

## Corporation Elects 16 Members

The MIT Corporation at its regular quarterly meeting Monday elected four of its five-year Term Members to Life Membership, re-elected two Term Members to additional five-year terms, and elected nine new Term Members, each to serve for five years.

Under the chairmanship of Howard W. Johnson, the Corporation is the Institute's governing body. Its members include some 90 distinguished leaders of industry, science, engineering, education and government in whom are vested the trusteeship of the Institute.

The Monday elections bring to 25 the number of Life Members of the Corporation. The four Term Members who were elected Life Members effective July 1 are:

**Breene M. Kerr** of Oklahoma City, Okla., partner in Resource Analysis and Management Group, Oklahoma City, and chairman and chief executive officer of H-K Corporation, Oklahoma City. A 1951 graduate of MIT, Mr. Kerr has been a Term Member of the Corporation since 1969 and a member of its Executive Committee since 1975. He has long been active in the affairs of the Institute and its alumni, serving as president of the 60,000-member MIT Alumni Association from 1972-73. A former executive with Kerr McGee Oil Industries, Inc., Oklahoma City, he served first as deputy assistant administrator and later assistant administrator of the National Aeronautics and Space Administration from 1964 to 1967.

**Frank R. Milliken** of Darien, Conn., president and chief executive officer and a director of Kennecott Copper Corporation, with headquarters in New York City. A 1934 graduate of MIT in mining and engineering, Mr. Milliken has served as a Term Member of the MIT Corporation since 1962, having been elected in that year, again in 1968 and again in 1973. He was a member of the Corporation Executive Committee 1963-65 and has served on that committee again since 1974, having been most recently elected in 1974. A former chief metallurgist with General Engineering Company, Salt Lake City, and assistant manager of the Titanium Division of National Lead Company, he joined Kennecott in 1952 as a vice president, became executive vice president in 1958 and president and chief executive officer

(Continued on page 5)

## For Some, Commencement Was Family Affair

Commencement was a family affair for some members of the MIT community as the children of faculty, staff, and alumni received their degrees.

Among the children of faculty and staff who received degrees on Monday, June 6, were:

**Anne L. Averbach**, daughter of Dr. and Mrs. Benjamin L. Averbach of Belmont, who received the SB degree in mathematics and was commissioned an ensign in the US Naval Reserve. Dr. Averbach is professor of materials science in the Department of Materials Science and Engineering.

**James J. Eisen**, son of Dr. and Mrs. Herman N. Eisen of Waban, who received SB degrees in political science and in economics. Dr. Eisen is professor of immunology in the Department of Biology.

**Brian T. Harrington**, son of Dr.



**HUSBANDS AND WIVES COMMISSIONED AT MIT**—Ensigns Linda and Ronald Pirek, kneeling, and Air Force Lts. Marilyn and Peter McQuade were among the 25 MIT students who received Army, Navy or Air Force commissions Friday, June 3, after completing ROTC programs. They are the first married couples to be commissioned at MIT, which is one of the small number of schools offering programs in all three major branches of the military. Marilyn McQuade is the former Marilyn Kelley. She is the daughter of Dr. and Mrs. Robert A. Kelley of Lacrosse, Wisc. Peter McQuade of Boise, Idaho, is the son of Justice and Mrs. Henry F. McQuade, now living in Vienna, Va. Linda Pirek is the daughter of Mr. and Mrs. Ralph Kerley of Highland Mills, N.Y. Ronald Pirek's parents are Mr. and Mrs. Chester Pirek of Dearborn Heights, Mich. The McQuades will be stationed at Kirtland Air Force Base in Albuquerque, NM. The Pireks will be stationed in Washington, D.C. See story, other picture on page 5.

and Mrs. John V. Harrington of Washington, DC, the SB degree in civil engineering. Dr. Harrington is professor of aeronautics and astronautics and electrical engineering.

**Ethan E. Jacks**, son of Mr. and Mrs. Stanley M. Jacks of Southboro, the SM degree in management. Mr. Jacks is senior lecturer at the Sloan School of Management.

**Philip C. Lambe**, son of Dr. and Mrs. T. William Lambe of Carlisle, the SM degree in civil engineering. Dr. Lambe is Edmund K. Turner Professor of Civil Engineering in the Department of Civil Engineering.

**Robert W. Mann, Jr.**, son of Dr. and Mrs. Robert W. Mann of Lexington, the SM degree in aeronautics and astronautics. Dr. Mann is Whitaker Professor of Biomedical Engineering in the Department of Mechanical Engineering.

**Alexander E. Nedzel**, son of Dr.

and Mrs. V. Alexander Nedzel of Weston, the SB degree in computer science and engineering. Dr. Nedzel is division head of Division 9 at Lincoln Laboratory.

**Donald E. Rediker**, son of Dr. and Mrs. Robert H. Rediker of Watertown, SB degrees in chemistry and biology. Dr. Rediker is adjunct professor in the Department of Electrical Engineering and Computer Science and associate division head at Lincoln Laboratory.

**Paul R. Samuelson**, son of Dr. and Mrs. Paul A. Samuelson of Belmont, the SM degree in management. Dr. Samuelson is Institute Professor and professor of economics in the Department of Economics.

More than 30 undergraduates who received degrees on Monday are alumni sons and daughters. One, **Mary C. Shaeffer**, who received the SB degree in chemical engineering,

## Technology Day Alumni Activities Are Friday Highlight

An estimated 3,000 MIT alumni and their families will be on campus Friday (June 10) for the annual Technology Day (formerly Alumni Day) program.

In morning and afternoon sessions at Kresge Auditorium, a group of young faculty members will brief the alumni on research they are doing in several areas. The subjects to be discussed include product innovation, deep sea mining, space explorations, the environment and computer music. The morning program begins at 9:15.

The Technology Day program is the highlight of MIT's annual alumni

week activities, which this year include a record number of class and departmental reunions and the traditional alumni night at The Boston Pops on Thursday (June 9).

The Friday events will begin at 8am with a breakfast for alumni in the Sala de Puerto Rico at the Student Center. There will be a Memorial Service in the MIT Chapel from 11:55 to 12:25. The reunion classes will present their class gifts at a luncheon in the Rockwell Cage beginning at 12:30pm. The day will continue with a reception at 5pm in the Mezzanine Lounge of the Student Center.

## Class Reunions Take Focus

MIT reunion week activities began Monday (June 6) some 75 miles from the campus, at the Wianno Club in Osterville on Cape Cod, where the 50th reunion class of 1927 is holding its gathering.

The class members return to the campus tomorrow (Thursday June 9) for a reception at the President's House before joining other returning graduates at MIT night at The Boston Pops.

The 25th reunion class of 1952 will be arriving at MIT today (Wednesday, June 8) and Thursday. Their major events are a dinner dance Friday night at the Hyatt Regency Hotel in Cambridge and a clambake at the Rivers Country Day School in Weston on Saturday.

Reunion activities—the roster of reunions this year includes 13 class reunions, 12 departmental reunions and two mini (or off-year) re-

unions—are held at various locations and times on and off the campus.

Class reunions are being held for all classes whose years end with the numerals 2 or 7 starting with the 65th reunion class of 1912.

Departmental reunions are being planned for the Departments of Architecture, Chemical Engineering, Civil Engineering, Electrical Engineering and Computer Science, Materials Science and Engineering, Mathematics, Mechanical Engineering, Nutrition and Food Science, Ocean Engineering, Physics, Urban Studies and Planning and also for the Alfred P. Sloan School of Management.

From 5 to 7pm Friday, June 10, the individual departments will hold wine and cheese parties at different locations.

The two mini-reunions will be held by the classes of 1924 and 1935.

## Wiesner Warns of Hazards In Seeking No-Risk World

President Jerome B. Wiesner urged graduates at MIT's 111th Commencement Monday to help lead the nation and the world away from the temptation to avoid solving massive human problems simply because the solutions may contain elements of risk.

"Using the energy question as a case in point," he said, "we can see in it the conflicting goals of protecting health or the environment, or avoiding accidents, and still assuring energy supplies for the decades ahead."

"At the moment there is opposi-

tion to nuclear power plants, strip mining of coal, burning coal, drilling for oil off the East and West Coasts, oil tankers, the construction of pipelines to carry natural gas or liquefied natural gas facili-

The complete text of Dr. Wiesner's Commencement Address appears on page 8. Other pictures are on page 4.

ties to bring gas in by ship, and mining of tar sands and oil shale.

"Each of these choices does pose some real problems; some pose actual, though small, risks.

"Yet in the end to do nothing and thus fail to provide for the nation's future energy needs would pose the greatest threat of all for our democratic society."

Dr. Wiesner was White House science adviser under the late President John F. Kennedy and served in a similar capacity during part of the White House tenure of the late President Lyndon B. Johnson. By custom, the president of MIT presents the commencement address at MIT graduations.

During commencement exercises Monday, Dr. Wiesner presented a total of 1,492 degrees to 1,323 graduate and undergraduate students. Some students received multiple degrees. All told, 751 bachelor degrees were awarded and 741 graduate degrees, including 143 doctor's degrees.

More than 3,000 parents, relatives and friends of graduates crowded into MIT's Rockwell Cage

(Continued on page 8)

# Report Suggests Ways to Prevent Oil Spills

An ocean engineer studying last December's *Argo Merchant* oil spill off Nantucket Island says spills from grounded tankers might be prevented if their hull structures were strengthened slightly and their deck openings made quickly sealable.

Dr. Jerome Milgram, MIT associate professor of ocean engineering, in a report just issued by the MIT Sea Grant Program, says research should be carried out to determine if modest hull strengthening would prolong the time a vessel is aground before it breaks up, releasing its oil into the ocean.

Typically, grounded tankers such as the *Argo Merchant*, he said, remain intact only a few days after running aground. That is not enough time, he said, for equipment and men to reach the scene, carry out a successful salvage and prevent an oil spill.

"If the expected lifetime of a grounded vessel could be materially increased, many salvage operations could take place which are not now possible with an expected lifetime of only a few days," Dr. Milgram said.

"Therefore, if studies indicated that a modest structural strength increase would markedly increase the expected lifetime of a grounded vessel, regulations upgrading structural standards for tankers entering US waters would be appropriate."

Dr. Milgram, in his report entitled "Being Prepared for Future

*Argo Merchants*," also suggested a requirement that all tankers entering US waters be capable of sealing all deck openings in one hour or less. Air could then be pumped into tanks from compressors aboard salvage vessels to increase buoyancy and refloat the grounded tanker before it breaks up. The world's existing oil tankers, he said, can be retrofitted to meet such a requirement if it were imposed by the US.

Dr. Milgram went aboard the *Argo Merchant* shortly after it went aground on the Nantucket Shoals on December 15, 1976. He monitored the events of the tanker grounding to help identify lessons to help people deal more effectively with future incidents.

Coastal state and federal governments should contract with barge operators for a prearranged amount of barge capacity on short notice, Dr. Milgram said. He suggests that operators be called upon to demonstrate their capability in "surprise tests" called without notice by the contracting agency.

Standby barge capacity for off-loading oil from grounded tankers quickly would avoid delays during which the vessels, buffeted by the elements, might break up. In the case of the *Argo Merchant*, it took about 47 hours for a barge to reach the scene.

The *Argo Merchant*, Dr. Milgram said, also made clear the need to address the question of legal, political and environmental responsibilities of decision makers

during such incidents.

The report says that if at one point it could have been determined rapidly that there were some undamaged cargo tanks aboard the *Argo Merchant*, additional buoyancy could have been provided by pumping oil from these tanks overboard.

However, the report says, because there was no one person involved who could or would assume responsibility for the dumping, no one would have made this decision to dump, even if the existence of undamaged tanks was confirmed.

"Situations like this tend to inhibit decision making," Dr. Milgram said. "Now suppose that one day after pumping one million gallons overboard, the wind unexpectedly shifted and the oil were blown ashore. Under no circumstances should the person who made the decision to pump the oil overboard or the weather forecaster be held accountable for this occurrence, and this fact should be law."

The report lists five items essential for a complete spill cleanup system.

The system begins with barriers to contain and control the oil. According to Dr. Milgram, these should be capable of working on the high seas in breaking waves up to eight feet high.

The barriers would be used with any of three existing types of skimmers. According to Milgram, however, none of these skimmers has been thoroughly tested offshore. He urges this be done promptly.

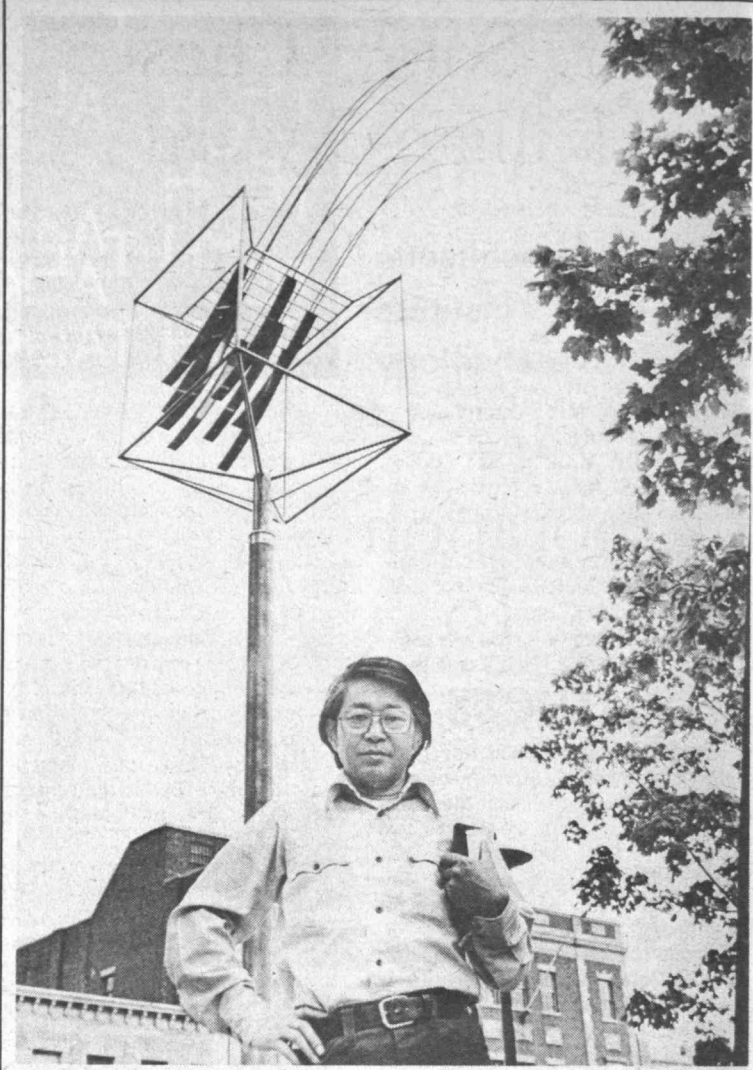
Two types of storage equipment are needed, he said. One is a small barge, about 75 feet long, capable of high speed delivery to a spill site. Arrangements could be made so that vessels of this type could store about 100,000 gallons of oil. The second type, commercial barges, could be available on a few hours notice, according to contract.

