1993 Award for Distinguished Public Service

Proper recognition for mathematicians who contribute valuable service to the profession is a matter of great importance to the Society. The continued growth and health of the discipline depends in large part on those individuals who contribute their time to public service activities in support of mathematics. To provide encouragement and recognition for such service, the AMS Council, responding to a recommendation from the Committee on Science Policy, established the Award for Distinguished Public Service. The $4000 award is presented to a research mathematician who has made a distinguished contribution to the mathematics profession through public service during the previous five years.

The 1993 Award for Distinguished Public Service was presented to I. M. SINGER of the Massachusetts Institute of Technology, on January 15, 1993, at the AMS-MAA Prize Session during the Joint Mathematics Meetings in San Antonio. The award was made by the AMS Council, acting through a selection Committee consisting of William Browder (chair), Robert M. Fossum, Kenneth M. Hoffman, John C. Polking, and David P. Roselle.

The text below includes the Committee's citation, the recipient's response, and a brief biographical sketch of the recipient.

I. M. Singer

Citation

The third American Mathematical Society Award for Distinguished Public Service is presented to I. M. Singer in recognition of his outstanding contributions to his profession, to science more broadly, and to the public good by bringing the best of mathematics and his own insights to bear on the activities of the National Academy of Sciences; on committees of the National Research Council, including the two so-called David Committees on the health of the mathematical sciences, and the Committee on Science, Engineering, and Public Policy; on the President's Science Advisory Council; on decisions of Congress, through testimony concerning the support of mathematics and mathematical research; and on a host of critical situations over many years in which his wisdom and intervention helped gain a hearing for the problems of his community and the contributions it makes to the nation.

Response

I am honored to receive the Society's Award for Distinguished Public Service and join the company of the two previous winners, Ken Hoffman and Harvey Keynes, who have dedicated themselves to education and public service. And I am touched by the gracious citation full of warmth and appreciation for my efforts on behalf of science and mathematics.

I. M. Singer

Over the past two decades I served on several key committees in Washington. Those twenty years have given me a perspective on science policy not common in mathematical

circles. Since the federal support for mathematical research is eroding, I thought it might be useful to review some things I have learned germane to our present plight.

I have vivid memories of my first year as a member of the National Academy's influential Committee on Science, Engineering, and Public Policy (COSEPUP). Chairman Harvey Brooks tried to establish a system of priorities for science; although he failed, it was a noble effort. When I was chairman, I also tried and failed, as has everyone since.

COSEPUP did succeed in getting individual disciplines to begin ordering priorities in their own fields, as they prepared reports reviewing their subject. That was not easy to do; ultimately disciplines realized the value of priority-setting despite the internal pain it generated. Astronomy, for example, has benefited by its recent presentation of a coherent research program. The cooperation implicit in creating that report grew out of the experience with priority-setting in earlier ones.

The White House Science Council (WHSC) was even more interesting because of the urgency of many of the issues and problems we discussed. The Council consisted of about twelve engineers and scientists from universities and industry, giving advice to the President on topics ranging from AIDS to Zoroastrianism.

On WHSC we also tried to put order in the vast disarray of federal support for science. It was there that we had the idea of revitalizing the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET). President Bush's science advisor, D. Allan Bromley, has used FCCSET initiatives very effectively to support science and engineering projects that directly benefit the nation. The participation of mathematics in these initiatives is vital to the country and furnishes us with new ideas, problems, and insights. But because we have not come up with our own agenda, the support for mathematics is being skewed.

I enjoyed COSEPUP and WHSC because they were committees of extraordinary scientists and very stimulating human beings grappling with difficult problems. Here I must single out Ed David on WHSC. He taught mathematicians that it was not enough to write reports. To implement them requires concerted efforts.

What have I learned relevant to the problems mathematics faces in seeking resources? I would like to make three points.

I. As a research activity it is a stark fact that we are *invisible*.

(i) A crises management government does not call upon us. We don't clean up nuclear wastes and we can't cure cancer.

(ii) In the Washington scheme of things, mathematical research is too small a budgetary item to worry about and spend any time on.

(iii) Education aside, mathematics is too hard and too esoteric to generate much public interest or enthusiasm (though I appreciate the inventive ways mathematicians have engaged the public). As hard as many of us have tried, for most science administrators, mathematics is an afterthought. Time and again we hear "Oh yes, we forgot about mathematics."

