

MIT Sky Opera, *Icarus*, To Premiere in Washington

The world's first sky opera, *Icarus*, will be premiered on the Washington, DC, Mall September 8 and 9, by artists from the MIT Center for Advanced Visual Studies.

Based on ancient Greek mythology, *Icarus* is the creative brainchild of Otto Piene, CAVS Director and inflatable sculpture artist, and Paul Earls, a CAVS Fellow, composer and laser artist.

The production will be presented both evenings at 8:30, weather permitting. The site will be the "Centerbeam" exhibit, a collaborative work of some 24 fellows at CAVS, on display this summer through mid-September at the eastern corner of the Washington Mall.

Icarus will not be a conventional opera of opera house genre. Rather, it will occur as an open musical event, developing and changing with the music, the weather and the participation of the audience and performers.

"Action," says Mr. Piene, "is the backbone of the project... the launching pad for the task of get-

ting *Icarus* to fly."

The music of *Icarus* is a combination of live, pre-taped and electronic music, structured around the lift-off of Daedalus and Icarus and their return to earth. The personalities of the father and the son are musically represented by John Fleagle, a member of Alexander's Feast (an early music/folklore ensemble from Boston), and the nationally acclaimed Columbus Boychoir of Princeton, Donald Hanson, director. Nora Post, oboeist, and Selim Earls, harpist, will also be featured performers.

The "Centerbeam" sculpture will take on the role of the opera's Minotaur. Laser projections of music and computer-generated images will be incorporated into

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Student Insurance Waivers

Those students who have not filed their Student Insurance Waivers must do so immediately. Forms are available in Rm. 12-134.

Sea Grant Presents Plan To Redevelop Lynn Harbor

Effective use of Lynn's natural and man-made waterfront resources could revive the city as an economic and residential center, according to a study issued by the MIT Sea Grant Program.

The report, "Lynn Harbor: Planning for Coastal Development," describes the results of an investigation conducted by a faculty and student team in response to a request from the City of Lynn. The group, part of a design subject at MIT, from January, 1976, to June, 1977, explored the development prospects for the underused Lynn harbor. The report makes proposals to help the city redevelop and manage the harbor so it can become an asset to the city.

Like many coastal industrial cities, Lynn, once a thriving center for North Shore commerce, industry, and residence, suffers from loss of population and jobs, a shrinking economic base, loss of retail sales and deterioration of physical structures, the report notes.

However, operating from the premise that "no single public policy will provide the solution to all the problems that exist," the study group, led by Professor William W. Seifert of the Department

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MIT Health Plan Benefits Increase

The following change in psychiatric benefits for MIT Health Plan members becomes effective September 1, 1978:

—The outpatient psychiatric benefits will increase from a limit of \$750 to \$1,000 per member per year.

—Additionally, co-payments for approved therapy will increase from \$15 to \$20 per visit for individual therapy and from \$7.50 to \$10 per visit for group therapy.

For further information regarding this benefit, or any questions on the MIT Health Plan, call x3-1322.

Lee to MIT?

With the Boston Red Sox leading the race for the American League pennant, questions have arisen about the fate of faltering pitcher Bill Lee. Boston Globe sports columnist Ray Fitzgerald made some suggestions last week, including:

"Send him to MIT, where he could be utilized as a visiting professor on interterrestrial bodies, with special emphasis on the probability that the universe is composed of black holes, into which we will all eventually fall."

Class of 1982 Boasts Most Women Ever

More women than ever before will be in evidence when the Class of 1982 arrives at MIT this week.

The class, numbering approximately 1,070, includes 235 young women (22 per cent), an increase of six per cent over the Class of 1981. The previous high was 20 per cent entering in the Class of 1978.

"As gratified as we are about the increase this year," said Peter H. Richardson, director of admissions, "we are still concerned that many young women of equal skill and education are missing opportunities to capitalize on a science-

based education and the professional potential it brings."

Gains also were recorded for the number of minority students expected to matriculate. A total of 97 black, Puerto Rican, Chicano and native Americans, including 70 men and 27 women, have accepted admission. They represent a 14 per cent increase over the Class of 1981.

In addition, the class will include 36 foreign students from countries other than Canada, which has 10.

All freshmen are due on campus by Friday afternoon, Sept. 1, when



Fog obscures the Boston skyline as lone bicyclist pedals down Memorial Drive. —Photo by Calvin Campbell

Halfman Appointed Acting Dean

Robert L. Halfman, professor of aeronautics and astronautics and associate dean for student affairs since 1972, has been named acting dean for student affairs, effective September 1, following the resignation of Dr. Carola B. Eisenberg, who will join Harvard Medical School.