Maneuvering vessels are needed to tow barrier-skimmer combinations. The report says many existing vessels can be retrofitted to allow the ability to tow continuously at slow speed while maintaining adequate steering control.

Finally, Dr. Milgram calls for trained personnel. He suggests that the present US Coast Guard Strike Force concept could be used if the number of strike forces were increased, and if training were thorough and regular.

"If any one of these elements is absent, essentially no oil cleanup can take place, even if all of the training items are provided," Dr. Milgram said.

The report will be reprinted in the July/August issue of *Technology Review*, the journal of science, technology and policy edited and published at MIT.



SCULPTOR Michio Ihara stands beneath "Central Square," a sculpture he designed for the small public space at the juncture of Western and Massachusetts Avenues in Cambridge. The wind-resonant sculpture, made of stainless steel and brass, has an open box four cubic feet in size sitting atop a 15-foot-high pole. It was recently sited in Central Square as part of the city's Cambridge River Festival. Ihara has been a fellow at MIT's Center for Advanced Visual Studies since 1970.

—Photo by Calvin Campbell

## ERDA Research Grant Funds Plasma Fusion Center Work

Professor Robert M. Rose of the Department of Materials Sciences and Engineering and Dr. Brian B. Schwartz of the Francis Bitter National Magnet Laboratory have been awarded a research grant of \$167,000 from the US Energy Research and Development Administration (ERDA). The work will be performed as part of the program of MIT's plasma Fusion Center which is directed by Dr. Albert G. Hill.

The initial nine month period of the grant is for a project entitled, "Development of a Ductile 150,000 Gauss Superconductor" and is sponsored by the Division of Magnetic Fusion Energy of ERDA. Development of better superconducting materials is seen to be essential to many of the national programs in energy research and is particularly important for fusion devices based on magnetic confinement of the plasma.

Recent experiments of the Plasma Fusion Center using the high field ALCATOR machine at the National Magnet Laboratory have indicated that higher fields result in improved confinement density and time for the plasma.

The electrical resistance of superconductors vanishes at very low temperatures. Superconducting wires can be wound into large volume, high field magnets. As long as the magnets are kept cold, typically in liquid He (-269 C), no further energy is required to maintain the magnetic fields. Commercially available superconducting materials can produce fields as large as 90,000 gauss from relatively ductile niobium-titanium alloys. (In comparison, the earth's magnetic field is about 1/2 gauss.)

Present day superconductors with the capability to produce greater magnetic fields are brittle, difficult to fabricate and expensive. In a recent report developed for ERDA entitled, "Superconducting Magnet Research in the Controlled Thermonuclear Program," it was recommended that a materials program should be established which focuses on the development of a relatively ductile, high field superconductor with good current capabilities in the range of 150,000 gauss and more.

The report emphasized the need for a coordinated program including physicists, metallurgists, and magnet technologists. The MIT superconducting materials

research team includes Professors Robert M. Rose and Thomas W. Eagar, Department of Materials Sciences and Engineering; Professors Judith Bostock and Margaret McVicar, Department of Physics; and Drs. Brian B. Schwartz, Simon Foner, Edward J. McNiff, Jr., and Raymond Roberge from the Francis Bitter National Magnet Laboratory. Visiting scientists from Japan and Switzerland will be joining the program in the fall.

The main objective of the research is to develop useful superconducting materials which can produce magnetic fields in the 150,000 gauss range for controlled thermonuclear reactions. Currently composite materials technology is being used to obtain ductility of A-15 type superconductors such as Nb<sub>3</sub>Sn and V<sub>3</sub>Si. The group has recently fabricated a specially prepared filamentary composite of Nb<sub>3</sub>Sn fibers in a Cu matrix using an "in situ" technique.

Preliminary data has shown that the material is about an order of magnitude better than previous materials being prepared by this method and have high current densities at 120,000 gauss. Characterization of the mechanical and superconducting properties of these materials are being conducted.

Other research areas include microstructural effects on mechanical and superconducting properties, the preparation and characterization of single crystal materials and composite materials and fine fiber technology. With the anticipated growth in funding, excellent opportunities for research will develop for graduate students in physics, materials sciences, electrical and mechanical engineering. Students should contact Professor Rose and Dr. Schwartz directly for further information.

The initial grant by ERDA was in response to a 5½-year comprehensive proposal. The intended end-product of the proposed research is the development of the basic science and technology for the manufacture of superconductors with adequate mechanical properties at 150,000 gauss. The proposal includes the development of technology transfer mechanisms in order to disseminate developments to industry and government sectors, including materials and manufacturers, and magnet designers and builders. In addition summer workshops, seminar series and a newsletter are planned.

of performance data from the components of a solar energy system. Pay for the summer is available.  
Contact: Prof Kaplow at x3-3322, Rm 3-5106.

### INSTITUTE NOTICES

#### Announcements

**Technology Children's Center**—Westgate summer session openings avail 2, 3 or 5 days for ages 2 yrs 9 mo to 5 yrs. 6/13-7/26 from 9 am-1pm. Info: x3-5907

**Child Care Office**—currently accepting applications for Family Day Care Program. If interested for infants or toddlers in own home contact Child Care Office, x3-1592, Rm 4-144.

**Hebrew Classes**—MIT Hillel Foundation. Beginners Hebrew, Mon, Thurs, 4-5pm, starting June 13; Intermediate Hebrew, Mon 5-6pm, starting June 6; Hebrew Literature, Thurs, 5-6pm, starting June 9. Religious Counselors Bldg, 312 Memorial Drive., Ms. Dalia Cohen, instructor. Registration & tuition, \$15. Contact Ms. Cohen, 492-9159.

**Official Notice**—Transcripts with June grades included will be available the week of June 27, if orders are placed now. Transcripts without June grades may be ordered up to June 17.

**Freshman Advisors**—Needed for the 1977-78 academic year to assist freshmen with various academic and non-academic decisions and situations they will face. If you'd like to get to know a few freshmen well and feel you can offer something to them in their adjustment to MIT, contact Freshman Advisory Council, Rm 7-103, x3-6771 for information.

### Club Notes

**Beginner's Sailing**—Instruction, Mon & Thurs, 5:15pm, MIT Sailing Pavilion.

**MIT/DL Bridge Club**—ACBL Duplicate Bridge. Tues, 6pm, Stu Ctr Rm 473.

**Gays at MIT**—(formerly SHL) Coffee-house/meeting, first Sunday each month, 5pm. Gay Lng (Walker Rm 50-306). Everyone welcome. Info or just an ear listen: x3-5440, or join us for lunch.

**Hobby Shop**—Mon-Fri, 10am-6pm, Rm W31-031. Fees: \$10/term for students, \$15/term for community. Info: x3-4343.

**Tech Model Railroad Club**—Meetings, Sat, 4pm; Operating Sessions, Fri nights; Rm 20E-214, x3-3269.

### Religious Activities

The Chapel is open for private meditation 7am-11pm daily.

**Tech Catholic Community**—Masses Sun, June 12: 9:15am; 12:15pm, Chapel.

### TECH TALK

Volume 21, Number 39  
June 8, 1977

Tech Talk is published 44 times a year by the News Office, Massachusetts Institute of Technology. Director: Robert M. Byers; Assistant Directors: Charles H. Ball, Robert C. Di Iorio, Katharine S.C. Jones, Joanne Miller, William T. Struble and Calvin D. Campbell, photojournalist; Reporters: Cathryn M. Chadwick (Institute Notices); Jakki Kougasian (Institute Calendar, Classified Ads), Sheila Richards, Business Manager.

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## CABLE TV SCHEDULE X3-3625

June 8-June 14	
<b>Wednesday, June 8</b>	
Channel 8: 11:30-1pm	BASEMENT VIDEO PRESENTS "Seabrook"
1-2pm	BASEMENT VIDEO PRESENTS "Shakespeare Ensemble"
<b>Thursday, June 9</b>	
Channel 8: 12noon-1pm	BASEMENT VIDEO PRESENTS "Shakespeare Ensemble"
1-2:30pm	BASEMENT VIDEO PRESENTS "Seabrook"
<b>Friday, June 10</b>	
Channel 8: 11:30-1pm	BASEMENT VIDEO PRESENTS "Seabrook"
1-2pm	BASEMENT VIDEO PRESENTS "Shakespeare Ensemble"
4:30-6pm	RECENT STUDIES ON CHROMATIN STRUCTURE by Dr. Pierre Chambon, Professor of Biochemistry, University Louis Pasteur Medical School, Strasbourg, France. Live from Harvard University.
<b>Monday, June 13</b>	
Channel 8: 12 noon-1pm	BASEMENT VIDEO PRESENTS "Video Images"
1-2pm	BASEMENT VIDEO PRESENTS "Eating at MIT"
<b>Tuesday, June 14</b>	
Channel 8: 12 noon-1pm	BASEMENT VIDEO PRESENTS "Eating at MIT"
1-2pm	BASEMENT VIDEO PRESENTS "Video Images"

# Robert Solow Chosen For Killian Award

Dr. Robert M. Solow, Institute Professor and professor of economics at MIT, has been selected as the 1977-78 recipient of the James R. Killian, Jr., Faculty Achievement Award.

The award, which recognizes "extraordinary professional accomplishments" by MIT faculty members, was established in 1971 as a tribute to Dr. Killian, MIT's 10th president and former chairman of the corporation. It carries a stipend of \$5,000.

The award recipient traditionally delivers a lecture or lectures during the school term.

Professor Solow is widely recognized as an outstanding economic



Professor Solow

theorist whose special fields of interest are mathematical economic theory, the theory of capital and growth, macroeconomics and the economics of natural resources.

The announcement of his selection as Killian lecturer was made at the May 18 faculty meeting by Dr. Sidney S. Alexander, professor of management and economics at the Alfred P. Sloan School of Management. He headed a five-member faculty selection committee.

The citation accompanying the announcement said that Professor Solow's teaching and research had been accomplished "with such wit, and style, and commitment, as to give him a special place in our community."

It also took special note of the long-standing professional and personal relationship between Professor Solow and his colleague in the Department of Economics, Dr. Paul A. Samuelson, Institute Professor, professor of economics and Nobel Laureate.

"The intellectual partnership of Solow and Samuelson must rank among the most productive of such relationships in the history of economics," the citation said, "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 the interaction has been immeasurable."

The citation added that Professor Solow's scholarly work "has been brilliant and path-breaking."

"Over 25 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," it said.

"In the fifties, at MIT," it continued, "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."

"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."

Of his teachings, the citation said

that "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."

The citation added that undergraduates "have been accorded equal time and attention" and noted that for many years Professor Solow "has delivered introductory economics lectures to enthusiastic classes who learned from him that the study of economics can be an exciting intellectual adventure."

Born in Brooklyn, New York, in 1924, Dr. Solow received the BA from Harvard College in 1947, the MA in 1949 and the PhD in 1951, when he won the David A. Wells prize. As a Social Science Research Council predoctoral fellow he studied mathematical statistics at Columbia University in 1949. He received honorary degrees from the University of Chicago, Brown University, Williams College, the Sorbonne in France, the University of Warwick in England and Lehigh University.

Dr. Solow joined the MIT faculty as assistant professor of statistics in 1950, became associate professor in 1954 and was appointed professor of economics in 1957. Upon the nomination by the MIT faculty, Dr. Solow was appointed an Institute Professor in 1973.

On leave from the Institute, Dr. Solow was a fellow at the Center for Advanced Study in the Behavioral Sciences at Stanford University in 1957, and a Ford Foundation fellow and Marshall Lecturer at Cambridge University in 1963. In 1968-69 he was George Eastman Visiting Professor at Oxford and Fellow of Balliol College.

Dr. Solow is author or co-author of more than 50 papers for professional journals. He has also written several chapters for books and is co-author of *Linear Programming and Economics Analysis* and author of *The Nature and Causes of Unemployment in the U.S.*, *Capital Theory and the Rate of Return and Growth Theory*.

In 1963 he was the Devries Lecturer at the Netherlands School of Economics and in 1964 Wicksell Lecturer at the University of Stockholm. In 1968 Dr. Solow gave Radcliffe lectures at Warwick University and in 1970 special university lectures at Manchester.

In the fall of 1964 he was one of 14 appointed by President Johnson as members of the National Commission on Technology, Automation and Economic Progress. Dr. Solow for a year had been senior economist on the staff of the Council of Economic Advisors to President Kennedy. He was appointed in January, 1968, by President Johnson to the President's Commission on Income Maintenance Programs to study and report on all aspects of public assistance and income transfer system in the US.

Professor Solow was elected to membership in the National Academy of Sciences in 1972.

A member of the Econometric Society, Dr. Solow served as a member of its council from 1961 to 1964, as its vice president in 1963, and president in 1964. In 1961 he was awarded the John Bates Clark Medal of the American Economic Association of which he was vice president in 1968 and will be president in 1979. He was a vice president of the American Association for the Advancement of Science in 1970.

Dr. Solow and his wife have three children and reside in Boston.

Professor Solow is the sixth MIT faculty member to hold the Killian lectureship.

The others were the late Dr. Hans-Lukas Teuber, professor of psychology and head of the Department of Psychology; Dr. Frank Press, presently director of the Office of Science and Technology and Policy and science advisor to President Carter; Institute Professor Morris Cohen; Institute Professor Victor F. Weisskopf; and Dr. Nevin S. Scrimshaw, Institute Professor and head of the Department of Nutrition and Food Science.

## Lyndon Firm Architecture Cited



PEMBROKE DORMITORIES at Brown University were designed by Lyndon Associates, Inc., of Cambridge, an architectural firm founded by MIT Professor Donlyn Lyndon. The firm recently received an Honor Award from the Boston Society of Architects for its work on the dormitories.

The architectural firm Lyndon Associates, Inc., of Cambridge has received an Honor Award from the Boston Society of Architects for the Pembroke Dormitories, Brown University, Providence, R.I.

Lyndon Associates, Inc., was founded in 1971 by Donlyn Lyndon, professor of architecture at MIT and chairman of the Committee on the Visual Arts.

The citation for the project, for which Professor Lyndon was principal designer, read, in part, "An exceedingly competent site plan that reinforces the city street with shops and creates private courts

that complement the urban activity. The building's mass is subdivided into residential scaled sections that reinforce the courtyards. Inset panels of colored brick bring a playfulness to the facade which contributes to the youthful environment."

The Honor Award was made during Boston Exports, an annual design award program sponsored by the Boston Society of Architects to acknowledge contributions its members are making to the environment of cities, states, and countries outside of the Boston area.

## Diverse Topics Explored In Sloan Management Review

Pension fund management... The 1976 US rubber tire strike... Man-Machine information systems... A method for planning change... Workers' participation in Europe.

These are some of the subjects explored in the Spring 1977 issue, published this month, of the *Sloan Management Review*, the professional management journal of the MIT Alfred P. Sloan School of Management.

In "Setting Investment Policy for Pension Funds," Gary L. Bergstrom and Ronald D. Frashure suggest that an analytical approach can be used to set realistic investment objectives for pension funds. They consider such techniques as statistical forecasting and foreign equity diversification. Bergstrom is vice president of The Putnam Management Company, Inc.; Frashure is vice president of The Putnam Advisory Company, Inc.