II. Our internal divisiveness is not greater than in most fields. The David Reports document that in the competition for funds, we do relatively poorly. Washington says that's so because "we haven't got our act together." The fact is that most fields have considerable internal strife, not invisible, either. We could present a more persuasive case for mathematics (see below), but our lack of unity is not the cause of our lack of support. More likely, it is because government officials think short-term; the long-term well-being of the nation is ignored, and with it the case for mathematics.

III. Scientists have abdicated their role in priority-setting; consequently, Congress distributes resources among disciplines largely on political grounds rather than scientific merit or value to the country. Science still operates on the old principle: each discipline presents its own case and may the "best" case win. In practice that means merit is secondary to political clout.

Where are we? We are engaged in an intense competition for scarce resources. Congress, getting no coherent advice from little science and too much advice from big science, is schizophrenic in its support of basic research. It demands that scientists focus on targeted research in order to increase our competitiveness (whereas it knows full well that where we can't compete, the cause is not lack of technology transfer). At the same time it funds huge and expensive science projects, some having merit, but none able to contribute to our economic well-being in the foreseeable future. The support for science is shockingly out of balance.

We have no dedicated supporters among scientific administrators. They have a different agenda, and, as I have stressed, mathematics is invisible to them. Our own mathematics representatives are sorely tried. Poor souls, they must placate a bitter, complaining community, many of whose members believe support for mathematics is an entitlement program. They must play the game of finding funds with rules invented by, and suitable for, other disciplines, not mathematics.

What shall we do? We can find other ways of validating the importance of mathematics. It is powerful, beautiful, and practical. We are engaged in the noble profession of teaching, applying, and expanding mathematics. The public understands its importance. That's one reason for their concern about mathematical education.

In the David Reports, we succeeded in describing many important applications of mathematics. But we have never tried to explain how pervasive the fundamental ideas of mathematics are in modern science and technology, indeed in modern life. It is time for a serious account of the intellectual impact of mathematics.

The country is asking us to improve mathematical education in grades K–16. It is asking us to apply what we know quicker, and it wants us to remain first in the world in mathematical research. Despite our differences, it seems to me that we can prepare a document that spells out what

it takes to accomplish these tasks, and, if the resources are not there, what diminished resources, distributed in different ways, will and will not accomplish.

Before such a document is prepared, we can still go before Congress and talk about mathematics. There is no one to represent us, as I have tried to explain. Even without an orchestrated effort, each of us could have an effect. Phil Griffiths and I appeared before the House Subcommittee on Veterans Affairs, Housing and Urban Development, and Independent Agencies [which oversees the National Science Foundation] last year. Afterwards, Congressman Chet Atkins said, "Real live mathematicians. That's a first. Come again." And so we should!

Once more, it is a great pleasure to be recognized for my efforts on behalf of mathematics, particularly by a selection committee so distinguished and so knowledgable about science policy.

Biographical

Singer was born on May 4, 1924, in Detroit, Michigan. He received a B.S. degree from the University of Michigan in 1944, and an M.S. (1948) and Ph.D. from the University of Chicago (1950). He was an instructor of mathematics at the Massachusetts Institute of Technology from 1950 to 1952, and an assistant professor at the University of California at Los Angeles from 1952 to 1954. He was visiting assistant professor at Columbia University from 1954 to 1955, and a member of the Institute for Advanced Study, 1955–1956. He then returned to MIT, advancing from assistant professor to professor between 1956 and 1977. He served as visiting professor (1977–1979) and professor at the University of California at Berkeley and is currently Institute Professor at MIT.

The Society has benefited immensely from Singer's activities. He served as Vice President (1970–1971) and on the Executive Committee of the Council (1975–1982). He also served on many publication committees, chairing several, and was an associate editor of the *Bulletin* (1982–1983) and *Proceedings* (1957–1959). Singer was on committees to select the Steele, Bôcher, and Wiener Prize recipients, as well as the Committee on Science Policy. In addition, Singer has given invited addresses at past AMS-MAA meetings and Summer Research Institutes and delivered the Colloquium Lectures. Nationally, he served on the White House Science Council from 1982 to 1988 and was chairman of the National Academy of Sciences Committee on Science, Engineering, and Public Policy (1973–1978).

Singer was a Sloan Fellow (1959–1962), a Guggenheim Fellow (1968–1969 and 1975–1976), and was awarded the Bôcher Prize (1969), the National Medal of Science (1983), and the Eugene Wigner Medal in 1988. His major research interests are differential geometry, geometric quantum field theories, and global analysis.