in 1968 as a memorial to another Manhattan Project scientist, Berkeley's own Ernest Lawrence.

Even before the bomb was dropped on Hiroshima, Lawrence's colleague Vannevar Bush, director of the (U.S.) Office of Scientific Research and Development, prepared a report at the request of President Roosevelt that emphasized the importance of science to national security. *Science: The Endless Frontier* (1944) laid the groundwork for

establishment in 1950 of the National Science Foundation (NSF). In the report, Bush advised that "in the last analysis, the future of science in this country will be determined by our basic educational policy."

Demonstration and experiment

Initially, the focus of U.S. federal support for science education was on the undergraduate and graduate levels. Eventually younger students began to win the attention of the scientific community. In 1956, a group of physicists centered at the Massachusetts Institute of Technology, among them Philip Morrison, formed the Physical Science Study Committee (PSSC). PSSC developed materials for the high-school level—a teacher's guide, laboratory apparatus, films, books—that emphasized experiment over memorization.

The Soviet launch of Sputnik in 1957 sparked an even more determined focus on American science education. In 1960, PSSC scientists—joined by philosopher of science and Manhattan Project historian David Hawkins, chemist George Hein, and others—formed the Elementary Science Study (ESS) to develop materials for even younger children. These scientists and curriculum reformers would, as advisors and friends, influence the science centers emerging from the 1960s on.

In 1963, the American Association of Physics Teachers launched a publication, *The Physics Teacher*, to support high school educators. One of the authors was Richard Crane of the University of Michigan, who wrote the journal's "How Things Work" column. Crane would later become closely involved in development of the Ann Arbor Hands-On Museum, installing

the museum's first exhibit, a hot air balloon, and inspiring a traveling exhibition named after his column.

Science centers organize

The first U.S. science center to use the name got its start when MIT's Courtland Randall, science advisor for the U.S. pavilion at the 1962 World's Fair in Seattle, helped to negotiate the structure's repurposing as the Pacific Science Center after the fair closed.

Randall went on to Oak Ridge, Tennessee, to work with the Atomic Energy Commission (AEC). The little science museum there, heir to the main Oak Ridge site of the Manhattan Project, developed traveling exhibitions. Around 1970, at the invitation of the AEC administrator, several science museums convened there to talk not only about borrowing exhibitions, but also about forming an association. Formal incorporation followed in 1973; ASTC was the result.

The scientific community continued to lend its support to the fledgling organization. The National Academy of Sciences (NAS), in Washington, D.C., provided initial office space for ASTC's staff of two. As Lee Kimche, ASTC's first director, would recall 20 years later, then NAS president Phil Handler "wanted scientists to know what was going on in science centers." In return, ASTC helped NAS start its own exhibition program, with shows on work like the stroboscopic photography of MIT's Harold Edgerton.

ASTC picked up speed with a start-up grant from NSF's Public Understanding of Science Program, housed at that time in the agency's Education Directorate. Exhibitions were a major focus of this early NSF support, as was ASTC's work with professional soci-

eties like the American Optical Society and American Psychological Association. The American Association for the Advancement of Science (AAAS) has also been a long-standing collaborator. During the 1980s, ASTC and AAAS developed a cooperative program to alert AAAS scientists to volunteer opportunities at science centers.

As more science centers and museums opened, the model of the scientist/director or scientist/chief educator continued. To name just a few, geophysicist Tuzo Wilson (an early proponent of plate tectonics) was among the first directors general of Toronto's Ontario Science Centre; neuropsychologist Richard Gregory founded the Exploratory in Bristol, U.K.; and physicist Ernie Malamud of FermiLab became founding director of Aurora, Illinois' SciTech Hands-On Museum.

'Where are the scientists?'

Growth and expansion were the hallmarks of the field during the late 1980s and 1990s. But by 1993, when ASTC carried out a series of 20th anniversary interviews with founders and early supporters, one of ASTC's first NSF program officers, George Tressel, identified what he called a "weakness."

For one thing, Tressel said, science centers had become "more a business." But more fundamentally, he thought, science centers' shift of focus from the curator to the educator had become a risk, because "science is a very fluid thing—things change from one day to the next."

"Without a science community as a direct part of the operation," Tressel warned, "you'll find that you're teaching stuff that's out of date and tired.... [You'll] do it in an unthinking way." Science centers need people with vision and capacity, he said, to "get the scientists involved." If nothing else, Tressel advised, it was important to keep asking two questions: "Where are the scientists?" and "How do we keep the science exciting?" ■

Wendy Pollock is ASTC's director of publications, research, and exhibitions.

Content and Commitment: *Insights from the VolTS Front-End Study*

By Renee Miller

In November and December 2005, Randi Korn & Associates Inc. (RK&A) conducted a front-end study for the *Volunteers TryScience* (VolTS) project (see opposite page). The evaluators conducted and analyzed 26 in-depth telephone interviews with members of three groups:

- scientists and engineers who volunteer in educational programs outside of science centers
- scientists and engineers who currently volunteer in science centers
- science center staff who work with volunteers.

The volunteers came from both academic and corporate backgrounds; some were retired from full-time employment. Discussion groups were also held with science and engineering professionals who attended a 2006 IEEE conference; these findings, though not presented officially in the RK&A report, did inform the analysis and recommendations.

This article is based primarily on the interviews done with the volunteers and staff who work in science centers. Museums were picked by location, size, and range of volunteer opportunities they offer. The kinds of collaborations represented ranged from advisory panels to one-time lectures to exhibition development. From the observations and recommendations in these interviews emerges a summary portrait of the characteristics that make for a healthy partnership.

Attitudes and motivation

Why would busy scientists and engineers take time out to share their expertise with science center audiences? Most volunteers we interviewed had only positive things to say about informal science education. They praised

the inquiry approach of science centers and their outreach to general audiences:

"The value is in the hands-on nature...."

"Science centers do a good job of just giving people access."

"I know that they have a commitment to the community, so I was happy to get involved when they asked."

Volunteers expressed a desire to "give back" to the community, but they also saw their role in the museum in specific terms. Some had come to the museum to share their expertise in a certain area of science:

"They asked me to be the champion for that volunteer activity."

"My role was basically in an advisory capacity, for the science end of things."

Others saw an opportunity to educate the public about what scientists do:

"I think people think of engineers and scientists as boring; the science center helps the public interact with people doing the jobs."

"It is all about networking; You're meeting people and getting to talk about your passion."

Even for those who, like one NSF-funded researcher, came because their particular project required community outreach, the social element was an important factor:

"Otherwise, I don't have the opportunity to talk to people about my work outside of work."

"It made me realize how good it was for me, from a job perspective, to talk to the people you're trying to serve."

Interviews with volunteer coordinators revealed that they value equally the role that these expert volunteers play in the science center. "They are able to make real-life science connections," said one staff member. Said another, "It is extremely important to ... show that we are in contact with people doing