During the 1976 US rubber tire strike, an international trade secretariat vowed to assist US workers by coordinating global support activities such as boycotts, monitoring of imports and refusal to work overtime. Professors Herbert R. Northrup and Richard L. Rowan of the University of Pennsylvania in an article entitled, "Multinational Union Activity in the 1976 US Rubber Tire Strike," examine the reports of such actions and the claims made as to their effectiveness in influencing the outcome of the strike.

Dr. Jeffrey A. Meldman, assistant professor of management science at MIT's Sloan School of Management, is the author of "A New Technique for Modeling the Behavior of Man-Machine Information Systems." A continuing challenge to managers trying to understand the behavior of complex man-machine information systems is the lack of powerful formal techniques for modeling the interactions of the human and mechanical systems components. Professor Meldman's article suggests that a recently developed, graphical formalism called "Petri nets" may provide a significant improvement in meeting the

criteria for explaining management information system logic.

Every organization is faced with the problem of formulating, implementing and evaluating program changes. Professor R. Timothy Stein and Elisabeth Leja of the University of Illinois at Chicago Circle, authors of "Impact Models as a Method for Planning Change," use an impact model to aid organizations in the process of planning and evaluating change programs. They draw upon the experience of a job enrichment program in a bank to develop a sequence of nine steps designed to assist the client and consultant in clarifying a program's purpose and the processes by which it can create the desired changes.

Workers' participation in management is a topic arousing increasing interest among managers in the US and abroad. In "The Codetermination Model of Workers' Participation: Where is it Leading?" Professor G. David Garson of Tufts University discusses the development of codetermination, the West German model of workers' participation, and examines major European alternatives to codetermination.

Finally, in an SMR Forum article, "Is Anybody Listening? A Fresh Look at the Art of Management Speechmaking," Robert S. Mason of R.S. Mason Associates tells top managers how to exploit their speechmaking opportunities so as to enhance their companies' credibility with an increasingly critical public. The author, himself a business speechwriter with broad experience examines strengths and weaknesses of management speeches in the last 10 years and offers time-tested guidelines for top executive speakers.

The *Sloan Management Review*, in its 18th year, publishes three times during the academic year. The editors are Lindsay Jo Fried, David St. Charles and Wayne Zafft. Gay Van Ausdall is the managing editor. Single issues of the Review are available for \$5 a piece at the Review office, E52-062. Annual subscriptions are \$14.

## 36 Employees Are Among Lowell Grads

The Lowell Institute School recently awarded graduating certificates to 347 students including 36 MIT employees and three MIT students.

Dr. Bruce D. Wedlock, director of the Lowell Institute School, presented the certificates at a graduation dinner at the MIT Faculty Club. Assisting him, in the absence of Mr. John Lowell, trustee of the Lowell Institute, was Mr. Vincent A. Fulmer, secretary of the Institute. The guest speaker was Dr. Edward T. Kirkpatrick, president of Wentworth Institute and Wentworth College of Technology.

During 1976-77, LIS offered courses in the fields of electronics, digital electronics, microprocessors, television systems technology, applied math, technical writing, oral communication, scientific glassblowing, machine tools, high speed photography, creative photography, mechanical drafting and metals joining. In addition, five intensive one-week daytime courses were offered during the winter in microprocessors. Enrollment totaled 705, 163 more than 1975-76 with 81 percent of the students completing certificate requirements.

MIT campus employees receiving certificates were: John Barnett, Center for Advanced Engineering Study; Benjamin Bergery, Center for Advanced Engineering Study; Margaret Bonner, Materials Processing Lab; Anthony Caloggero, Electrical Engineering & Computer Science. Computer Science.

Francis Canali, Information Processing Services; Robert Cavanaugh, Physical Plant; Joan Chartres, Research Lab of Electronics; William Connelly, Ocean Engineering; John Connolly, Research Lab of Electronics; Herbert Ewin, Lab for Nuclear Science.

Jain Fenton, Nuclear Engineering; Leslie Finck, Information Processing Services; Zoila Flores-Quesada, Nutrition and Food Science; Christine Green, Materials Science and Engineering; Richard Gudaitis, Earth and Planetary Sciences.

James Harris, Physical Plant; Maxwell Jacobs, Lab for Nuclear Science; Walter Littlewood, Aeronautics and Astronautics; Winifred McDonough, Treasurer's Office; Paul Menadier, Nuclear Reactor Lab; Michael Molnar, Materials Science and Engineering.

David Noble, Humanities; James O'Connor, Center for Space Research; Robert Paquette, Center for Space Research; Virginia Powell, Development Office; Judith Quimby, Nutrition and Food Science.

Miriam Rich, Materials Science and Engineering; Henry Simpson, Ocean Engineering; Joseph Upham Jr., Center for Advanced Visual Studies; Maria Wehrle, Lab for Nuclear Science; E. Donald Weiner, Chemistry.

MIT Lincoln Laboratory employees receiving certificates were: Donald Ball, George Catuna, James Dobrovic and Charles Summers.

MIT Students who received certificates: Ernesto Perea, Fernando Sobrevilla and Richard Spedden.

## Chemistry Wins Grant from Kodak

The MIT Department of Chemistry has been selected to receive a \$6,000 research grant as part of Eastman Kodak Company's 1977 Educational Aid Program.

The grant is awarded to "assist and encourage graduate education and research. A portion of the grant will be used to support Eastman Kodak Scientific Awards (in the amount of \$500 to \$1,000) and/or Eastman Kodak Fellowships (with a minimum stipend of \$2,500). The balance will be used for scholarships and to strengthen academic and research programs in the department.

## Anderson Wins ACLS Fellowship

Stanford Anderson, professor of history and architecture in the Department of Architecture, is one of 93 recipients of fellowships from the American Council of Learned Societies. Professor Anderson's project is "a historiography of modern architecture and its relation to current issues."

The fellowships, supporting post-doctoral research in the humanities and related social sciences, are supported by grants from the Ford Foundation, the National Endowment for the Humanities and the Carnegie Corporation.

**June 8  
through  
June 19**

**Seminars and Lectures**

**Wednesday, June 8**

**A Positive Effect on the Nutrition of Philippine Children of an Oral Glucose Electrolyte Solution Given for Diarrhea: Update\*** — Dr. Norbert Hirschorn, Staff Associate, Clinical Research Center. Clinical Research Center Seminar. 9am, Rm E18-408.

**Thursday, June 9**

**Depression and Migraine: Common Biochemical Basis?\*** — Dr. Merton Sandler, chemical pathology, Bernhard Baron Memorial Research Labs, Queen Charlotte's Maternity Hospital, London, England. Laboratory of Neuroendocrine Regulation Seminar. 4pm, Rm 66-144.

**Wednesday, June 15**

**Cardiac Cachexia\*** — Dr. William P. Steffe, medicine, Boston University Medical School, and director, Clinical Nutrition Unit, University Hospital, Boston. Clinical Research Center Seminar. 9am, Rm E18-408.

**Friday, June 17**

**Atherosclerotic Disease in Israel\*** — Dr. Gerald Brook. Arteriosclerosis Center Seminar. 12:30-2pm, Arteriosclerosis Center Conference Rm E17-421. Bring lunch.

**Community Meetings**

**Wive's Group\*\*** — Group leaders: Charlotte Schwartz, sociologist & Myra Rodrigues, social worker, both from Medical Dept; Carol Hulsizer, faculty spouse in residence, Ashdown Hse. Wed, 3-5pm. Babysitting, Stu Ctr Rm 473. Cheryl, x3-4911. **Jun 8:** Chief James Olivieri, Patrolman Terry Downes, of MIT Campus Patrol, will speak on "Campus Police — Available Services and Community Problems." Rm 407, Stu Ctr. Note room change.

**Summer Art Program\*\*** — Sponsored by MIT Student Art Association. Classes start June 13. Registration thru Jun 10, 1-5pm, W20-429. Info: x3-7019.

**Movies**

**LSC Double Feature\*\*** — Fri, Jun 10, Rm 26-100. **Guess Who's Coming to Dinner**, 7pm; **The Madwoman of Chaillot**, 9:30pm. Admission: 75¢ w/-MIT or Wellesley ID.

**The Devil's Eye (Bergman)\*** — MIT Film Society. Fri, June 10, 7:30 & 9:30pm, Rm 6-120. Donation, \$1.25.

**The Last Man on Earth\*\*** — LSC Movie. Sat, Jun 11, 7 & 9:30pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

**LSC Double Feature\*\*** — Fri, Jun 17, Rm 26-100. **The Mouse that Roared**, 7pm, comedy starring Peter Sellers. **The Illustrated Man**, 9pm, science fiction starring Rod Steiger. Admission, 75¢ w/MIT or Wellesley ID.

**Beauty and the Beast (Cocteau)\*** — MIT Film Society. Fri, Jun 17, 7:30 & 9:30pm, Rm 6-120. Admission: \$1.25.

**Operation Kid Brother\*\*** — LSC Movie. Sat, Jun 18, 7 & 9:30pm, Rm 26-100. The "Missing" James Bond, starring Neil Connery. Admission, 75¢ w/-MIT or Wellesley ID.

**Dance**

**MIT Folk Dance Club — International:** Sun, 7:30-11pm, Sala. **Balkan:** Tues, 7:30-11pm, Stu Ctr Rm 491. **Informal:** Fri, 12n-2pm, Kresge Oval (Bldg 7 Lobby in bad weather). **Israeli:** Thurs, 7:30-11pm, Sala.

**MIT Summer Dance Workshop\*\*** — Self-motivated projects and group support. First meeting, Jun 14, 5-7pm, duPont W31-125. Info: Stina Cooke, 491-6050, lv msg.

**Exhibits**

**Collaborative Drawings by Derith Glover and David Covert\*** — Mon evg, Jun 13 thru Sat, Jun 18, Stu Ctr, West Lng.

**Cambridge Churches: A Community Resource\*** — Photographic review of Cambridge Religious Architecture organized by the Cambridge Historical Society. Thru Jun 17, Rotch Library. Visual Collections, Rm 7-304.

**Women in American Architecture: A Historical and Contemporary Perspective\*** — exhibition documents the role women have played in the history and development of American architecture. Sponsored by the Committee on the Visual Arts & the MIT Department of Architecture. Thru Jun 18, Hayden Gallery, Mon thru Sat, 10am-4pm, free.

**Sculpture by Nancy Schon** — June 2-30, MIT Faculty Club.

**MIT Historical Collections\*** — Permanent exhibition Mon-Fri, 9am-5pm, Bldg N52, 2nd floor. **Bicentennial Exhibits:** Katharine Dexter McCormick, '04; Vannevar Bush, '16; Karl Taylor Compton; Norbert Weiner, '48. 1876 Exhibit, Bldg 4 corridor. **The New Technology Exhibit** 2nd fl balcony of Lobby 7. **Energy Exhibit** Bldg E40, 1st floor. **Radiation Laboratory Exhibit** main corridor, Bldg 8. **Center for Space Research Astrophysics Exhibit** Main corridor, Bldg 4.

**Strobe Alley\*** — High speed photographs by Harold E. Edgerton, Institute Professor and Professor of Electrical Measurement, Emeritus. Bldg 4, 4th floor.

**Hart Nautical Museum\*** — Permanent exhibit of rigged merchant and naval ship models, half models of yachts and engine models. Open daily Bldg 5, 1st floor.

**Canones\*** — Music Library, Rm 14E-109. Examples of the use of canons from 7 centuries of music.

**Graphics by MIT Design Services\*** — On exhibit in Bldg 7 corridor.

**Athletics**

**MIT Summer Basketball League\*\*** — Rosters due by Mon, Jun 13, Manager's Office, Rm W32-31. Info: Howie Golub, x3-5957, or Jeff Gertz, x3-7472.

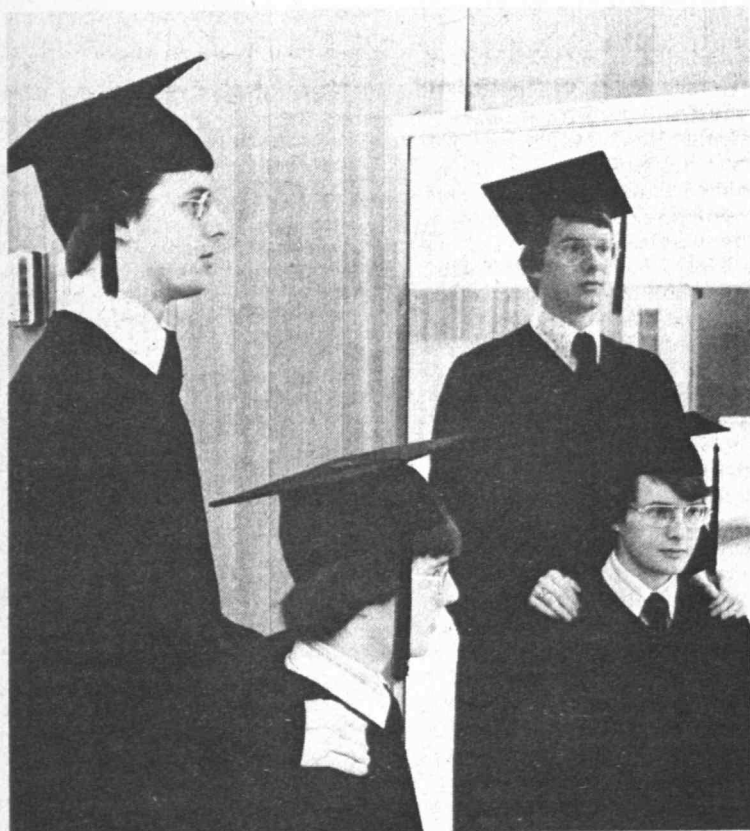
**MIT Summer Basketball League\*\*** — Referees needed. Call Howie Golub, x3-5957, or Jeff Gertz, x3-7472.

**Home Schedule\*** — Saturday, Jun 18 — Grad Soccer, Cup Competition, 2pm, Briggs Field.

Freshmen are encouraged to attend departmental lectures and seminars. Even when these are highly technical they provide students one means to learn more about professional work in a departmental field.

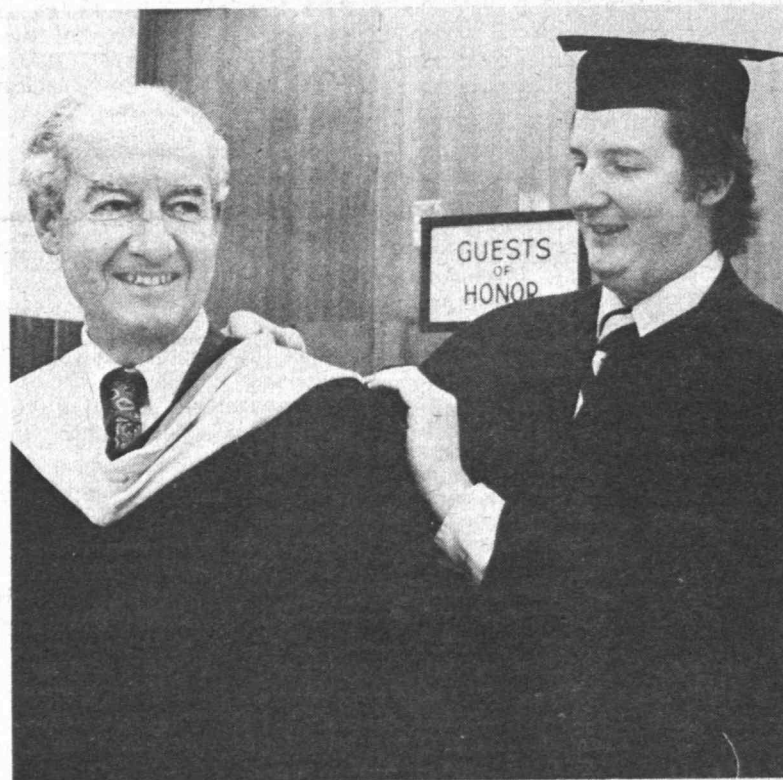
\*Open to the public  
\*\*Open to the MIT community only  
\*\*\*Open to members only  
Send notices for June 15 through June 26 to the Calendar Editor, Room 5-111, Ext. 3-3270 before noon Friday, June 10.