Announcement of Professor Halfman's appointment was made by Vice President Constantine B.



Dean Halfman

Simonides, to whom the Office of the Dean for Student Affairs will report during a four-to-six month period of reappraisal of the organization and structure of student support responsibilities initiated by Chancellor Paul E. Gray earlier this month.

In announcing the review, Chancellor Gray said:

"Such a reappraisal has not taken place at MIT for nearly two decades" in spite of the fact that there has occurred, particularly in the past 10 years, a shift of historic significance in the relationship of students to institutions of higher education."

"Dean Eisenberg will never be replaced as a person, and we will not attempt to search for a permanent successor until the review is completed," Mr. Simonides said. "In the interim, we are fortunate that Professor Halfman has agreed to be acting dean. He is superbly qualified to lead the office. His experience at MIT goes back many years as a student, faculty member, associate chairman of the Faculty, chairman of the Experimental Study Group Program for the past four years, and, for the last six years, associate dean for counseling."

Professor Halfman, as acting dean, will serve as the initial point of contact with individuals and groups within and outside the MIT community on all operational aspects of the DSA office. He will continue as the senior member of the counselling section, will direct and coordinate the work of the other program sections of the Office, and will provide stability and leadership to the DSA staff. He will also continue as chairman of the ESG.

Other major program sections of

the Office include Student Activities, under Associate Dean Robert J. Holden who is also the dean in residence on campus and carries several other responsibilities; the Office of Freshman Advising headed by Associate Dean Alan L. Lazarus; and the Residential Program Section, headed by Associate Dean Robert A. Sherwood.

In addition, associate and assistant deans will continue to carry special program responsibilities such as the programs for women students (Dr. Holliday Heine), minorities (Ms. Mary Hope), the undergraduate seminar program (Ms. Bonny Kellerman), pre-professional advising (Ms. Susan Houpt), and administration and budget (Ms. Alice Seelinger). These programs cut across the major program sections and some extend beyond the office into wider

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Service Planned For Gen. Lampert

A memorial service for Lt. General James B. Lampert (USA, Ret.), vice president for resource development at MIT, will be held Friday, Sept. 8, in the MIT Chapel at 2:30pm.

General Lampert, who was 64, died July 10 at Walter Reed Army Medical Center following an illness of several months. The funeral was held July 13 at West Point where General Lampert was buried.

Before coming to MIT in 1972, General Lampert had a distinguished 40-year career in the US Army which included assignments as superintendent of West Point, Principal Deputy Assistant Secretary of Defense and High Commissioner of the Ryukyu Islands. (A full obituary is included in Tech Talk, July 12. Copies are available in the News Office, Rm. 5-113.)

Survivors include Mrs. Lampert, the former Margery F. Mitchell, two sons, James B. Lampert, Jr., of Milton, and the Rev. Richard B. Lampert of Binghamton, N.Y.; a daughter, Mrs. Richard M. (Hester) Hill of Pelham, N.Y.; and six grandchildren.

Memorial contributions may be made to the West Point Fund or to the American Cancer Society.

Off-Campus Housing Scarce

There is at present an extreme shortage of off-campus housing in the Cambridge and greater Boston areas.

Incoming students, single or married, in need of housing are urged to go to the Off-Campus Housing Service, Rm. E18-301, for information concerning roommate listings and apartment rentals. Listings are updated daily and free telephone service is available for local calls concerning the listings.

Students, faculty and staff members, who can temporarily house single students or families are asked to call Off-Campus Housing, x3-1493, to list their accommodations.

the Freshman Picnic will launch a 10-day Residence/Orientation week. During that period, the new students will select their living groups—dormitories or fraternities—meet their advisors, be introduced to more than 100 extra-curricular activities and, finally, select their courses of study. Registration at MIT is Monday, Sept. 11; classes begin Tuesday, Sept. 12.

While half of the new students come from New England or the

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T to Note MIT

MIT will soon join a number of its sister institutions such as the Museum of Fine Arts, Massachusetts General Hospital and Harvard University in having a subway stop bear its name.

The MBTA has agreed to rename the Kendall Square station on the Red Line as the Kendall/MIT stop. New graphics are being designed by the MBTA and will be installed at the station sometime this fall.

Mathematician Quillen Honored by Fields Medal

Dr. Daniel G. Quillen, professor of mathematics at MIT, was awarded the prestigious Fields Medal at a recent meeting in Helsinki, Finland, of the International Congress of Mathematicians.

