

4. Professor Alexander, Chairman of the Killian Award Selection Committee, presented the report of the Committee announcing its selection for the Killian Award Lecturer for 1978, Robert Merton Solow, Institute Professor, Professor of Economics. The report of the Committee follows.

"In 1971 this faculty established the James R. Killian, Jr. Faculty Achievement Award as a permanent tribute to James R. Killian, Jr., tenth President of MIT (1948-1959) and Chairman of the Corporation from 1959 to 1971. The purpose of the Award is: "To recognize extraordinary professional accomplishments by full-time members of the MIT faculty; to provide a means for the communication of these accomplishments to the faculty, students, other members of the MIT community and to the general public, and by so doing to honor the contributions made by Dr. Killian to the intellectual life of the Institute."

It is my pleasant duty to bear witness today to our continuing esteem and affection for Dr. Killian by announcing, on behalf of the Selection Committee, its choice of the sixth recipient of the Award.

But first, I hope that I may be permitted to extend, on your behalf as well as my own, our thanks to the members of the Selection Committee.

Professors: Robert M. Fano  
Howard Green  
Thomas B. King  
Felix M.H. Villars

The Committee had no small task making its selection. They shared that task cheerfully, diligently and ably and took great satisfaction, as I did, in reviewing the extensive evidence of the scientific and academic achievements of so many distinguished members of the Faculty. If we had had a dozen awards to make, we would still have found it necessary to leave many worthy recipients unrewarded. Dr. Killian can indeed take satisfaction in knowing that the tradition of

excellence he so strongly fostered at MIT is being maintained.

I should, accordingly, like to announce, on behalf of the Committee, its selection for the Killian Award Lecturer for 1978, Professor Robert Merton Solow.

#### CITATION

Robert M. Solow embodies, to a remarkable degree, those qualities of scholarship and character which Dr. Killian worked so diligently and skillfully to develop at MIT. Robert Solow's world-recognized work in economics has helped maintain the pre-eminence of MIT in that field. His teaching has contributed much to the education of graduates and undergraduates alike. His colleagues have benefitted from his perceptive discussion and criticism of their work. All these things he has done with such wit, and style, and commitment, as to give him a special place in our community.

Robert Solow was born in Brooklyn in 1924, and educated in that borough's public schools and at Harvard University. His undergraduate study was interrupted by combat service in World War II as a non-commissioned officer in the Signal Corps. He returned to Harvard after the war, taking his B.A. in 1947, his M.A. in 1949, and his Ph.D. in 1951.

Midway in Solow's graduate career at Harvard, in 1949, the late Ralph Freeman, pursuing that policy of early recognition of genuine talent that did so much to gain for MIT an economics faculty of world-wide eminence, offered him an appointment at MIT as Assistant Professor of Statistics. It was to take effect a year later, in 1950, after an initial leave to study, on a pre-doctoral fellowship at Columbia, the exciting new developments in mathematical statistics of the late Abraham Wald.

The room assigned to him as his office at MIT was located between that of Professor of Statistics Harold Freeman and that of Professor of Economics Paul A. Samuelson, a position he was long to occupy fruitfully in topographic, institutional, and intellectual space. The center of gravity of his interest gradually moved, however, from statistics to economics. In 1954 he was appointed Associate Professor of Statistics, in 1958 Professor of Economics, and in 1973, Institute Professor. He never forgot, however far he ventured on the seas of economic theory, to fix his location by bearings on the solid ground of empirical measurement. (This nautical metaphor may be allowed in reference to one who qualifies as the skipper over thirty the sea-struck youth of Martha's Vineyard would most like to crew for.)

The intellectual partnership of Solow and Samuelson must rank among the most productive of such relationships in the history of economics, extending far beyond the occasional explicitly collaborative work. Each served as testing ground for the ideas of all of his colleagues, but most of all for each other. The gain to each, and to the discipline of economics, from that interaction has been immeasurable. And from MIT's point of view, nothing so powerfully held each of them to the Institute as the presence of the other.

Though he speaks to the world in everyday language, if his polished prose can be so described, in that part of his professional work that is commonly called professional work, he is an economist's economist. When an Oxford don, in a serious if light-hearted paper in a British learned journal, addressed the question "Are American Economists Better?" Solow figured, both implicitly and explicitly, as the paradigm case. Particularly noted was the cheerful vigor of his approach which seemed to be saying 'let us see whether we can learn anything'.

His scholarly work has been brilliant and path-breaking. Over twenty-five years ago, before concern with inequality was quite so fashionable, he wrote his doctoral dissertation on how random processes can explain the statistical dispersion of incomes and the stability of such dispersion over the years.

In the fifties, at MIT, Solow wrote a remarkable series of papers on the factors affecting the growth of national income. These provided both the theoretical foundation of what is now the standard analysis, and the key to the empirical measurement and estimation of the relative contribution of the factors involved.