**Commencement Day 1977**

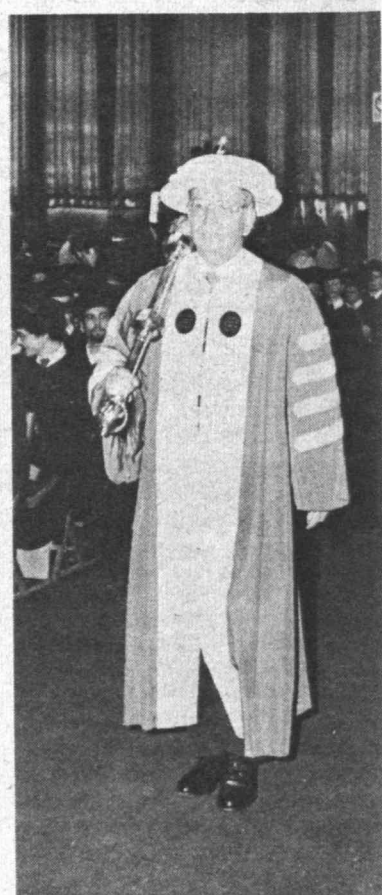


**MIRROR IMAGES**—Kevin J. and Michael P. Haggerty of Worcester, Mass., each received the bachelor of science degree at MIT's 111th commencement on Monday, June 6. Kevin received the SB degree in architecture; Michael the SB degree in management. They were among the 1,323 graduate and undergraduate students who received a total of 1,492 degrees at the exercises held in MIT's Rockwell Cage as more than 3,000 relatives and friends looked on. MIT President Jerome B. Wiesner

delivered the commencement address, and urged the graduates not avoid solving massive human problems simply because the solution may contain elements of risk.



**MANN TO MANN**—Robert W. Mann, Jr. (right), adjusts the academic hood worn by his father, MIT Professor Robert W. Mann at MIT's 111th commencement on Monday, June 6. Mr. Mann, Jr., president of the MIT Graduate Student Council, was seated among the guests of honor, and his father, Whitaker Professor of Biomedical Engineering in the Department of Mechanical Engineering, marched with the MIT faculty. Mr. Mann, Jr., who received the SB degree from MIT in 1975, received the SM degree in aeronautics and astronautics and will work as an industry analyst for American Airlines in New York City. Professor Mann is himself an MIT graduate, having received the SB, SM, and ScD degree in mechanical engineering from MIT in 1950, 1951, and 1957.



**CHIEF MARSHAL** for the 111th commencement at MIT on June 6 was Edward O. Vetter of Dallas, Texas, president of the MIT Alumni Association. Mr. Vetter, MIT '42, led the academic procession and carried the MIT mace.



**WITH TAPE RECORDERS** and cameras at the ready, friends and relatives thronged the ends of the platform hoping to capture that special moment for "their" graduate.

Photos  
By Calvin Campbell

# Corporation Elects Life, Term Members



Mr. Kerr Mr. Milliken



Mr. Murchison Mr. Smith



Dr. Austen Mr. Clark



Mr. Ayukawa Mr. Clare



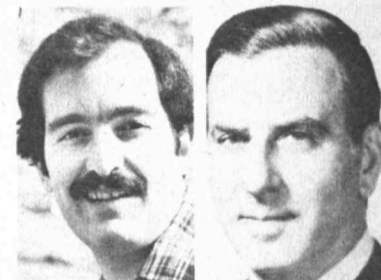
Dr. Hill Mr. Koch



Dr. McAfee Mr. McNear



Mr. Meyer Dr. Saxon



Mr. Castellano Mr. Leventhal  
president of the statewide university system in 1975. He serves as a member of the MIT Physics Department Visiting Committee.

(Continued from page 1)  
in 1961.

Clint W. Murchison, Jr., of Dallas, Tex., a partner in Murchison Brothers, Dallas, and owner and chairman of the board of the Dallas Cowboys professional football team. A 1944 graduate of Duke University, Mr. Murchison received the master of science degree from MIT in 1947 in mathematics. He has been a Term Member of the MIT Corporation since 1972 and has served on the Corporation's Investment Committee since 1973. He has served on several MIT development and departmental visiting committees and presently is chairman of MIT's National Sponsoring Committee for Athletics.

Gregory Smith of Marblehead, Mass., former president and general manager of the Eastman Gelatine Corporation at Peabody, Mass. Mr. Smith graduated from MIT in 1930 in chemical engineering and received his master of science degree in that field from the Institute in 1931. He has long been an active leader in many of the educational, cultural and alumni affairs of the Institute. He has been a Corporation Term Member since 1968. He has been a member of the Corporation Joint Advisory Committee, which is composed of representatives from several segments of the MIT community, since 1969, serving as chairman 1970-71 and having been re-elected chairman in 1975, a position he holds presently. Mr. Smith has taken a particular interest in MIT's unique Undergraduate Research Opportunities Program (UROP) which involves students in on-going research projects both at the Institute, at other universities and research centers and in industry. Mr. Smith was president of the MIT Alumni Association in 1967-68.

The two Term Members re-elected to additional five-year terms are:

W. Gerald Austen, M.D., of Weston

Mass., chief of surgical services at the Massachusetts General Hospital, Boston. Dr. Austen graduated from MIT in 1951 in mechanical engineering, and received the doctor of medicine degree from the Harvard Medical School in 1955. He was first elected a Term Member of the MIT Corporation in 1972.

W. Van Alan Clark, Jr., of Marion, Mass, president and chairman of Sippican Corporation of Marion. Mr. Clark received his bachelor's degree from Williams College, Williamstown, Mass., in 1941, and received the master of Science degree in 1942 from the MIT Sloan School of Management. He was a member of the teaching staff at the Sloan School from 1946 to 1958 serving as associate dean of the School from 1956-58. He first was elected to the MIT Corporation in 1972. Mr. Clark also serves as a trustee of Williams college.

Those elected Term Members of the Corporation for the first time include:

Yaichi Ayukawa of Tokyo, Japan, chairman of CPC Japan, Ltd., and a leading Japanese food industry executive. A 1945 graduate of Tokyo University in agricultural chemistry, Mr. Ayukawa received SB, SM and PhD degrees from MIT in food science and in industrial management. He is a member of the MIT Class of 1952. As a volunteer on behalf of MIT, Mr. Ayukawa has played a major role in enlisting support for the Institute from major Japanese industrial organizations.

David R. Clare of Westfield, N.J., president and chairman of the executive committee of Johnson & Johnson, New Brunswick, N.J. A 1945 graduate of MIT in mechanical engineering, Mr. Clare has been with Johnson & Johnson since 1946. He became president of the Domestic Operating Company in 1970, a director and executive committee

member in 1971 and president and chairman of the executive committee in 1976. He was a member of the MIT Corporation's Medical Department Visiting Committee 1971-74 and has been a member of the Biology Department Visiting Committee since 1974.

Henry A. Hill of Haverhill, Mass., president and founder of Riverside Research Laboratories, Inc., Haverhill. He is currently president of the American Chemical Society. He has long been active in the Northeast Section of the Society and in its national offices. Dr. Hill graduated from Johnson C. Smith University in 1936, pursued studies at the University of Chicago, then came to MIT where he was a Rosenwald Fellow, receiving the PhD degree in chemistry in 1942. He worked as a research chemist with Atlantic Research Associates, was research director and later vice president for research with National Atlantic Research Company, and became a group leader and later vice president of Dewey and Almy Chemical Company before founding his own consulting laboratory in 1961. He is a member of MIT's Chemistry Department Visiting Committee.

Charles G. Koch of Wichita, Kan., chairman of Koch Industries of Wichita. He received the SB degree in general engineering in 1957, the SM in mechanical engineering in 1958, and the SM in chemical engineering in 1959, all from MIT. He is a former member of the Chemical Engineering Department Visiting Committee at MIT and was a member of the National Sponsoring Committee that enlisted the worldwide support that made possible construction of the new Ralph Landau Building for Chemical Engineering at MIT.

Jerry McAfee of Pittsburgh, Pa., chairman and chief executive officer of Gulf Oil Corporation, Pittsburgh.

A former president of the American Institute of Chemical Engineers, Dr. McAfee graduated from the University of Texas in chemical engineering in 1937 and received the Sc D degree from MIT in chemical engineering in 1940. He joined Gulf in 1944 and, except for the period 1967-69 when he was executive vice president of British American Petroleum Co., Ltd., he served in numerous research and operating positions with Gulf at the vice president level, serving as president of Gulf Oil Canada, Ltd., 1969-75. He has been Gulf chairman and chief executive officer since 1976. He, too, served on the sponsoring committee for the Ralph Landau Building at MIT and is a former member of the Chemical Engineering Visiting Committee.

Denman K. McNear of Kentfield, Calif., president of the Southern Pacific Transportation Company. A 1948 graduate of MIT in civil engineering, Mr. McNear joined Southern Pacific upon graduation. He formerly was vice president of operations and became president in 1976. He also serves as president of the St. Louis Southwestern Railway Company of Texas. He holds the MBA degree which he received from Stanford University in 1950. At MIT, he has been a leader in alumni affairs, particularly in northern California, serves as a member of the MIT Corporation Development Committee and is a former member of the Civil Engineering Department Visiting Committee.

F. Richard Meyer III of River Forest, Ill., a widely-known corporate and industrial consultant in the Chicago area. A 1942 graduate of the MIT Sloan School of Management, he worked in various management capacities with Stewart Warner Corporation and later the Acme Steel Company. He has been a consultant in corporate mergers and acquisitions in Chicago since 1956. At MIT he serves on the Corporation Development Committee and the Mechanical Engineering Visiting Committee, is a former director of the Alumni Association, and is a director and former president of the MIT Club of Chicago.

David S. Saxon of Kensington, Calif., president of the University of California. Dr. Saxon received his SB degree in 1941 and the PhD degree in 1944, both in physics and both from MIT. He worked at MIT's Radiation Laboratory helping develop radar during World War II and joined the faculty at the University of California at Los Angeles in 1947 where he was professor of physics 1958-75, chairman of the Physics Department 1963-66, dean of physical sciences 1966-69, executive vice chancellor 1968-75 and university provost 1974-75. He was elected

## Two Married Couples Are Commissioned

Two married couples were among the 14 Navy midshipmen, six Army cadets and five Air Force cadets commissioned Friday, June 3, at MIT.

The new officers—lieutenants in the Army and Air Force, ensigns in the Navy—will receive their degrees from MIT at the Institute's 111th commencement ceremony Monday, June 6.

The married couples were Marilyn K. McQuade of Lacross, Wisc., and Peter D. McQuade of Boise, Idaho, who were commissioned second lieutenants in the Air Force, and Linda D. Pirek of Highland Mills, N.Y. and Ronald C. Pirek of Dearborn Heights, Mich., who were commissioned ensigns in the Navy.

It was the first time married couples had received commissions at MIT, which is one of the small number of schools offering programs involving all three major branches of the military service.

In addition, the ceremonies marked the first time women had received commissions in the Army and the Navy through MIT ROTC programs. The Air Force commissioned its first woman student at MIT in 1975.

Commissioned a second lieutenant in the Army was Doris Lawson of Birmingham, Ala.

Anne L. Averbach of Belmont, Mass., daughter of Professor Benjamin L. Averbach of the Department of Materials Science and Engineering at MIT, and Mrs. Pirek were the first two women to receive Navy commissions at MIT.

Rear Adm. Ralph Hedges, commander of the Naval Patrol Wings, U.S. Atlantic Fleet, was the speaker at the commissioning ceremonies held in Kresge Auditorium.

MIT provost Walter A. Rosenblith was master of ceremonies and MIT Chancellor Paul E. Gray, who recalled that he had received his com-

mission in the Army at MIT in 1954, introduced Admiral Hedges.

In his remarks to the newly commissioned officers, Adm. Hedges said the military had received a "bum rap" during the Vietnam era.

"The military did not ask for Vietnam," he said. "The military is another instrument of foreign policy. We carry out the orders of the commander in chief." The admiral said he believes the American people now understand that the military was not to blame for the nation's involvement in Vietnam. He told the MIT students that there is a "better

environment" today in the military services. As an example, he mentioned the all-volunteer aspect of the services.

"I don't know if this will work," he said, "but if it does, it will be because of people like you."

The oaths of office were administered by Army Col. John S. Kark, Navy Captain Kevin J. O'Toole and Air Force Col. William R. Trott, who direct the ROTC programs at MIT.

The Rev. Constance Parvey, Lutheran Religious Counselor at MIT, gave the invocation. Ensign David Efimetz of the Navy Chaplain's Corps, gave the benediction.



MIT FIRST—Anne L. Averbach, who received her SB in mathematics at MIT's 111th commencement Monday, June 6, is one of the first two women to receive Navy commissions at MIT. Ensign Averbach, here being photographed by her father, Professor Benjamin L. Averbach of the MIT Department of Materials Science and Engineering, and Linda D. Pirek were commissioned ensigns Friday, June 3. The Averbachs live in Belmont, Mass. Ensign Averbach will report next month to the supervisor of shipbuilding, conversion and repair, San Francisco.

—Photo by Calvin Campbell

## Interdepartmental Mailboxes To Speed Internal Mail

Effective Monday, June 13, the Building Services section of Physical Plant will place additional MIT mailboxes at eight locations around the Institute.

The new mailboxes, standing beside existing boxes, will be exclusively for interdepartmental mail. Signs will clearly identify the interdepartmental boxes.

A pilot program of pre-sorting mail has been in effect in Building E19 since February and has proved

very successful according to Theodore M. Doan, Jr., manager of building services.

"By separating mail at the deposit location, subsequent handling and sorting is greatly expedited," Mr. Doan said.

Locations of the new boxes will be:

Building E 52	Building 8
Building 2	Building 13
Building 3	Building 36/38
Building 4	Building 56

## Fitchburg Exhibit Has MIT Artists

Works by two artists long associated with MIT are included in the season's final major exhibition at the Fitchburg Art Museum.

On exhibit are abstract paintings by Otto Piene, director of the Center for Advanced Visual Studies, and photographs by the late Minor White, founder of MIT's Creative Photography Laboratory and former professor of photography in the Depart-

ment of Architecture. Completing the show are watercolors of New England seascapes by Richard Wiggin Johnson and of New England landscapes by Robert Foster Johnson.

