Raising the Image of Science in Britain

Cultural, economic, and political factors have led three of Britain's oldest scientific organizations to join hands in promoting a greater public understanding of science

London

In the final year of the 18th century, the Massachusetts-born physicist Benjamin Thompson—better known by his German title as Count Rumford—raised the then significant sum of £30,000 through private subscriptions to create a public institution in London for "diffusing the knowledge and facilitating the general introduction of useful mechanical inventions and improvements" through scientific lectures and demonstrations.

One of Rumford's aims was to overcome suspicions of the new technologies of the period. "Our whole purpose has been to popularize science for the past 200 years," says David Phillips, deputy director of Rumford's brainchild, the Royal Institution of Great Britain. "It worries me that we still have to do it today."

The Royal Institution is one of three leading scientific organizations—the other two being the British Association for the Advancement of Science and the Royal Society—which have recently joined forces in creating an ad hoc Committee on the Public Understanding of Science (COPUS).

The creation of the committee was, in itself, the main result of a report 18 months ago by a working group of the Royal Society, which has served as a catalyst for a new resurgence of interest in the scientific community in ways of encouraging greater public interest in its activities.

Initiatives launched by various bodies include:

- A new medal, the Michael Faraday Award, named after the Royal Institution's most illustrious 19th-century popularizer, to be awarded annually by the Royal Society to a scientist for his or her contribution to the public understanding of science.
- The launch by the British Association of a media fellowship scheme similar to that run by the American Association for the Advancement of Science to give practicing scientists a brief experience of how the mass media works.
- A decision by the Economic and Social Research Council to finance a series of research projects, costing more than $750,000, into the way in which science and technology are perceived by the British public.
- Plans being developed by the education department of the British Broadcasting Corporation to launch a major "scientific literacy" campaign in 1988 comparable to a highly successful adult literacy campaign which ran in the early 1980s.
- The proposed appointment of a public relations officer for science, financed out of contributions raised from private industry, whose job would be to develop ways of enhancing the public image of science.

The support that has grown steadily for these separate initiatives since the Royal Society report was published seems to confirm that "it was the right report at the right time," the assessment of working group chairman Walter Bodmer, director of research at the Imperial Cancer Research Fund. "The response that we got, for example the interest shown by heads of major industries, was very positive; the tide was in the right direction among the right people."

The report's main impact lay less in its recommendations than in the way it placed the public's understanding of science firmly on the scientific community's agenda. However, the report itself has not been without its controversial side. Its main criticism was that scientists were not doing enough to tell the public about their research. Not everyone has agreed, however, that this was the heart of the problem. For example, the report received a lukewarm response from *Nature*, which described its analysis as "over-flattering to the scientific community everywhere" by refusing to address "the convention of self-certitude that has been taken up by academics."

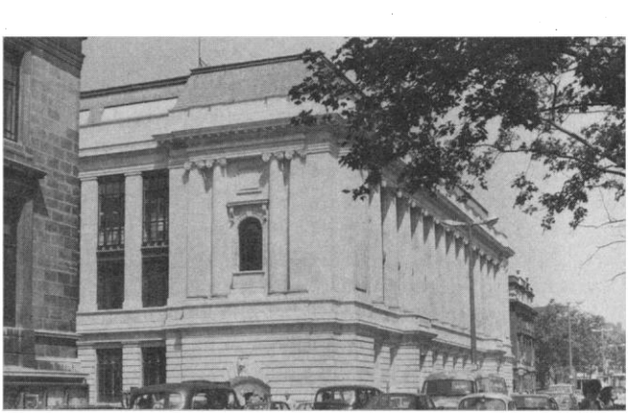
Even working group member John Ziman, visiting professor of science policy at Imperial College, London, argues that some of its conclusions were self-serving. "The Royal Society [working group] started from a rather mandarin point of view," says Ziman. "It said that it was the duty of scientists to tell people about science, and the duty of other people to listen to what they said."

Ziman is chairman of the recently created Science Policy Support Group which has been given the task of allocating the grant from the Economic and Social Research Council.

Research to be supported by this money will range from investigations of the social factors influencing public perceptions of the risks of nuclear power and toxic waste, to attitudes toward science among young people, and among leading industrialists. In each case, says Ziman, emphasis will be on taking a "bottom-up" approach, seeking not only to describe how people feel about science but why they respond in the way they do.

Ziman argues that numerous questions remain to be answered through research before the public understanding of science can be significantly improved. In contrast, those involved with COPUS claim that the needs are too urgent to wait until conclusive research results are in. This is partly the result of various immediate pressures to enhance the public image of science—a goal which, while not identical to that of raising public understanding, nevertheless in practice has become closely identified with it (as illustrated by the committee's enthusiasm for appointing a public relations officer).

Three separate external factors are at work. The first is the argument that increased public enthusiasm will encourage



London's Science Museum

Recently opened a "hands-on" gallery for children. The ad hoc committee on the public understanding of science says this is the kind of activity it would like to encourage.

the government to relax the tight financial restrictions on research. "There is a feeling in the British Association, for example, that we should be taking a much more up-front attitude in terms of generating public support for science," says Briggs.