The Fields Medal is given to persons under 40 years old for unusually outstanding accomplishments in mathematics. Recipients are chosen by an international selection committee. The award is considered to be the equivalent of a "Nobel prize" in mathematics, since Nobel prizes are not given for mathematics.

Three other mathematicians were honored with the Fields Medal at the Helsinki meeting. They are Charles Fefferman of Princeton University, Pierre Deligne of the Institut des Hautes

Sciences in France and Gregor A. Margulis of the Institute of Information Transmission in Moscow.

This brings to 24 the total number of Fields Medals awarded since the prize was established in 1932 by a bequest from Canadian mathematician John Charles Fields. The first two Fields Medals were presented in 1936, and one of

them was given to MIT mathematician Jesse Douglas. Professor Quillen was honored for his work in algebraic K-theory, and his proofs of the Adams and Serre conjectures. Algebraic K-theory is a new research area that uses the techniques of geometry and topology to solve problems in algebra.

One of Professor Quillen's MIT colleagues has said that Professor Quillen's proof of the Adams conjecture—an important problem in topology—is a "beautiful proof" done "in a way that astounded everyone."

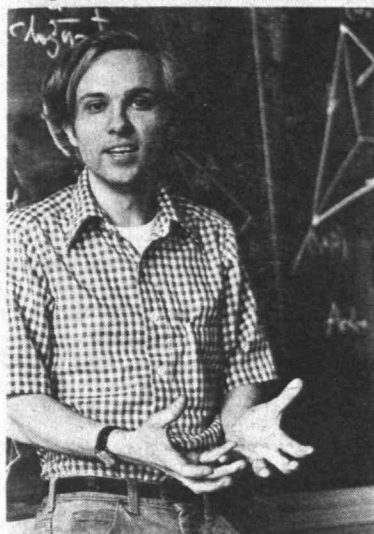
The Serre conjecture, which deals with abstract algebraic objects called modules, has stumped some of the great algebraists of the world since it was first posed in 1954. Professor Kenneth M. Hoffman, head of the MIT mathematics department, calls Professor Quillen's proof "ingenious and surprisingly short."

Professor Quillen has earned the respect of his colleagues for his ability to master many different areas of mathematics, and apply the results of one area to problems in another.

Earlier Professor Quillen received the Cole Prize of the American Mathematical Society for his work in algebraic K-theory in 1975. He was elected to the National Academy of Sciences this past spring.

Professor Quillen came to MIT in 1964 as a C.L.E. Moore Instructor in mathematics. He spent 1968-1969 in Paris as an MIT Sloan Fellow in Mathematics. He was a member of the Institute for Advanced Study at Princeton University in 1969-1970, and he became professor of mathematics at MIT in 1971. In 1973-1974, Professor Quillen went back to Paris as a Guggenheim Fellow. He received his PhD from Harvard University in 1964.

Professor Quillen lives in Newton, Massachusetts.



Professor Quillen

Scientifics in France and Gregor A. Margulis of the Institute of Information Transmission in Moscow.

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Peer Help Service to Begin, Organized by Students

A new student-organized Peer Help Service will begin operating on campus this fall.

The new service will be an addition to already existing student counseling and support services such as the Dean for Student Affairs Office, the psychiatric service and the social work service of the Medical Department.

The Peer Help Service will be an informal, anonymous, advising, referral and information service operating from 7pm to 6am modeled after Harvard's highly

Keefe Promoted In Development

Richard W. Keefe, assistant director of the Development Office, has been promoted to associate director of the office effective August 1.

Mr. Keefe will continue to provide administrative support to MIT's \$225 million Leadership Campaign and to act as special liaison to President Jerome B. Wiesner. To these duties he will add responsibility for the day-to-day operation of the Development Office and he will increase the number of external visits he makes on behalf of the Leadership Campaign.

A Boston area native, Mr. Keefe received the AB in political science from Stonehill College and the MA in political science from Boston College. Mr. Keefe served as 1st lieutenant, US Army, and later was assistant chief of the Manpower Development Branch, United States Aid for International Development. Before coming to MIT he was director of Alumni Relations at Stonehill College. Last year he was selected for the Outstanding Young Men of America award.

Mr. Keefe and his wife live in Pembroke, Mass.

successful Room 13 project which has been in operation for several years.

"We hope to have a service students will feel free to call or drop in at any hour of the night," said Andy Adler, a senior in linguistics and philosophy from Plainview, N.Y., one of the organizers of the group.

"Students are reluctant to disturb the established help resources later at night and the access to the dean or psychiatrist on call is cumbersome. The Peer Help Service will provide immediate contact."

Mr. Adler emphasized, however, that the Peer Help Service can not be expected to offer long-term service.