The exhibition continues through June 18.

# CLASSIFIED ADS X3-3270

Ads are limited to one per person per issue and may not be repeated in successive issues. All ads must be accompanied by full name and Institute extension. Only Institute extensions may be listed. Members of the community who have no extensions may submit ads by coming in person to the *Tech Talk* office, Room 5-111, and presenting Institute identification. Ads may be telephoned to Ext. 3-3270 or mailed to Room 5-111. **They will be printed on a first come first serve basis as space permits.**

## For Sale, Etc.

Sony hi quality amfm cstte, almost nw, \$100. Soichi, 494-8363.

Michelin radials, 4, 135-380, \$20/ea. Bob, x3-7306.

Sears 18" elec lwn mwr w/xtra blade, grass ctchr, pwr rake, 3 yrs, \$45. Rick, x5845 Linc.

Townclass 17' fbrgl sailbt, 50lb mshrm mooring, main & jib, hinged rudder & mast, \$1,450. Landry, x5857 Linc.

Fender Precision Bass, \$225; Gibson SG, \$230; Phono/am/fm, \$75. Call 484-7490.

Lvng cntry, must sell evrythg, hsehd furn, appliances, baby furn. Call 742-6453.

Stereo csstte deck w/Dolby, mdl CD 302A by Superscope, nw cond, \$75. Dale, x8-3337 Draper.

Fedders air cond, 7,000btu, casement type, ideal for Tang, \$50. Pat, x3-6749.

Refrig, 4.5 cu ft, auto defrost, exc cond, \$75. Jack, x3-7860.

Waterfingers pulsating shwr spry, best. Dick, x8-3966 Draper.

Tent, 10'x12', slps 4-6, nds some mending, best. Judy, 325-2278.

Refridge, exc wrkng cond, \$20. Call 924-1613.

Couch, unfolds to 1 bed, storage underneath for blinks, etc, \$20, you move. Linda, x3-7023.

Cstm furn, hsehd items, incl Fr Prov DR set w/oval tbl, 6 chrs, buffet, console piano w/bench, crnr unit w/2 upholstered beds, Roman shade, Kirsch rods, Wrld Bk encyc, tbls, lamps, etc. Lois, x3-4971.

Guitar, Yamaha FG-160, acoustic, stl strng, case, nw, \$100. Dave, x3-1637.

Wtrbld, K sz, fully equipped; K tbl; desk; sgl bed; qn sz mtrss; conv sofa; lamps; phone tbls; vy cheap, lvng cntry. Call 661-9839.

Zenith 21" b&w tv, flr mdl, gd cond, \$50 or best. x3-6117.

Mod 7 pc dining set. Call 628-4511.

Unused VW tent, \$150, attaches to sliding dr of late mdl bus. Mike, x7181 Linc.

Csstte tape: Maxell UDC90; Also stereo equpmnt. Rich, 787-5288, evgs, lv msg.

Dynaco ST-120 amp, 60 w/chnl, \$90. Dave, x3-7423.

LR furn: sofa, love chr, 3 tbls, 2 lmps, gd cond, \$250. Carlos Patino, 494-9081.

Sears prtble dsh wshr, \$100 or best. Bob Wilkinson, x8-3975 Draper.

Amara ac, 10,000btu, used only 1 sum, may dlvr, \$175. Sally, x3-4274.

Realistic STA 82, 22 w/ch, quadrivox, still under wrrty, orig \$300, ask \$220. Ken, 734-0648.

Tech Arrow Club Membrshp, 140 Plan, \$50. Ralph, 862-5904 evgs.

Fbrglis loop, 12" (not a sailboard), w/trlr; Qn bed; M 10 sp bike; Misc furn. Jim, x3-6735, not bef Thurs.

Universal bike rack, \$10. Claire, x3-6438.

Lwtv bkpk w/frame, barely used, \$30; Bed frame, fits any sz, \$5. David, x3-2716.

Grdn trector, non riding w/plow & cultivator atchmnts, runs wl, \$95. Bob Sherwood, x8-3328 Draper.

Nw 4 lb slngng bgs, 2; 2 brmr Coleman stove; Coleman Intrn; 80 qt Coleman cooler. Gerry, x3-6034.

Miranda Sensomat RE, 35mm reflex, 55mm fl.4 lens, exc cond, w/case, \$90. John, 322-8533.

Alum boat, 12', 7.5hp, Sears O.B., Lady Bea trlr, 4 life prsvrs, oars, 3' gal remote tank, Danforth anchor, \$375. Peter, x3-4712.

Dk rm equip, Durst M600 enlgr w/EL Nikor 50mm f4 lens, \$125, used vy lttle, also have polycntrast fltrs, dryer, trays, safe lite, timer, tanks, other access. Norman Lariviere, x56141 Haystack.

Old Fshn yd sale & auc, 6/19, 10am-6pm, 48 Francis St, Ryere.

Sofa, \$10; Easy chrs, \$3, \$5, \$8; Wl shlvs, \$10, \$15, \$25; Iron, \$3; Plants, \$1-\$4; Curtains; Kitchenware; Toys. Call 776-6450.

Force 5 racing sailbt, 13'10", by AMF Alcott, vy gd cond, compl w/Simek Shipmate trlr, \$950. x3-1303.

Refrig, \$35; air cond, 17,000btu, \$165; dresser w/chr & nite tbl, \$50; stl dsk, \$25; sm 4 brnr elec stove, \$50; stereo, \$250; all prcs nego. Barbara, x3-4926.

BR sets; Mahgny Dr set; Rclning chr; K set; Trunks; Cedar chst; etc. L. Romano, x8-2887 Draper.

Antique Sp gult circular chandelier; Venetian Victorian chandelier & mtchg mirror 5' long; Spanish rug, turquoise, avocado, blk, 9x12. Call 262-0178.

Qn sz mtrss, fair cond, orig \$160, ask \$40. Giorgio, x3-6554.

Bunk bed or 2 sgl beds, \$80; Qn sz bed, \$40; 13" tv, \$40; other items. Call 625-0761.

Moving, must sel wint bureau (5 drwrs); blk has-sock; fire scrn & tools; 2 beige 4x6 rugs; Smaller items. Candy, x3-7558.

Stereo rcvcr, \$110; PE trntrl by Dual, \$60; Dolby noise reducer, \$60. Mike, x3-6717.

Mvng, must sell: Bureau, \$20; Coffee tbl, \$7; Cbnt/bkshlf, free stndg, \$20; wshng mach, gd oper cond, \$50; Easy chr, \$5; Elec guit, \$30; Gas lwn

mwr, \$35; Mdl hleprt for radio cntrl, w/eng, \$100; Mdl car for radio cntrl w/eng, \$25. Bob Singer, x3-4900, kp tryng.

Buddhist artifacts: Singing prayer bell & dorge, \$50; Kali Thangka, \$500. Tom, x7459 Linc.

M 10 sp bike, 21", 27 lbs, exc cond, blu, \$160, x5-7354 Dorm.

Used cmra, Fujica 35-EE, 35mm, fl.9, \$75. John, 933-1897, aft 6.

## Vehicles

'64 Buick Skylark, 4 dr, sm econ V8, \$250. Joe, x8-1497 Draper.

'67 newly rebilt Engine, VW bug, red '64 bdy, nds nw brks. Claude, x3-3213.

'69 Ford Pick-up/cmptr, \$800. Call 666-8388, aft 5.

'69 VW, auto, gd bdy, eng, trans, brks, sun rf, nw st cvrs, \$625. Anna, x3-7256.

'70 Chevy Camaro spt coupe, V8, 3 sp std flr shft, vinyl top, \$1,350. Bob, x7056 Linc.

'70 Ford Maverick, 75K, 2 dr sedan, 6 cyl, \$650 or best. Call 484-3492 (Belmont).

'70 Mustang V-8, 302, 80K, 2 dr, sprts rf, nw auto trans, pwr st, A.M., rebuilt eng, nw alternator, \$600. Richard, x3-2346.

'71 AMC Gremlin, stand, radio, htr, nw tires, gd wrkng cond, dpndble, avail 7/1, \$585. Chip, x3-6656.

'71 Pontiac Catalina, classic cnvrtble, gd on gas, nw Michelin tires, exc cond, must see to apprec, \$2,000. x3-2686.

'72 Saab 99E, 2 dr, fuel inj, amfm radio, radials, bdy & eng exc, nw clutch, \$1,800 or best. Florence, x3-7052.

'73 Fiat 124, spt coupe, 31K, 5 sp, fl instrumentation, stereo, amfm csstte, exc cond. Chuck, x3-2401.

'73 Ford LTD wgn, pwr st & brks, ac, exc cond, \$2,275 or best. Call 566-0972, aft 6.

'73 Merc Capri, 6 cyl, 2600 eng, 2 dr, radio, rear defstr, 40K, \$1,500. John McCarthy, x3-2996.

'73 Honda, CB350, frnt disc brks, nw frnt tire, nw btry, recent tune up, exc cond, \$600. Ross, x213 Linc.

'74 Chevy Malibu midsized wgn, 39K, gd cond, \$1,950 or best. x3-3711.

'74 Fiat 124, 4 dr, 60K, exc mech & cosmetically, wl maintained, nw brks, exh, etc. \$1,950. Call 232-7418, aft 6.

'74 Fiat X19, tan, nw tires, lw mileage, amfm, \$2,795 or best. Richard, x8-1595 Draper.

'74 Vega Gt htchbk, 4 sp, sprts int, vy gd cond, priced below whisle, \$1,000. Draper, x8-2735.

'75 Volvo, org, 30K, std, amfm, exc cond, \$4,500 or best. Kevin, x3-4884.

'75 Yamaha RD 350 mtrcycl, compl w/hwy bars & luggage rack, chain & lock, exc cond, \$875. Dale, x3-1559.

'76 Ford Granada, 4 dr sedan, 6 cyl, 250 c.i. eng, pwr st, brks, radials, 21K, exc cond. x3-2772.

## Housing

Arl, sum sub, 3BR dplx, 2 min to cntr w/bus to Harv & Kendall Sq, Jul-Aug, \$325. Call 646-5470.

Arl, bright 3BR Cape, 2B, LR, DR, eat-in K, dw & disp, on delightful priv lot adj to wds on cul-de-sac, pretty vw of Bos, ask \$48,900. Call 643-3980.

Billerica, ranch, \$41,900, 22 mi from MIT. x3-1428.

Bos, Beacon Hill, stu apt avail immed, rent nego. Jonathan, x3-1352.

Brkline, f to shr w/3 others, spac, 8 rm apt, 4BR, 2B, frpl, ht, prkng, storage, near T & shops, avail 6/15 or 7/1, \$115. Marilyn, x3-5673.

Camb, furn apt, 12 min wk to MIT, BR, LR, B, K, \$175 incl util, avail 6/15 sub thru 8/31 w/opt. Call 864-4754.

Camb, for sale, 2BR mod ranch, ac, fncd, yd, fnshd bsmnt, paved drvwy, \$34,500, nr T. Call 492-2806.

Camb, Cntrl Sq area, attrctv 3 rm furn apt, incl ht, util, priv B, 3rd flr, on T. x3-7138.

Camb, lux BR apt, 14 mo lease, \$271 incl ht. Eric, x3-1380.

No Camb, unhtd 5 rm apt, quiet st. x8-3546 Draper.

Les, Fiske-Diamond schl dist, cntr entry raised ranch, 3BR, 2 1/2 B, frpl, LR, fam rm, screened prch, 2 car gar, conv to shops & town. Jerry, x5442 Linc.

Lex, sub for 12 mo from fall '77, 3BR hse, lib, playrm, 2 1/2 B, 2 car gar, exc schools fly furn, pool & tennis club. Call 861-8734.

Lex, 3BR Colonial, scrmd prch, 2 car gar, wded lot, Harv bus line, \$49,900. Call 862-1760, aft 5.

Newtonville, sum sub, furn BR apt, gar, exc prch, quiet st, \$240 incl util, nego. x5385 Linc.

Stoughton, twbnse, 2BR, 1 1/2 B, study, dw & disp, deck car & dr, dbl gar, ac, pool tennis, easy train commute to MIT, rept or rent-purch, \$495 incl ht. Dennis, 344-0624.

Falmouth, 4BR hse, nr beach, \$325/wk; 2BR, \$2-25/wk. Jean, x3-2361.

LK Maranacook, ME, Lk frnt ctgge w/lg sandy beach, tennis & golf avail locally, \$125/wk. Tom, x8-2794 Draper.

Owl's Head, ME, ctgge on Penobscot Bay, Jun on-ly. Tom, x613 Linc.

ME, nr Rangeley, lux contemp 3BR hse on huge lk, supurb vw ovrlng lk, mt rng, wldmss, swim, hike, fish, canoe incl w/rent. x8-2577 Draper.

Andover, NH, nr Ragged Mt & King Ridge, 200 acres, flds, wds, lng frntge on Cn Black Water Riv, fine vw, old rds, frnt by covered bridge, \$95,000 w/terms. Call 861-0079, aft 6.

Stowe, NH, 6.5 wded acres, contemp renov, 900 ft wtrfrntge on Assabet Riv, 4BR, 2 1/2 B, 2 gar, rec & lndry rms, livestock pen, nr twn beach. Eleanor, x3-7098.

Glencoe, Nova Scotia, sum hse rntl, 2BR, slngng loft for 4, swim nrby riv, wtrfl pool, prime spot brdwtchg, hiking, rock hunting, 12 acre hillside site, \$125/wk. Alex Parker, x7453 Linc.

## Animals

M angora cat, 3 yrs, free to gd home. Diane, x8-3995 Draper.

Last chance for cute & cuddly 3 wk old gerbils, breaking up breeding pr aft 3 litters in 10 wks. Call 494-0143 evgs.

## Lost and Found

Found, necktie in vcntry of Tang, Mehdi, x3-5348.

## Wanted

Vega rims, 2, Ed, x3-5778.

Sml hse for visiting Australian prof & fmly, 9/25-1/1 or 6/1, pref home in gd sch dist. Prof. J.N. Newman, or Sandy Ryan, x3-6809.

Rims, w/ or w/out tires, for '74 Ford Mustang II. x3-6116.

Camb, stu apt, max \$185, wl move in end Jul or beg Aug. Sue, x3-1702.

Blow torch (fluid burning torch); swngline #13 stapler; Fluorescent/Incandescent combo desk lamp; sml H O fire extngsr; blnk P.C. boards & chemcls; video monitor; photo-voltaic cells; IBM pirf feed platten; cash paid. Call 494-8888.

## Roommates

Camb, nr Tech Sq, 8 min wk to MIT, 1 cmfrtblr rm avail to shr w/2 MIT grad stus, lg K, LR, \$95 incl util. Call 272-8921.

Camb, Harv St nr Cntrl Sq, rmmte for sunny 2BR apt, avail now- 8/31 w/opt, non smkrs pref, \$120 + util. x3-4183.

Camb, off Mass Ave, Br in 2BR apt, rent vy cheap, nego, 6/15-8/1. Dora, x3-4441.