The second factor—one that has grown considerably in importance since the Royal Society report was published—is that an increased awareness of the importance of science-based industries will help overcome the financial community's apparent reluctance to invest in long-term research and development.

Last week, for example, George Walden, the government minister responsible for science, told an audience in Cambridge that the current difficulties facing British scientists are less the result of government parsimony than of attitudes of an industry that was "at the top of the league in pay raises and bottom in research."

Third, there is the argument that the ability to separate scientific facts from interpretations of their social significance should lead to improved political decision-making on subjects that range from the disposal of radioactive waste to the treatment of AIDS.

Here again, however, reactions to the committee's program have not all been positive. Several critics point out that the dominant decision-making model used in developing its recommendations is one in which the main decisions about the allocation of scientific resources are made by a relatively small community of top-level decision-makers.

Many of those who introduced discussion about the social implications of science into university courses 20 years ago sought explicitly to challenge this model of the way science should be organized. In contrast, the Royal Society's initiative is "much more top-down, much more establishment driven," says Ziman. "One could almost describe it as the establishment's final, belated response to the science and society movement."

Bodmer sharply disagrees with those who argue that his prime concern is the social authority of scientists. "You don't necessarily get the answer that the majority of scientists want by giving people more understanding, but it would be perverse to say that you do not want them to understand more science in order to be able to dominate them," he says.

Nevertheless, Bodmer admits that getting the message across, whether to politicians or to government administrators, has become an important task for the scientific community. "British scientists have been very poor at lobbying," he says. "They do not have an organized lobby, and they need to. Everyone else does." ■ **DAVID DICKSON**

Crises and Nuclear Control

In spite of all the public attention that has been paid to nuclear weapons, the management and control of atomic arsenals remain poorly understood, according to two recent studies.* Yet "operational matters are more important than arsenals and doctrine" if the world is ever brought to the brink of nuclear war, points out Ashton Carter of Harvard's Center for Science and International Affairs, who helped write both reports.

One of the studies, conducted under the auspices of the American Academy of Arts and Sciences and Cornell University's Peace Studies program, concentrates on the functioning of command and control systems during periods of crisis between the superpowers. Written by 14 analysts, including several retired military officers, the study concludes that a range of policy changes are needed to ensure that crises are kept under control. "The chances that a superpower crisis could run amok are very real," says Kurt Gottfried, a Cornell phycisist who helped organize the study.

Reducing the risk of nuclear war requires that more attention be paid to containing crises and, in particular, "the ability of governments to stay in command of events in crises," the study concludes. However, several factors may work against crisis stability.

■ The short flight times of submarine-launched missiles and intermediate-range missiles in Europe provide little warning of missile attack. Although the report concludes that a surprise attack aimed at "decapitating" national control systems is "not a rational strategy for either side under essentially all circumstances," the presence of such weapons close to the superpowers' capitals would contribute to instability during crises.

■ Uncertainty about the ability of command and control systems to function during a nuclear attack could in itself exacerbate a crisis. Fear of losing control could push either side to escalate first.

■ "Growing antisatellite capabilities could turn space into a medium for exceptionally swift crisis propagation" by severely impairing command, control, and intelligence operations if key satellites were destroyed.

These conclusions lead the authors to several recommendations aimed at enhancing stability during crises. For the United States, they include giving the highest priority to efforts to upgrade the command and control system—including the planned deployment of military communications systems designed to function in a nuclear war—and making crisis stability a central focus of arms control efforts.

As far as the latter goal is concerned, the study suggests an agreement that would prohibit either side from placing ballistic missiles—either on land or at sea—within 1500 miles of the other's capital, and a ban on testing antisatellite weapons. In addition, the study argues for an agreement to reduce the number of strategic warheads on each side by 50% and a move toward mobile launchers, each with fewer accurate warheads, which are less vulnerable to attack.

The second study, a 750-page tome written by 22 experts on military systems and cosponsored by the Brookings Institution and the Harvard Center for Science and International Affairs, offers no conclusions or recommendations. However, a general theme is that, although control of nuclear weapons appears to function well in peacetime—there have been no accidental explosions in the 40 years of the atomic age and robust mechanisms are in place to guard against such a dire event—the functioning of the control systems during crises or even outright war have received inadequate attention.

In particular, a chapter written by Paul Bracken of Yale University notes that possible breakdown of command and control after the onset of a nuclear war could make it very difficult to terminate hostilities. In an introduction, the study's three editors write that "Limiting and controlling operations once they are under way are still more the abstractions of strategists than concrete guidance to military operators. Termination is apparently an operational vacuum." ■ **COLIN NORMAN**

*_Managing Nuclear Operations_, edited by Ashton B. Carter, John D. Steinbruner, and Charles A. Zracket, Brookings Institution, 1987.
Crisis Stability and Nuclear War, edited by Kurt Gottfried and Bruce Blair, to be published by Oxford University Press.