"It is a supplement to, and not a substitute for, regular MIT services to students," he said.

The service hopes to establish a group of 30 student counselors, half male and half female, who will work in pairs about once every two weeks. Counselors will have a brief initial training period to learn listening and counselling skills and information resources, followed by supervised group meetings. Group supervisors will be members of the professional student support staff at MIT.

At present there are about 10 counselors who have completed initial training and will recruit and train more students during R/O Week and the early part of the term. It is hoped the Peer Help Service will be operational at the beginning of October. Plans call for it to be situated in the Campus Room, between Ashdown House and the religious counselors' house.

Meanwhile, flyers on the Peer Help Service are available in the Information Center (7-121) and messages may be left at x3-7839 or in the Dean for Student Affairs Office (7-133).



THE INVISIBLE WORLD, subject of a fall, 1979, National Geographic TV special, has been the special preserve of Professor Harold E. (Doc) Edgerton for years, so it was to be expected that the producer of the special would pay a visit to MIT's wizard of the strobe light whose high-speed photography has allowed millions to see the "invisible" beauty that

surrounds us. For example, as in this photograph, the rapid, deft hand movements of a juggler. Shown with Dr. Edgerton is Charles Miller, a lecturer in the Department of Electrical Engineering and Computer Science, long an associate of Doc's on high-speed photography projects. The juggler is Skip King.

—Photo by Calvin Campbell

Halfman Appointed Acting Dean

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MIT community activities.

Vice President Simonides will be the senior Institute officer and member of the Academic Council responsible for the Office of the DSA. He will direct the review of DSA organization and external relations, and will be responsible for major policy decisions, new appointments, staff evaluation and budget, in consultation with Dean Halfman and appropriate members of the DSA staff.

The Department of Athletics, headed by Professor Ross A. Smith, will continue to be a part of the Student Affairs area.

In announcing the review of student-related organization two weeks ago, Chancellor Gray set four objectives:

(a) Review and define the scope and responsibilities of the DSA Office.

(b) Review the relations of the Office with the faculty and with the Institute's educational program, including admissions, academic advising and personal counselling, discipline, athletics, campus environment, and the coupling of the Office to the work of the standing

faculty committees.

(c) Review the relations among student support areas and recommend appropriate changes or improvements in the organization of these areas and their interaction with the DSA and with each other.

(d) Recommend the appropriate leadership for the DSA Office, guided by the reviews in (a), (b) and (c), and take whatever steps are necessary to put this leadership into place.

Mr. Simonides has been attending DSA staff meetings and meeting individually with members of the staff to familiarize himself with the work of the office and to establish guidelines for the internal and external review.

Since the announcement was made on August 16, Mr. Simonides said he has heard from many faculty members, students and staff members who have suggestions and want to contribute to the review.

"Right now," he said, "I am trying just to listen with an open mind and to think about the issues and how best to understand them."

Dean Halfman came to MIT as an undergraduate in 1940 and re-

ceived the SB degree in aeronautical engineering in 1944. After serving in the US Navy for two years, he returned and received the SM degree in 1947.

He was named assistant professor in 1948, associate professor in 1955 and professor in 1964. From 1957-61 Professor Halfman was executive officer of the department and later served as its deputy head.

Between 1962 and 1970 Professor Halfman represented MIT in various capacities in the Kanpur Indo-American Program. He served at the Indian Institute of Technology at Kanpur, India, from 1962-63 and as program leader from 1966-68.

Professor Halfman served as the first associate chairman of the faculty during 1970-71 and has been a member of many standing committees of the faculty including the Committee on Educational Policy and the Committee on Graduate School Policy. He also was a member of the Special Task Force on Education and was a founder of the Experimental Study Group, an independent learning program for freshmen.

Class of 1982 Boasts Most Women Ever

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Middle Atlantic states, 11 per cent are from the South Atlantic, 15 per cent from the North Central, seven per cent from the South Central and 11 per cent from the Western states. Nearly 80 per cent attended US public high schools, 15 per cent independent or church-related schools and six per cent overseas schools.

The oldest freshman this year is 23 and the youngest will soon be 16. Sixty-five members of the class already have ties to MIT as sons or daughters of alumni, faculty or staff. Another 13 are grandchildren, while 35 are brothers or sisters of present students.

Nearly 30 per cent of the class (317 students) were admitted under MIT's Early Action Program through which they are notified of acceptance by Christmas if their completed applications have been received by November 1. In addition, 60 per cent of the freshmen have been given college credit for work done or tests taken before their matriculation at MIT.

While over 80 per cent of the freshmen ranked in the top 10 per cent of their high school classes (in schools that compute rankings),

their scholarly pursuits were matched by their extracurricular activities.