For example, a nation's output grows because of the growth of population, and hence of the labor force; because of growth of the non-labor factors of production, tools and machinery, raw materials and goods in process, buildings and land, all roughly lumped together as "capital"; and because of improvements in the technology used. The problem was how to separate out the effects of these diverse components. Paul Douglas, later to be Senator, had explored, in the 1920's, the labor and capital contributions by direct study through regression analysis of the response of the economy's output to the factor inputs. His important work had reached a dead end because of its inability to grapple with technical change for which, unlike labor and capital, no directly available measure of input exists. The subject was brought to life by Solow's insight that the familiar fact that the shares of labor and capital in the distribution of income depended on their role in the production process could be inverted to use wage and property-income statistics as elements in the estimation of the contribution of the corresponding factors of production to the production process. In this way a measure of the effect of technical change of the production process on the output of the economy could be estimated as a "residual", a now commonplace use of the term deriving from Solow's analysis. Economists had been prone to emphasize the increase of capital per worker as the principal explanation of the great increase in output per worker in the leading Western economies in the last century or two. Such an increase in output per worker is what is principally meant by "economic growth" or "development". Solow's methods, applied both by himself and by a host of others who came to use them yielded primacy of place to technological change as the key to economic growth -- an appropriate finding to come out of MIT. When practical economists grapple with long-term development problems of the less developed countries, or for that matter of developed countries, the tools they use were forged by Solow.

Conspicuously absent from the growth scenarios just described was the limitation of natural resources. Following Solow's lead, economists in the last decade have sought insights into the degradation of the environment and the future trends in energy and raw material costs, and the spatial patterns of urban land use. Solow has also made notable contributions to the theoretical and empirical study of inflation and of fiscal policy, here again establishing findings directly relevant to public policy, and furnishing the basis for others to carry on the work on practical problems.

These technical researches do not exhaust Solow's scholarly influence. When John Kenneth Galbraith advanced the theory of The New Industrial State, it was Solow who provided the most cogent, if devastating, evaluation. When events of the late 1960's moved many young economists to seek a new and radical economics, it was Solow's fair-minded but biting critiques that helped restore their perspective. Solow's witty public speeches have been widely anthologized, so that students all over the country, and the public at large, are able to gain from them some of the same benefits that MIT students receive from his lectures.

Among the leading economists of the world, it would be hard to find another to compare with Professor Solow as a teacher. The roll of his former graduate students reads like a Who's Who of the leaders of the younger generation of economists, and more are on the way. Robert Solow's achievement is to be measured not only by his advances in economic thought which are impressive enough, but also for his contribution to the education of others in the almost forgotten sense of that word as the development of character. His former students testify that at least as important as the knowledge and skill he transmitted to them was his influence on their own personal development in relation to the discipline. He so clearly loved the subject and respected high standards of achievement in it, and he so clearly cared about them, that they too came, in some measure, to feel the same way about it, an orientation which has enhanced their satisfaction in their own work.

Nor has his teaching been confined to Ph.D. candidates. Undergraduates have been accorded equal time and attention. For many years he has delivered introductory economics lectures to enthusiastic classes who learned from him that the study of economics can be an exciting intellectual adventure. And the undergraduate students in his intermediate macroeconomics course enjoy the rich experience of exploring the frontier of knowledge in a subject of practical importance. His colleagues value that achievement for the demonstration that matters of practice are best approached through theory. Not only from MIT but from Oxford and Cambridge, where he has filled honorary lectureships, have come reports that his example has caused the rest of the economics faculty to look to the quality of their teaching.

So inspiring a teacher naturally attracts more than his share of students seeking guidance on theses and on the subject matter, a burden Professor Solow has gracefully borne.

In Professor Solow are to be found technical skills of the highest order combined with practical good sense and superb ability to communicate. These talents have, naturally, led to extensive demands on him for public service, to which he has responded generously, but subject to the limit imposed by his primary responsibility to his calling. He has been an influential and productive member of numerous public commissions and panels, and for one year, served on the staff of the President's Council of Economic Advisors.

He has been awarded many honorary degrees and other academic honors.

The economics profession, the MIT community, and indeed the world of affairs in which he has played a significant part, are grateful to him for demonstrating that it is possible to be both witty and profound at the same time. His students know that it is not in him to deliver a dull lecture, and his work as a public servant and as publicist he has been able to make his substantial contributions with elegance, style and good humor. During his stint in Washington, the one thing he enjoyed even more than telling the President what to do was telling him what to say. To a born teacher speechwriting came naturally.

Economists fondly remember the testimony of an early 19th century Scottish philosopher who knew Adam Smith slightly, Ricardo well and Malthus intimately. "Is it not something to say for a science (he asked) that its three greatest masters were about the three best men I ever knew." Robert Solow is among that number. He, among economists, like James R. Killian among university presidents, is notable not only for the admiration, but also for the affection he commands. And neither toward economists nor university presidents is widespread affection a common thing. MIT can well take pride in such men."