Camb, No sd Harv Sq, lg rm in lg 4BR apt, quiet nghbrhd, 1 1/2 blks to T, easy prkng, prtly furn, lw rent. Chip Farley, x3-6050.

Lex, rm avail for sum, shr use of hse, on T to Harv Sq, \$110. James Jones, x3-2180.

Lynn, f to shr 6 rm apt off Lynn Shore Dr, near T, 30 min to Bos, \$162.50 htd. x3-4701.

Som, Prtr Sq, sub immed thru 8/31, unfurn BR in 5BR hse, sunny, clean, nr shops, lndry, T, \$97.50. Jerry, x3-4170.

## Carpools

From Plym, Duxbury, or Kingston area, 6 wks only, 6/11-8/19, to attend MIT stu wkshp. Donna Barry, x3-3471.

## Miscellaneous

Roland Davis Retirement Party, held by the Physical Plant electric shop, Jun 10, Dominic's Supper Club. Info: Larry or Bob, x3-6351.

Belmont, rm, 1/2 B, for sum in exch for services, nr T. Alan, x3-3982.

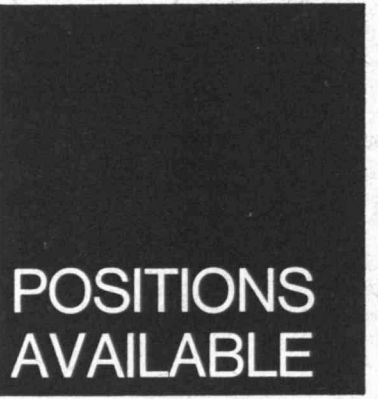
Wl type thesis, manu, tech, fast & accur, IBM Correcting Selec. Debbie, x3-1848.

Fast accur typing, tech & non-tech on IBM Correcting Selec, rsnble rts. Sandy, x3-1533.

Wl type theses manu, rprts, etc, fast & accur. x3-4528.

Exp painters, refs avail, call now. William Morris or Steve Ratliff, 266-2968.

Gen cntrctng wrk wntd, we are a sm group of compt stus w/skills as crpntry, plumbing, roofing, pntng; let us remodel yr hse at frac of prof fee. x5-6103 Dorm.



This list includes all non-academic jobs currently available on the MIT campus. Duplicate lists are posted on the Women's Kiosk in Building 7, outside the offices of the Special Assistants for Women and Work (10-215) and Minority Affairs (10-211), and in the Personnel Office (E19-239). Personnel Interviewers will refer any qualified applicants on all biweekly jobs as soon as possible after their receipt in Personnel.

Persons who are NOT MIT employees should call the Personnel Office on extension 3-4251.

Employees at the Institute should continue to contact their Personnel Officers to apply for positions for which they feel they qualify.

Dick Higham 3-4278  
Pat Williams 3-1594  
Carolyn Scheer 3-1595  
(Secretary - Ann Perkins)

Virginia Bishop 3-1591  
Mike Parr 3-4266  
Ken Hewitt 3-4267  
(Secretary - Paulette Chiles)

Sally Hansen 3-4275  
Lewis Redding 3-2928  
Richard Cerrato 3-4269  
(Secretary - Jenni Leibman)

**Sponsored Research Staff, temporary, in Mechanical Engineering** to do postdoctoral research on the development and testing of transparent heat mirror films; produce multilayer thin films and investigate optical properties and thermal cycling stability. A Ph.D. in Material Science, Electrical Engineering, Applied Physics or a related field is required. A good experimental background is necessary as well as familiarity with computer programming. Appointment is for 11 months. R77-102 (6/8).

**Admin. Staff, part-time, Family Day Care Program Director, in the Child Care Office** to administer a child care program in which children are cared for in MIT affiliated homes; recruit families to provide care; interview and assist parents in locating suitable care for their children; follow up with participants in the program and assist in resolving related problems; assist in organizing monthly meetings and in producing a monthly newsletter. Experience in operating comparable program is preferred. Applicants must have a knowledge of child development and have organization skill. Familiarity with foreign cultures and languages helpful. Position begins 8/1/77 and is a 1/2 time appt. A77-36 (6/8).

**Admin. Staff Administrative Dietician, in the Food Service** to organize and direct a coordinated program for Food Service units, with responsibility for general management, menu planning, food preparation and service. Duties will include budget development; supervision of personnel; development of cycle menu structure; purveyor liaison;

personnel training programs; liaison with MIT community. A Bachelor's degree in Food Service, or equivalent combination of education and experience is required. In addition, applicants should have at least 2 years related experience. American Dietetic Association membership preferred. A77-35 (6/8).

**Admin Staff, Admin. Asst., in Architecture** to assist Department Head in the Coordination of a wide variety of faculty and committee activities; prepare working drafts, annual reports; handle administrative aspects of several departmental functions. A working knowledge of the field of architecture and/or academic administrative experience is required as well as strong organizational ability required. A77-34 (6/1).

**Sponsored Research Staff, Energy Analyst, in the Energy Lab.** Photovoltaic Program will have primary responsibility to estimate demand for terrestrial applications of photovoltaics (solar cells used for direct conversion of sunlight to electrical energy). Analysis will be derived from existing information sources with which applicants should be familiar. A Bachelor's degree in economics, or a related policy science with a minor in economics, is required. (Master's degree preferred). A basic facility with mathematics and 1 or more programming languages is desirable. R77-100 (6/1).

**Admin. Staff, Manager, Text Sales, in the MIT Press** to be responsible for all aspects of sales and promotion of all text titles, primary and supplementary. Duties include planning direct mail promotions; selecting texts for paperback reprinting; arranging for and participating in book exhibitions. Applicants must be familiar with the text market and text marketing, and experienced in direct mail promotion. A77-32 (6/1).

**Sponsored Research Staff, temporary, Technical Writer, in the Aeronautics and Astronautics Innovation Center** to assist in the writing of books on technological innovation; gather information from faculty members; prepare and type drafts; assist in editing. A Bachelor's degree in Engineering or a related field is required, as well as writing experience (other than technical documentation and manual preparation). Applicants must have a command of the English language, and be able to type. Position is for 11 months. R77-99 (6/1).

**Administrative Staff, Director, Engineering Internship Program** in the School of Engineering to direct activities of the Program: budgeting and administration of funds; contractual arrangements with participating companies; counseling of students; supervision of office personnel; coordination of relations between MIT, participating companies, MIT faculty and students; administer all aspects of student recruitment and selection process. A Bachelor's degree in Engineering and at least 5 years experience in the administration of teaching programs and/or appropriate experience in industry are required. Applicants should also be familiar with the broad spectrum of engineering fields and their current state-of-the-art. Masters degree desirable. A77-31 (6/1).

**Academic Staff, temporary, Technical Assistant, in Physics Department** to assist students in laboratory techniques such as vacuum disposition, electronic circuit construction, metal working; troubleshoot experimental set-ups, making equipment adjustments as necessary; assist faculty in developing and improving experimental material. A Bachelor's degree in Physics, extensive undergraduate laboratory experience required. Some teaching experience desirable. Position is for 1 year. C77-26 (6/1).

**Admin. Staff, Production Manager, in the MIT Press** to supervise and manage production activities (approximately 80 new titles, 100 reprints, 24 journal issues annually). Responsibility includes scheduling, cost estimating and evaluating, manufacturing procurement (type, paper, printing, etc.). Will also evaluate supplier methods, costs; plan production budgets. A Bachelor's degree, or equivalent combination of education and experience, plus at least 3 years production/editorial experience, including outside supplier liaison, and book production schedule coordination required. A77-33 (6/1).

**Academic Staff, Laboratory Coordinator, in the Biology Department** for a large laboratory course. Will be responsible for smooth operation of laboratory: material purchase and preparation; testing of experimental procedures; assisting in scheduling a large teaching assistant group; will act as senior teaching assistant. A Bachelor's or Master's degree in Microbiology or Biochemistry required. C77-22.

**Exempt, Administrative Staff, in the Dean for Student Affairs Office** to coordinate housing assignments, charges, and information flow; determine eligibility, make charge adjustments, maintain records and statistics for all on-campus undergraduate housing. Applicant must be able to apply Institute housing policies with tact and sensitivity; be able to handle detailed procedures with high degree of accuracy. Knowledge of university housing policies and student account billing procedures helpful. E77-25 (6/8).

**Exempt, Administrative Assistant, in Campus Housing** to handle several duties related to operation of housing service: scheduling and supervision of clerical, housekeeping, maintenance functions; budget management; inventory control. Applicants must have work experience and/or educational training in accounting systems, and be familiar with industrial or other large-scale housekeeping procedures and with building maintenance. E77-24 (6/1).

**Exempt, Inpatient Nurse, in the Medical Department Infirmiry.** Will do primarily bedside nursing, and will also provide first aid and emergency treatment on 11PM-7AM shift. Applicants must be Mass. Registered Nurses with at least 2 years' work experience in medical/surgical nursing. Experience in first aid and/or emergency clinic desirable. Hours are primarily 11PM-7AM, but applicants should have flexibility to work other shifts. All shifts include every other weekend off. E77-23 (6/1).

**Tech. Asst. IV (trainee)** in Psychology Dept. to function as technical and secretarial assistant in a laboratory studying neurophysiology. Technical duties include some autoradiographic processing of slides, making of slides, occasional film making, drafting and data analysis. Secretarial duties include assisting in proposal preparation; typing of papers; monitoring of grants. Familiarity with photographic processing (b&w) and drafting (mechanical drawing and Leroy lettering) required. Good secretarial skills also necessary. College training, some background in psychology and/or a related area desirable. B77-228 (6/8).

**Secretary V in Aerospace Studies** will handle a variety of duties to support Air Force ROTC program: provide policy information to prospective students; organize meeting agenda; follow up on various administrative matters related to program; independently compose correspondence; edit manuscripts, verifying content accuracy as necessary; maintain budget records; assist in budget preparation; arrange luncheons and other social events. Excellent typing and general secretarial skills, the ability to learn military administrative practices required. Familiarity with MIT procedures desirable. B77-234 (6/8).

**Secretary V to Department Head and Associate Department Head in Electrical Engineering and Computer Science** to arrange appointments and travel; respond to or arrange for response to written and oral inquiries; assist in compiling confidential files and data; handle Visiting Committee arrangements. In addition to excellent general secretarial skills, applicants should be able to handle confidential material with discretion and have editorial capability. Shorthand is not required. B77-210 (6/1).

**Admin. Asst. V** at the MIT Press to handle all aspects of direct mail program: prepare catalogue and brochure copy; select mailing lists; coordinate production (composition, pasteup, printing, etc.);

secure mailing permits; monitor budgets. Excellent organization and writing skills, some production experience required. Position involves handling several detailed projects simultaneously. A minimum of 2 years publishing experience is preferred. B77-214 (6/1).

**Secretary IV, part-time, (academic year)** to the Director of Drama in the Humanities Dept. will handle general secretarial duties; handle inquiries regarding tickets, performances, rehearsals; maintain expense records; transcribe machine dictation. Good typing and general secretarial skills required. Position is for 3 1/2 hrs./day, Mon.-Fri. during academic year only (Sept.-May). B77-222 (6/8).

**Secretary IV** to academic staff member in the Center for Policy Alternatives involved in projects related to environmental/occupational health, law and policy, and on teaching in technology and law. Will handle general secretarial duties including typing; organizing proposals; monitoring accounts; coordinating projects and arranging travel. Excellent typing, shorthand (or willingness to acquire shorthand) and organizational skills required as well as ability to set priorities and work independently. Interest in above subject matter desired. 37 1/2 hrs./wk. B77-225 (6/8).

**Secretary IV** in the Medical Department Radioactivity Center will assist in contacting radium therapy patients for study at MIT; arrange their travel to the Institute; escort patients to and from treatment sites; perform general secretarial duties (type, maintain files and supplies; answer phones, etc.). Excellent typing, English grammar skills required. B77-229 (6/8).

**Secretary IV** in the Programming Development Office to perform secretarial duties for a large group of programmers: type technical documents, using computerized editing equipment; maintain technical files; arrange meetings and travel; answer phones. At least 3 years secretarial experience, ability to organize work load and to work with a large group of people required. B77-232 (6/8).

**Secretary IV** in the Dean for Student Affairs Office to the Assistant Dean in the Freshman Advisory Council and Undergraduate Seminar Program: maintain budget and other records; respond to inquiries regarding programs and procedures from students, faculty and others; handle all other general secretarial duties as necessary. Ability to organize and complete work in a hectic environment, good secretarial and interpersonal skills required. B77-227 (6/8).

**Secretary IV** in the Plasma Fusion Center will act as principal headquarters secretary supporting two senior staff members: type reports, correspondence from machine dictation; arrange travel; organize and maintain files. Secretarial training and at least two years secretarial experience required. Applicants should be able to organize and carry out responsibility with minimal supervision. B77-226 (6/8).

**Secretary IV** in Mathematics to type a substantial volume of material (correspondence, class materials, mathematical manuscripts) for faculty and staff members; compose some correspondence; arrange travel; answer phones; maintain files and records. Excellent typing skill, including ability to type



**LOOKING LIKE A GIANT PILLOW, The J. B. Carr Indoor Tennis Center** provides a backdrop for a solitary runner on the track.

—Photo by Calvin Campbell

Accuracy with detailed work, ability to set priorities required. Familiarity with MIT helpful. B77-211 (6/1).

**Clerk-Receptionist III**, temporary, in the Office of Personnel Services to work in main Personnel reception area; answer applicants' inquiries on available positions and application procedures; arrange appointments with interviewers; provide backup telephone coverage to office staff members; process a large volume of resumes through a review system; assist in preparing job listings for posting in MIT newspaper. Will handle other clerical duties as necessary. Typing skill, the ability to assist several people (in person and on telephone) simultaneously, and to deal with people in a sensitive manner required. Position is approximately for the period 7/25/77 through 10/10/77. B77-213 (6/1).

**Reactor Operator IV** in the Nuclear Reactor Laboratory will serve as shift operator on MIT Reactor after passing NRC Operators Examination. Will monitor operation of a 5 MW reactor; assist with various technical tasks; maintain related logs. Applicants must have 2 years technical college training, or equivalent, in order to pass Operators' Licensing examination. Ability to work under pressure of emergencies also necessary. 40 hrs./wk. B77-221 (6/8).

**Hourly, Reproduction Worker A**, in Graphic Arts to expose and develop plates; mix inks; puts plates on press; load paper into automatic feeder; adjust punching unit and makes other adjustments for half tone and line registration; do 1 or 2 color printing. May also train other operators and handle other related duties as necessary. Graduation from high school, or equivalent, plus a minimum of 5 years applicable experience required. H77-83 (6/8).

**Hourly, Audio-Video Operator B** in the Graphic Arts Service to set up, operate and maintain all types of slide and motion picture equipment; clean, inspect, repair slides and films; drive motor vehicle; deliver and pick up material and equipment. Handle related duties as necessary. A minimum of 4 years applicable experience, commercial driving experience, Massachusetts drivers license (unrestricted) and ability to pass special drivers' physical examination required. H77-82 (6/8).

**Heat & Vent, Mechanic B, hourly**, in Physical Plant requires a minimum of 2 years' experience in operation of Central Station Air Conditioning Equipment and service systems. Position also requires working on a rotating schedule covering a 24 hr/day-7 day/week operation; irregular schedule. H77-81, H77-85 (6/8).