They're very interested in sports, have taken active parts in music, drama, debate and school publications and have been class or club officers. Many have had

part-time jobs and others have worked full-time during the summer.

During the upcoming R/O week they will have the opportunity to get involved in the activities that reflect their interests as members of the MIT community.

MTG to Present Godspell

The MIT Musical Theatre Guild will present nine performances of the musical *Godspell* beginning September 1 at the Kresge Little Theatre.

Evening performances will start at 8:00 on Sept. 1, 2, 8, 9, 15 and 16. Matinees are scheduled for 3pm on Sept. 2 and 10.

Admission to all evening shows is \$4.00; \$3.50 for matinees; and \$2.00 with an MIT I.D. to all shows. There will be an additional matinee performance for freshmen only on Sept. 9 with free admission.

The *Godspell* musical is based on the Gospel according to St. Matthew. Paul Gonyea, director of the Musical Theatre Guild's production, says each performance is expected to be somewhat different to allow for improvisation from the

cast. The producer is Bob Van deKloot, choreographer is Sharon Glazer and music director is Ed Roberts, who works at MIT's Lincoln Lab.

There are about 60 active members of the Musical Theatre Guild, many of them MIT students, some from the MIT community and others from the Boston area.

The group performs two major shows annually and one or two smaller productions during the academic year. In November, the members plan to present the Greek musical *Zorba*.

For more information or reservations, call 253-6294.

THE INSTITUTE CALENDAR X3-3270

August 30 through September 10

Events of Special Interest

TCA-Red Cross Blood Drive* — Give blood: Wed, Sept 6 and Thurs, Sept 7, 9:30am-3:45pm, 4th floor, Student Center. Refreshments will be provided.

An Evening with Institute Faculty and Staff* — Sponsored by the Medical Department and the Foreign Student Office as part of the International Open House and will feature: Dr. Louis Menand, special assistant to the Provost and senior lecturer, political science; Claire Kramsch, lecturer, humanities; Prof Fred McGarry, materials science and engineering; Prof Philip Morrison, physics; K Nagaraja Rao, senior research associate, center for policy alternatives. Tues, Sept 5, 7pm, Rm 10-105. Please come and join the discussion.

Community Meetings

MIT Go Club R/O Activities* — Planning for you, instruction for beginners, and players of all ranks will be around to play. Sun, Sept 10, 1pm, Student Center Room W20-473.

Bowling League** — Lincoln Laboratory 10-pin bowling league starts, Wed, Sept 13, 5:45pm, Turnpike Bowladrome Rte 2, Cambridge ABC-WIDC sanction, mixed league. Interested in joining? Call Art Salkins x5741 Lincl or Tony Augustine x7736 Lincl.

Tesoro Receives '78 SWE Award

Dr. Giuliana C. Tesoro, adjunct professor in the Department of Mechanical Engineering, has been honored by the Society of Women Engineers as the 1978 recipient of its Achievement Award.

Dr. Tesoro, widely regarded as one of the most productive textile scientists living today, has gained international distinction for her contributions to the science and technology of polymers, fibers and fabrics. Among her significant achievements are the development of durable anti-static treatments for synthetic fibers and, more recently, work on polymer combustion, fire retardance, and the chemistry of flame retardant finishes for cellulosic fibers.

She is the third MIT woman to be honored in recent years by the society with its achievement award. Professor Sheila Widnall was the 1975 recipient and Professor Mildred Dresselhaus received the award in 1977.

Dr. Tesoro joined the Fibers and Polymers Division of the mechanical engineering department in 1972 as a senior research associate. She was appointed visiting professor in 1973 and adjunct professor in 1976. Dr. Tesoro has held several important posts in industry and as a teacher. She holds the PhD in organic chemistry from Yale University.

A native of Venice, Italy, Dr. Tesoro has been a citizen of the United States since 1946. She is married to Victor Tesoro. They have two grown children, Claudia and Andrew.

MIT Oarswoman Named to Team

MIT's Diane Medved (Leawood, Ks.), a junior chemical engineering major, recently qualified for the United States National Women's Rowing Team.

Ms. Medved qualified for the US Team while rowing for the College Boat Club of Philadelphia, Pa. The 6'3" oarswoman rowed in the number three position of the club's four-oared shell and traveled to Seattle to participate in the National Women's Rowing Association Championships held June 15-18. The following week the club traveled to the open trials for the national team held at Lake Burnaby, British Columbia.

From July 4-August 7, the 14-woman team, coached by the Yale women's crew coach, Nat Case, traveled throughout Europe.

Social Events

Faculty Club** — Tues, Sept 12, Lobster Night, baked or boiled lobster, salad bar, dessert cart, \$8.50 incl tax. RSVP x3-4896.

Faculty Club** — Open Monday thru Friday: Luncheon served Noon-2pm; Dinner served 5:30-8pm. Happy Hour Monday thru Friday, 4:30-6:30pm, wide variety of drinks \$1.05.

Exhibitions

MIT Student Art Lottery and Loan Exhibition* — Sponsored and organized by the Committee on the Visual Arts. Over 100 framed prints and posters by contemporary masters from the List Student Loan Program and Catherine N. Stratton Collection of Graphic Art. For loan to full-time registered MIT students. On view Hayden Gallery and Hayden Corridor Gallery, Sept 5-15, 10-4pm; Wed evenings 6-9pm. Fri, Sept 15, 1pm Gallery Closing Lottery winners announced at 5pm, party in Gallery.

Gyorgy Kepes, The MIT Years: '45-'77* — Organized and sponsored by the Committee on Visual Arts with the assistance of the Compton Gallery Committee. On view at the Compton Gallery, Mon-Fri through mid Sept, 9am-5pm, Building 10, 1st floor, MIT. Info: 253-4400.

Charles Stark Draper: Many Facets of the Man* — Major photographic show on view Mon-Fri, 9am-5pm, Historical Collections, 265 Mass Ave, 2nd floor, Camb, Mass. For information call 253-4444.

The Compton Years* — A photographic essay of the lives of Dr. & Mrs. Karl Taylor Compton. Mon-Fri, 9am-5pm, Historical Collections, 265 Mass Ave, 2nd floor, Camb, Mass. For information call 253-4444.

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

MIT Historical Collections* — In house exhibits include antique globes; The Ellsworth A. Wentz Collection of motors and meters; rare instruments including compasses, sundials and other measuring devices from the 17th and 18th centuries; Early Alumne and several exhibits of memorabilia and photographs honoring prominent graduates of the Institute. On view daily, 9am-5pm, 265 Mass Ave, 2nd floor, Camb, Mass.

MIT Historical Collections* — Permanent exhibition Mon-Fri, 9am-5pm, Bldg N52, 2nd floor. Katharine Dexter McCormick, '04; Vannevar Bush, '16; Bldg 4 corridor. The New Technology Exhibit 2nd floor balcony of Lobby 7. Energy Exhibit, Bldg E40, 1st floor. Solar Energy, Bldg 8, main corridor. Center for Space Research, Astrophysics Exhibit, main corridor. Bldg 4. Bldg 6 Dedication Exhibit.

The Outdoor Collection* — There are many fine pieces of contemporary sculpture displayed on the MIT campus, including works by Alexander Calder, Louise Nevelson, Pablo Picasso, Henry Moore, Tony Smith and Jacques Lipschitz. For information and guides to the campus, call the Information Office, 253-4795.

MIT Science Fiction Society* — Come and visit the world's largest lending science fiction library. Hours posted on door, Rm W20-421.

Musical Caricatures* — Music Library, Rm 14E-109. Numerous cartoons of various aspects of music, especially pictures of famous composers and conductors.

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

Theatre and Shows

Godspell* — Presented by the Musical Theatre Guild, based on the gospel according to Saint Matthew. Evening performances: Sept 1, 2, 8, 9, 15, 16, 8pm; Matinees: Sept 2 & 10, 3pm; free performance for freshmen, Sat, Sept 9, 3pm, Kresge Little Theatre. Admission: \$2 w/MIT ID; outsiders \$4 evenings, \$3.50 matinees.

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 department and field.

*Open to the public

**Open to the MIT community only

***Open to members only

Send notices for Sept 6 through Sept 17 to Calendar Editor, Rm 5-113, x3-3270, before Noon, Friday Sept 1.

Nuclear Reactor 20th Anniversary Marked

The first nuclear reactor to be built in the northeastern United States is entering its third decade of safe and useful operation at MIT, upgraded, redesigned and more versatile than when it first went critical on July 21, 1958.

The five megawatt facility, operated by the interdisciplinary Nuclear Reactor Laboratory, is different in many vital ways from the research tool first proposed in 1954 by James R. Killian, then MIT's president.

For one thing, it is now a hybrid reactor, employing light water for cooling and moderation and heavy water for a reflector.

Dr. Manson Benedict, Institute Professor, Emeritus, speaking at the July 27 ceremony marking the 20th anniversary, recalled the history of the MIT reactor including the many contributors to this major project and the benefits which have been derived for MIT and the nation as a whole.