**Technician A, hourly**, in the Environmental Medical Service at Bates Linear Accelerator, Middleton, Ma. Will work as a member of the rotating Radiation Protection Office crew. Duties include radiation surveys, security searches, environmental monitoring, decontamination, radiation shielding, instrument calibration and general radiation protection activities. At least 2 years day technical school training which emphasized Radiation or Health Physics plus 2 years applicable experience required. H77-58.

The following positions were still available at *Tech Talk* deadline. The date following each position is the date of the most recent *Tech Talk* issue in which the position was described.

**ADMINISTRATIVE STAFF:**  
A77-3, Systems Prog., Info. Processing Serv. (2/16)  
A77-15, Director, MIT Alumni Fund (4/13)  
A77-20, Prog., Analyst, Info. Proc. Serv. (5/4)  
A77-21, Systems Prog., Info. Proc. Serv. (5/4)  
A77-22, Asst. Dir., VP, Resource Devel. (5/4)  
A77-23, Prog. Analyst, Info. Proc. Serv. (5/11)  
A77-25, Legal Asst., Off. of Spons. Prog. (5/18)  
A77-26, Syst. Prog., Info. Proc. Serv. (5/18)  
A77-29, Asst. Labor Relations Mgr., Pers. Relations (5/25)  
A77-30, Super. Publications Serv., Info. Proc. Serv. (6/1)

**BIWEEKLY:**  
B77-70, Sec. III-IV, Chemical Engineering (3/16)  
B77-102, Sec. IV, Sea Grant Prog. (6/1)  
B77-114, Sec. IV, Medical Dept. (4/6)  
B77-126, Sec. IV, Ctr. for Policy Alternatives (5/4)  
B77-132, Sec. IV, Sloan School (4/27)  
B77-138, Sec. III-IV, MIT Assoc. Prog. (5/4)  
B77-144, Sec. IV, Medical Dept. (5/4)  
B77-151, Sec. IV, Aero/Astro Dept. (5/4)  
B77-152, Sec. IV, Industrial Liaison Prog. (5/4)  
B77-155, Sec. IV, Industrial Liaison Prog. (5/11)  
B77-161, Sec. III, Mech. Eng. (5/11)  
B77-164, Copy Machine Asst. III, Libraries (5/18)  
B77-165, Tech. Asst. V, Haystack Observatory, Westford (5/18)  
B77-169, Sec. IV, Libraries (5/18)  
B77-171, Sec. IV, Sloan School (5/18)  
B77-172, Sec. IV, Nutrition & Food Sci. (5/18)  
B77-173, Edit. Asst. IV, MIT Press (5/18)  
B77-175, Sec. IV, Dean for Stdn. Affairs (5/25)  
B77-176, Sec. III-IV, Chemical Eng. (5/25)  
B77-179, Sec. IV, Biology (5/25)  
B77-182, Section Head V, Barker Eng. Lib. (5/25)  
B77-183, Sec. IV, Sloan School (5/25)  
B77-189, Key punch Oper. III, Computing Serv. (5/25)  
B77-191, Sec. III-IV, Off. of Pres. & Chanc. (5/25)  
B77-196, Sr. Clk. IV, Alumni Assn. (6/1)  
B77-200, Sec. IV, Chemistry Dept. (6/1)  
B77-201, Sec. IV, Alumni Assn. (6/1)  
B77-202, Admin. Asst. V, Nuclear Eng. (6/1)  
B77-203, Sec. IV, Career Pl. & Placement (6/1)

B77-204, Sec. III, Meteorology Dept. (6/1)  
B77-205, Sr. Clk. IV, Alumni Assn. (6/1)  
B77-208, Sec. III, Math Dept. (6/1)

**ACADEMIC STAFF:**  
C77-4, Tech. Asst., Biology (4/6)  
C77-10, Tech. Asst., Biology (5/4)  
C77-18, Asst. Radiation Protection Off., Medical Dept. (5/4)  
C77-23, Mgr. of Financial Serv., Medical Dept. (5/25)  
C77-24, Tech. Asst., Biology (6/1)  
C77-25, Staff Asst., Libraries (6/1)

**SPONS. RES. STAFF:**  
D76-17, Biochemist, Res. Lab. of Elec. (2/25)  
D76-121, Res. Engineer, Energy Lab. (7/28)  
D76-187, Postdoc. Sci., Ctr. for Space Res. (10/13)  
D76-188, Postdoc. Sci., Ctr. for Space Res. (10/13)  
D76-225, Sci. Applications Prog., Lab. for Nuclear Sci. (5/4)  
D76-232, High Energy Physics Res., Bates Linear Accelerator (1/5)  
D76-233, High Energy Physics Res., Bates Linear Accelerator (1/5)  
D76-243, Metallurgist, National Magnet Lab. (1/12)  
D76-244, Manager, Combustion Facility, Energy Lab. (1/12)  
D76-246, High Magnetic Field Res., National Magnet Lab. (2/9)  
R77-16, Prog. Mgr., Energy Lab. (2/9)  
R77-17, Systems Theory Res., Elec. Syst. Lab. (2/9)  
R77-22, Astro Physics Res., Ctr. for Space Res. (2/16)  
R77-26, Planetary Radar Data Analysis, Earth & Planetary Sci. (3/2)

R77-33, postdoc. res., Physics, Ctr. for Theoretical Physics (3/9)  
R77-34, postdoc. res., Physics, Ctr. for Theoretical Physics (3/9)  
R77-35, postdoc. res., Physics, Ctr. for Theoretical Physics (3/9)  
R77-36, postdoc. res., Physics, Ctr. for Theoretical Physics (3/9)  
R77-37, High Energy Physics res., Bates Linear Accelerator (3/9)  
R77-49, Res. Eng., Energy Lab. (3/23)  
R77-51, Sr. Res. Eng., Energy Lab. (3/23)  
R77-53, postdoc. res., Physics, Res. Lab. of Elec. (4/6)  
R77-67, Sr. Design Eng., National Magnet Lab. (4/13)  
R77-72, Instrumentation Physicist/Eng., Energy Lab. (4/27)  
R77-73, Plasma Physicist, National Magnet Lab. (4/27)  
R77-74, Plasma Physicist, National Magnet Lab. (4/27)  
R77-75, Nuclear Magnetic Resonance Res., National Magnet Lab. (4/27)  
R77-79, Postdoc. Res., Physics, Lab. for Nuclear Sci. (5/4)  
R77-80, Postdoc. Res., Physics, Lab. for Nuclear Sci. (5/4)  
R77-82, Applications Analyst, Energy Lab. (5/4)  
R77-85, Comp. Specialist, Energy Lab. (5/11)  
R77-91, Sr. Accelerator Physicist, Lab. for Nuclear Sci. (5/18)  
R77-92, Elec. Eng., National Magnet Lab. (5/18)  
R77-93, Biophysicist or Medical Physicist, National Magnet Lab. (5/25)  
R77-94, Design Eng., National Magnet Lab. (5/25)  
R77-95, Biophysicist, Biology (5/25)  
R77-97, Chemical Eng., Energy Lab. (6/1)  
R77-98, Elec. Eng., Hlth. Sci. & Tech. (6/1)

**EXEMPT:**  
E76-41, Principal Oper., Physical Plant (12/1)  
E77-3, Mech. Shop Super., Physical Plant (1/26)  
E77-5, Real Time Diagnostic Syst., Prog. Haystack Observatory (2/2)  
E77-11, Resident House Mgr., Housing & Food Serv. (4/13)  
E77-13, Eng. Asst., Energy Lab. (4/13)  
E77-16, Admin. Asst., Libraries Microreprod. Lab. (5/4)  
E77-19, Circulation Mgr., Alumni Assoc. (5/4)  
E77-21, Admin. Asst., Stud. Fin. Aid (5/11)

**HOURLY:**  
H77-29, 2nd. Class Engineer, Physical Plant (3/9)  
H77-71, Cook, Endicot House, Dedham (5/4)  
H77-80, Campus Patrol Officer, Campus Patrol (5/25)

The following positions have been FILLED since the last issue of *TECH TALK*:  
B77-139, Sec. IV  
R77-83, Spons. Res. Staff  
H77-75, Spons. Res. Staff  
B77-160, Sec. III-IV  
A77-19, Admin. Staff  
B77-170, Sec. IV  
B77-179, Patrolman  
B77-180, Sec. IV  
D76-240, Admin. Staff  
B77-209, Sec. IV  
B77-190, Sec. III  
B77-178, Sec. III  
B77-188, Acctg. Asst. V

The following positions are on HOLD pending final decision:  
R77-86, Spons. Res. Staff  
B77-177, Sr. Clk. III  
B77-199, Sr. Lib. Asst. IV  
B77-81, Spons. Res.  
B77-156, Clk. III  
C77-20, Acad. Staff

## New Plan For Handicapped Adopted

MIT has adopted a formal affirmative action plan for employment and advancement of qualified handicapped persons in conformance with regulations of the federal Rehabilitation Act of 1973.

Called a "Program for the Employment of the Handicapped at MIT," copies of the plan are being distributed this week to headquarters of departments, laboratories and centers. A reference copy also will be available in the Information Center, Rm 7-111.

Central to execution of the program is a section inviting self-identification of handicapped employees and applicants to one of the persons responsible for the program. Self-identification by such individuals is encouraged as a means of aiding MIT in carrying out its obligations under the law. Submission of this information is voluntary and refusal to provide it will not subject individuals to any adverse treatment.

The program also calls for employers within MIT to make reasonable accommodations for the employment of qualified handicapped persons. These include both making necessary physical changes and job restructuring.

Recruiting efforts are part of the program as well, calling for MIT to take positive action to attract qualified handicapped employees. These

include seeking employment referrals from places such as vocational rehabilitation agencies, sheltered workshops and educational institutions that specialize in training handicapped persons. The program also calls for including handicapped employees in advertising and recruiting efforts.

Under another provision, Physical Plant and the Planning Office will conduct a review of the campus to identify architectural barriers limiting access to facilities. Where immediate structural changes cannot be made, a transition plan will set forth a long range design for elimination of architectural barriers.

Responsibility for implementation of the program rests with John M.

Wynne, vice president for administration and personnel and equal employment opportunity officer for MIT; Patricia A. Garrison, assistant equal employment opportunity officer, and John T. Dargin, personnel manager at Lincoln Laboratory.

In addition to this program, MIT will conduct a self-evaluation of its conformity with regulations effective June 3, 1977, prohibiting discrimination because of handicap against otherwise qualified applicants for admission and requiring the Institute to provide access for handicapped students to Institute programs and facilities. The self-evaluation will be conducted during the coming year.

## Lowell School Announces Courses

Lowell Institute School has announced three one-week, intensive courses in electronics to be offered during the summer term.

"Op-Amp Applications" will include both linear and non-linear op-amp circuit design with emphasis on understanding device limitations. Dates are June 20-24.

"Introduction to Digital Electronics" will cover combinational logic, memory devices and a variety of counting and timing circuits. The course assumes no prior experience and is scheduled for July 18-22.

"Advanced Digital Electronics" will be a detailed study of characteristics and limitations of digital circuits and their applications to instru-

mentation, computation and control. The course will run July 11-15, and a basic knowledge of introductory digital electronics is a prerequisite.

With seven contact hours per day divided between lecture and laboratory, intensive courses have proved to be the optimum solution for technicians and engineers who wish to become familiar with new areas of electronics in the minimum time.

Applications are due 10 days before the start of the course. Tuition for each course is \$225, but MIT employees will qualify for tuition assistance if the course is job-related. Additional information and applications are available in the LIS office, Room 5-118, Ext. 3-4895.

## Observer Out

A new issue of *MIT Observer*, a 20-page compilation of news clippings about MIT, published primarily for parents of undergraduate students, is out this week.

Subjects covered in this issue range from the report of the Workshop on Alternative Energy Systems, through lectures on World Change/World Security, advances in the MIT Leadership Campaign, to IAP and the recordings of the MIT Symphony Orchestra. Copies of *MIT Observer* are available in the Information Center, Rm 7-111.

## Obituary

### Eleanor F. O'Brien

Services for Eleanor F. O'Brien, administrative assistant in the Department of Nutrition and Food Science, were held Saturday, June 4, in Arlington. Mrs. O'Brien, 64, died June 2 following a long illness.

She is survived by ten children: Mrs. Mary Ellen Powers of West Roxbury, Mrs. Patricia McCarron of Arlington, Mrs. Catherine Haskell and Mrs. Frances Lane of Andover, Mrs. Elizabeth Ann Oaks of Columbus, Ohio, Joseph P. O'Brien of Sudbury, John O'Brien of Cambridge, Leo O'Brien, Richard O'Brien and Edward O'Brien of Arlington, and 10 grandchildren.

Memorial contributions may be made to the Symmes Hospital Cardiac Unit in Arlington.

## 20 High School Students Enroll in NSF Program Here

Twenty high school students will study at MIT this summer learning to use computers on problems in mathematics and physics.

The six-week course, offered for the second consecutive summer at MIT, is made possible by a National Science Foundation Student Science Training Program grant and is offered by MIT's Artificial Intelligence Laboratory and the Laboratory's Logo Group research project which is concerned with applying computers to education.

Program directors are Dr. Harold Abelson, lecturer, and Dr. Andrea di Sessa, special lecturer, of the MIT Division for Study and Research in Education. Both participated in similar programs when they were high school students—Dr. Abelson at Lakewood High School, Lakewood, N.J., studied one summer at Notre Dame; and Dr. di Sessa, at Jefferson High School, Edgewater, Col., studied one summer at Colorado College.

"We won't use computers as teaching machines but rather as powerful tools the students can program and learn about through a

project-oriented approach," Dr. Abelson said.

"Possible summer projects include programming a sound generator to learn about physics, developing an autopilot for spaceship navigation, and experimenting with computer controlled color graphics systems to learn about visual perception. The course will help us develop our project on computer use in education and provide a stimulating summer for the students."

Participating high school students will be:

Andrew Axup of Rock Island, Ill.; Catherine Briasco of Ashland, Mass.; Glen Campbell of Bedford, Mass.; Donald Coombs of Plymouth, Mass.; Randall Correia of S. Dartmouth, Mass.; Sarah Ferguson of Lincoln, Mass.; David Furuno of Stonington, Conn.; Joel Gould of Needham, Mass.; Oren Grad of Newton Center, Mass.; Andrew Gratz of Acton, Mass. Also, David Hammer of Marblehead, Mass.; Joshua Kurtzberg of Yorktown Heights, N.Y.; John Lassinger of Sugartown, Penn.; Brian O'Toole of Wollaston, Mass.; David Roberts of West Newton, Mass.; Lisa Rosinson of Tewksbury, Mass.; Joseph Romm of Middletown, N.Y.; Edward Speroni of Hopedale, Mass.; Jane Ann Yater and Joan E. Yater of Lincoln, Mass.

# Wiesner Calls for 'Shared Language' in Technology

(Following is the text of the address presented by Dr. Jerome B. Wiesner, president of MIT, at MIT's 111th commencement, Monday, June 6, in Rockwell Cage.)