MIT used the occasion of the anniversary to honor Dr. Benedict, who, in 1954, was one-half of the entire MIT nuclear engineering faculty, and the late Professor Theos J. Thompson, who joined the project in the spring of 1955 and headed the Research Reactor Design Group. He was killed in a plane crash in 1970.

Photographic portraits of Professors Thompson and Benedict were presented to Mrs. Thompson and Mrs. Benedict. MIT Research Vice President Thomas F. Jones, Jr., said the portraits will be hung in the foyer of the laboratory as a permanent tribute to the men whose early efforts meant so much to the establishment of the research reactor.

In his remarks on the early days of the reactor, Professor Benedict paid tribute to his late colleague. "The man who should be speaking, as you all know, is Tommy Thompson, but his untimely death in 1970 made that impossible and deprived MIT and our nation of one of our most gifted and productive engineers."

Chancellor Paul E. Gray said the successful modification to the research reactor, which took about two years and is now completed, would not have been possible without the foresight displayed by Professor Thompson.

"It is to the abiding credit of Tommy Thompson that he assumed future refinements would be needed and gave us a design which made such refinements feasible."

The chancellor said the MITR-II, as the reactor is now called, "represents a redesigned and upgraded reactor, thanks to Professor David Lanning and to Lincoln Clark, Jr." He also paid tribute to

many others who were instrumental in the upgrading.

The new design has made the reactor into a fundamentally different research tool," Dr. Gray said. "It has three times as much beam flux for major users, such as the neutron scattering experiments group under Professor Clifford Shull and his colleagues in physics. The quality of the neutron flux has been greatly increased at low energies, and this is very important for a wide range of experiments. We have seen a factor of 10 improvement in low energy neutron flux, in terms of signal to noise ratio."

The quality of the neutron beam in the medical facility has been improved, the chancellor went on. "The fast neutron background used to be a significant part of the focused dose delivered to the patient. Now it is a minor part."

Dr. Gray pointed out that the ceremony was really a "triple feature"—the 20th anniversary of the reactor, the completion of the modification, and the start of the third year of a new mode of operation for the research reactor.

"Two years ago," Dr. Gray said, "the Institute took an important and carefully considered step in establishing the Nuclear Reactor Laboratory as a separate free-standing interdisciplinary research center in the full sense of the MIT tradition. Prior to that time . . . the MIT reactor was operated and administered by the Department of Nuclear Engineering. On July 1, 1976, the responsibility for the laboratory was transferred from the Department of Nuclear Engineering to the Office of the Vice President for Research. . . . On April 3, 1976, Dr. Otto K. Harling was appointed the first director of the newly established laboratory, and so this new mode of operation is the third element of our celebration here today."

Dr. Gray pointed out that there has been a "remarkable turnaround in the economics of the reactor operation under Dr. Harling's leadership."

The annual volume of MIT research involving the reactor laboratory has grown from \$900,000 in fiscal 1976-77 to an estimated \$2.2 million in the new fiscal year.

He said the increase means that the laboratory is now supporting "nearly three times as much MIT research volume in the third year of reorganization of the laboratory."

The net deficit of the laboratory has also been cut in half—from \$386,000 in 1976-77 to an estimated \$185,000 in the new fiscal year.

To illustrate MIT's commitment to the Nuclear Reactor Labora-



BENEDICT, THOMPSON HONORED—Portraits of Professors Manson Benedict and the late Theos J. Thompson were presented to Mrs. Benedict, left, and Mrs. Thompson by Dr. Thomas F. Jones, Jr., MIT's vice president for research, at ceremonies July 27 marking the 20th anniversary of the MIT research reactor and the completion of the reactor modification.

tory, Dr. Gray pointed out that the Institute has invested \$3 million of its own resources in the reactor design.

"The \$3 million represents roughly half of the total money which the United States has spent on research reactor improvement during the past five years. I know of no more dramatic illustration of a private institution acting in the national interest than the investment we have just made in this research facility."

MIT Provost Walter A. Rosenblith, whose remarks at the ceremony dealt with the role of the laboratory in advancing education, said 1,000 articles and papers of technical literature have been produced as the result of research at the reactor.

The provost reported that of 1,400 papers listed through 1970 by the American Nuclear Society, 174 were from MIT, and the institution in second place had generated 70. (The high productivity universities all had a nuclear research reactor.)

"That's the kind of distribution that we would like to maintain, and I hope you will in the next 20 years."

In reporting on what the future holds for the laboratory, Dr. Harling said he was not going to paint "an unrealistically rosy picture." He warned that difficult fiscal problems still remain, but said that the "creation of an inter-departmental center around the MITR was a positive step in meeting the challenges of a changing pattern of reactor utilization as well as of tightened research budgets . . ."