By Jerome B. Wiesner

Good morning. Welcome to this 111th MIT graduation ceremony. A hearty congratulations from the MIT faculty and administration to all of you who are receiving degrees this morning and to your guests. Welcome too, to Dr. Johnson, Dr. Killian, Mayor Velucci, and honored guests.

I would like to recognize particularly the families and friends of these young men and women on whom we confer degrees today. You share a justifiable sense of pride, and, I suppose, relief on this happy day. There is no adequate way to express appreciation for what you have done to help make this day possible. I congratulate all of you who are mothers, fathers, brothers, sisters, wives, husbands, sweethearts, young children, grandparents, and aunts and uncles. This is the one day of the year when our favorite expression "the MIT family" takes on its deepest possible meaning. I would like to ask the Corporation and the Faculty to join me in giving you our recognition. You have been successful here primarily because of what you were when you arrived at MIT. But the MIT faculty has worked hard to help you learn and grow. Nowhere can one find a faculty more dedicated to excellence in teaching and research or prouder of their students—they deserve our thanks.

During the four years that the Class of '77 has been here we have shared many experiences. While you were suffering through problem sets, quizzes, Fourier transforms, registrar's forms, and tuition hikes, and while MIT was navigating through financial shoals, all of us were nonetheless aware of major events occurring outside the Institute. These were the years of Watergate, the Bicentennial celebration, the first public recognition of impending energy shortages, growing struggles for personal freedom in many countries around the world (and growing repression too), and most recently a national presidential campaign and election in which, despite sharp differences, we have chosen leaders in accordance with the collective values of the people. On the campus, we debated issues that reflected some of these outside concerns; among them, for example, were educational programs sponsored by foreign governments. We have also been close-up witnesses to one of modern history's few attempts to limit scientific inquiry, the recent DNA controversy. We have had lively discussions over such academic issues as the humanities requirements, pass-fail, sculpture on the campus and the Writing Pro-

gram. You took all these events, local, and national, seriously, and engaged vigorously in the discussion and the sorting out of the hope and frustrations which have taken place in our society during these four years. You saw—perhaps for the first time—how precious and delicate a democratic society really is.

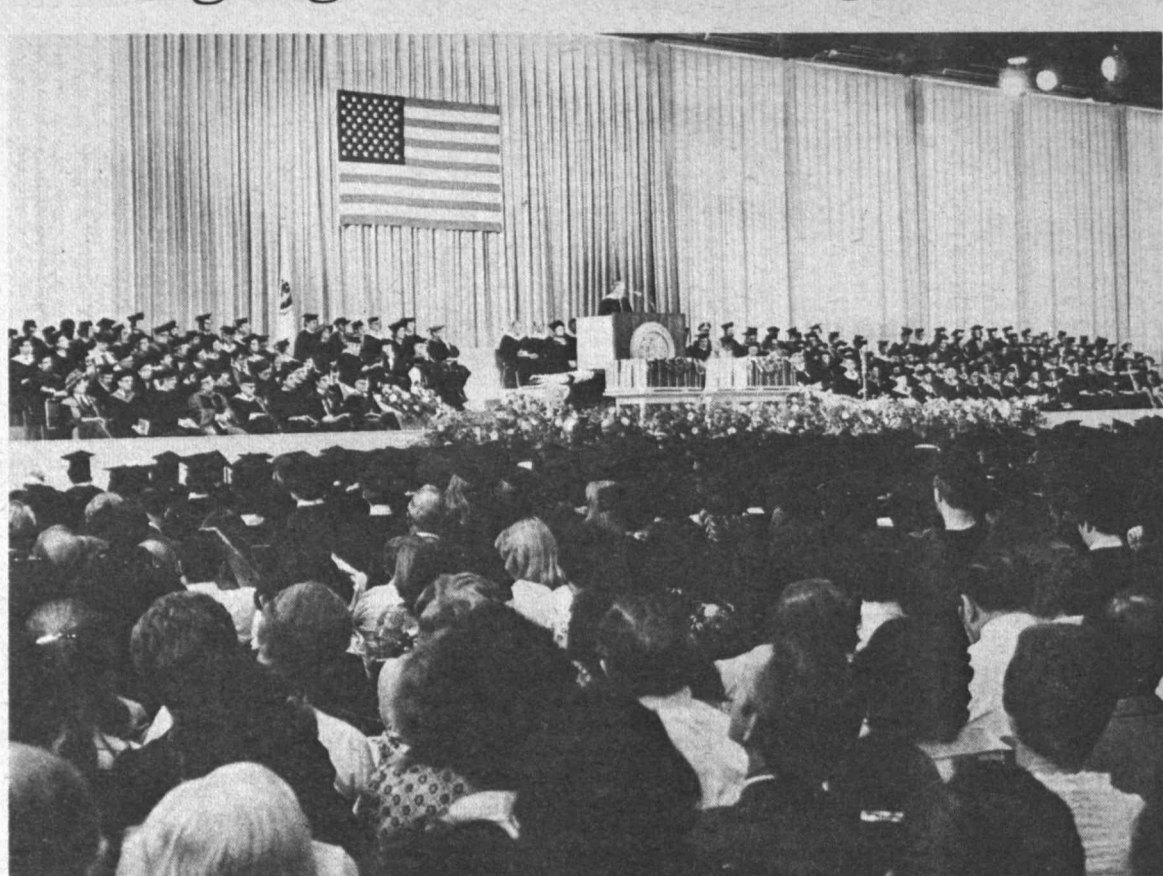
The seeds planted by all of these events are with us as a growing part of the nation's view of itself and its future. Each in its own way, represents a challenge of our ability to understand and to set, or reset, national, local, and personal priorities.

This morning I want to use these events to highlight four points. First, we have seen that no matter how deeply you are involved in solving some immediate problem, events and issues in the society at large will inevitably impinge on you. At MIT you have demonstrated a serious concern for your non-academic as well as academic environment and have learned, I believe, that your actions can influence events enough to make the effort worthwhile. The college generation of the 60s left us with the now classical slogan, "If you're not part of the solution, you're part of the problem." This was meant to debunk the ostrich theory that if one ignores a problem long enough it will simply go away. That college generation found that events important to them had to be dealt with head on, couldn't be ignored. Thus they played a major role in shaping the nation's views on a number of issues, chief among them the Vietnam War, and many of them are young leaders of today. You, the Class of '77, have demonstrated that you are equally determined to help shape the world in which you live.

My second point is a related but broader issue; namely, how our nation can learn to deal collectively with large national issues while, at the same time, retaining a fundamental respect for the hopes, feelings, and freedom-to-choose of the individual. This is the central question of our time; it is fundamental to our way of life. It was recently said by an MIT faculty member, most poignantly, that social policy, no matter how benign, can feel to an individual like a bulldozer in one's living room. If you're directing the path of that bulldozer (and many of you will be in such positions) clearly you will want to be aware of its power. Individual rights tend to fall before the common good. Somehow we need to recognize that preservation of freedom and individuality, in the face of increasing societal restrictions, is a most essential common cause.

My third point can be stated rather simply. Most of our vital societal goals are in competition with one another, yet they must be reconciled. For example, complexity and size demand increasing control and regulation, a social need which is clearly in conflict with individual freedom and initiative, which has been our traditional source of strength and greatness. The great drive for social and economic equity is not without its financial costs and political strains, requiring resources and attention that might be devoted to other, equally important or desirable goals. The need to protect and restore the environment for future generations limits what we can build or use today, and yet we are accustomed to almost take as a right the freedom to consume as we choose. Past and recent experiences with the unexpected side effects of technology are causing people to be much more cautious about the introduction of new technologies even though they will be needed if we are to strike a viable balance between man and nature in the future. Many more examples could be listed. The main thing to realize is that it isn't a question of rights and wrongs but rather of balancing conflicting goals, so that society as a whole can continue to develop effectively on many fronts with minimum discomfort to all.

The adjudication of conflicting goals is made more difficult when the choices involve not just prefer-



MIT COMMENCEMENT—MIT President Jerome B. Wiesner (at podium) addresses those gathered for the 111th commencement on Monday, June 6. Dr. Wiesner gave the commencement address and urged the graduates not to avoid solving massive human problems simply because the solutions may contain elements of

risk. He presented degrees to the graduates as their names were called by the deans of their respective schools. 1,323 graduate and undergraduate students received a total of 1,492 degrees as more than 3,000 friends and relatives looked on.

—Photo by Calvin Campbell

ences but risks. When the hazards people faced were mostly of the kind we called "acts of God," whether in the form of epidemics or natural disasters or even wars, they were faced resignedly and stoically. What else could one do? Today we face an additional set of risks—those associated with man-made technology. Unlike natural disasters, the probability of man-made risks can usually be adjusted. Unfortunately, the cost of making the risks very small is apt to be very large and finding an appropriate balance is not just a technical question or even an analytical one, but a question of value—which risks are worth what costs?

Using the energy question as a case in point, we can see in it the conflicting goals of protecting health or the environment, or avoiding accidents, and still assuring energy supplies for the decades ahead. At the moment there is opposition to nuclear power plants, strip mining of coal, burning coal, drilling for oil off the East and West Coasts, oil tankers, the construction of pipelines to carry natural gas or of liquefied natural gas facilities to bring in gas by ship, and mining of tar sands and oil shale. Each of these choices does pose some real problems, some pose actual, though small, risks. Yet in the end to do nothing and thus fail to provide for the nation's future energy needs would pose the greatest threat of all for our democratic society.

The balancing of benefits and risks has recently led to concern about a specific area of fundamental research which new technology has made possible. We in Cambridge have had a ringside seat in the extremely interesting debate over DNA research in which it appeared for a time that it might be totally prohibited—to me, a most disturbing prospect. The challenge has now moved to the national level where legislation is being considered for the supervision of DNA research. Currently, scientists are trying to ensure that appropriate monitoring does not turn into precedent-making restrictions and regulations.

I am certain that in years to come we will frequently hear proposals to restrict research in one or another field of science, and you can be almost certain that they will be the most interesting fields, for in them will be found the widest range of new opportunities—and worries. In my view, to carry out such restrictive actions would stifle human progress. The long-term costs would be very high, because a civilization which limits its inquiry for fear that what it learns might be misused, would soon suffocate both its intellectual life and

its social development. On the other hand, a civilization which doesn't learn how to be sensitive, selective, and timely in the deployment of new technology is condemned to cope with major disruptions either from technology's belated deployment or its absence.

At any given moment, the incommensurate trade-offs between environment, intellectual vitality, health, aesthetics, energy, risks, and economic welfare can only be made through informed public debate. Since there are conflicting viewpoints in the society, the final result will rarely satisfy anyone completely. But the better informed the debate, the more likely the result will approximate a true balancing of interests. And thus to my fourth, and final point. It is essential to improve the quality of the public debate over the socio-technical issues before us and here your help will be most valued. Many of these conflicts exist because the various interest groups are not able to communicate. We know from communications theory that shared symbols are the only basis for any communication pro-

cess. But increasing differences in educational experience and life style among the various professional and working groups in the country have minimized that common heritage. Common words conjure up quite different images and understanding is hard to achieve.

In a world so dependent as ours upon science and technology, in which decisions are made by majority choice, the lack of an adequate shared language will make rational choice extremely difficult. Men and women educated as you are in the special disciplines of science, technology and the humanities, you who are multi-literate in this special sense can form a vital bridge between people of differing backgrounds and interests. I am confident that if we all engage these issues seriously there will emerge an understanding and shared vision of what our nation can become. On a personal note, I have known a great many of you. It has been great to have you here and I offer you my warmest good wishes for your future endeavors. Thanks for being with us.

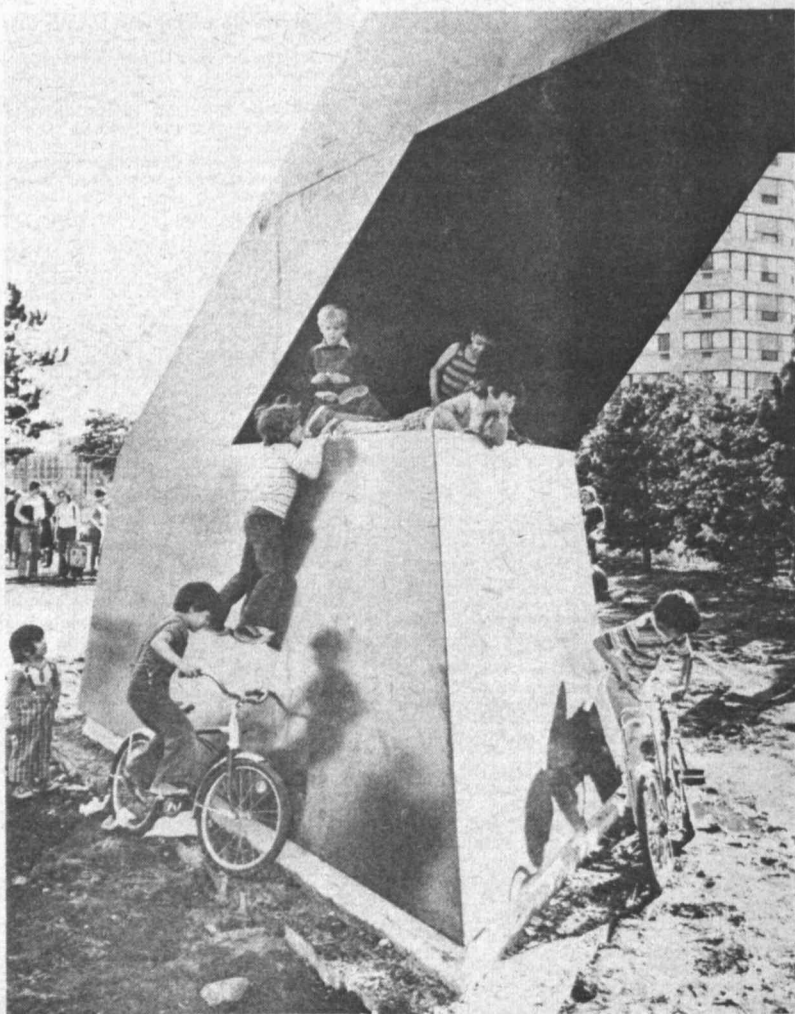
## Commencement

(Continued from page 1)

for the three-hour ceremonies that began with a solemn academic procession of graduates and faculty in academic regalia.

MIT graduation activities began last Friday with ROTC commissioning exercises. Fourteen Navy midshipmen, six Army cadets and five Air Force cadets received their commissions. Rear Admiral Ralph Hedges, commander, Naval Patrol Wings, U.S. Atlantic Fleet, was the principal speaker at the tri-service ceremonies.

Commencement activities will continue throughout this week with alumni classes gathering for reunions both at MIT and at resort areas throughout New England. Alumni will then convene together on the MIT campus Friday, June 10, for MIT's annual Technology Day program where alumni and their families will attend seminars and lectures dealing with some of the advanced research and development being carried out by MIT faculty.



CHILDREN PERCH on section of *For Marjorie*, a large, fire-hydrant red steel sculpture by Tony Smith recently sited at the entrance to the Westgate complex at MIT. Bicycles give the children the needed boost to reach the ledge.

—Photo by Calvin Campbell