"When the NRL was started we had a deficit which was twice our

income. We are now projecting an income which is twice our deficit. . . .

"I am optimistic that with continued hard and effective work on the part of the NRL staff and with a reasonable level of administration support we will be able to continue the present trend of increasing and broadening the use of the specialized capabilities of the NRL. This should result in the continuation of the general trend of significant improvements in the ratio of MIT research volume to the net operating cost or deficit."

Professor Harling provided an overview of the major reactor utilization areas and activities of the Nuclear Reactor Laboratory. He also assessed the relative health or strength of these areas which included traditional research areas such as neutron scattering studies of condensed matter, neutron and nuclear physics, nuclear engineering, reactor operation training, medical irradiations, neutron radiography and a variety of service irradiations. Of these, neutron scattering and neutron physics have always been strong at MIT and these research areas continue to be highly important, he said. Reactor utilization areas which have received special attention since the formation of the Nuclear Reactor Laboratory include nuclear trace analysis, irradiation damage studies of materials for nuclear power reactors and medical isotope production. These three areas are now relatively healthy and are projected to continue to grow. Other areas such as medical uses of the MITR-II offer the potential for much stronger programs, and these opportunities will be pursued in the future, Professor Harling said.

'Remanufacturing' May Be Way to Extend Product Life

What homeowner hasn't heard these fateful words about some household appliance: "This just isn't worth repairing. You'll have to get a new one."

Until now, there has been little hope of appeal from such a sentence.

But two researchers at the MIT Center for Policy Alternatives—Robert T. Lund and William Michael Denney—think there is at least one alternative that ought to be given further consideration.

The process of "remanufacturing," they say, has the promise of providing lower-cost, like-new products while also creating new jobs, especially at unskilled and semi-skilled levels.

Lund and Denney, who have been involved in a study of ways to extend product life, believe that the time has arrived for a serious assessment of "the neglected alternative," remanufacturing, which essentially means disassembling worn-out products and utilizing the still-useful parts to make products that are virtually as good as their brand-new counterparts.

"Even when a complex durable product such as an automobile, an appliance or a machine has come to the end of its useful life," they explain in a recently issued report, "there is much in that product that retains its full functional value if the components could be put to use again. The brushes in electric motors may wear out but the armatures and their windings are good; bearings may fail, but the castings in which they are set are still sound. Each of these functionally useable parts has a value (as represented by the materials, labor, energy and overhead costs associated with its manufacture) that is many times the residual material value as scrap. Remanufacturing is an approach that finds intermediate methods of preserving the functional value of the original product—essentially giving older prod-

ucts new lives."

Lund and Denney make clear that they are not speaking of unit-by-unit rebuilding of products, which would be too small in scale to have significant economic impact. Rather, they are referring to "the highly organized business" of total disassembly of products, pooling of interchangeable parts, and production line reassembly with some replacement of worn parts.

"It is a strategy," they explain, "aimed at capturing the residual functional value in a used product that might otherwise be destined for disposal, by reprocessing all useable parts to arrive at a like-new product or functional value nearly equal to the original."

The researchers say that remanufacturing stacks up well against other methods of extending product life.

"Unlike strategies aimed simply at increasing the life of the original product (for example, increased durability)," they say in their report, "remanufacturing helps deal with the fact that all products do eventually wear out. While repairs can keep a product in operation for an extended period, there arrives a time when repair costs become prohibitive and the unit is discarded. When this happens, the residual value of the product (or of its salvageable parts) is entirely lost. . . . Through remanufacturing, one has the opportunity to preserve a much larger share of the product's functional value over an extended period."

As an employment booster, Lund and Denney note that remanufacturing involves a number of process steps that are relatively labor intensive. The bulk of the work is in parts refinishing, testing and assembly, where people are needed. Remanufacturing, therefore, can provide a stimulus to new jobs not only in the remanufacturing operations, but also in the

development of collection and distribution networks needed to sustain such an industry.

As in all matters involving extended product life, remanufacturing has some potentially negative factors. For example, remanufactured products would compete with some portion of the new product market, and theoretically the new jobs mentioned by Lund and Denney might be created at least in part at the expense of existing jobs of the new product industry. The researchers say they are convinced, however, that remanufacturing carries fewer of these risks than most other strategies.

While remanufactured products undoubtedly would compete with some portion of the new product market, they say there is a high probability that the lower prices on the remanufactured models will create a new market among lower income consumers and even among higher income consumers wanting

to add to their household stock—a second refrigerator, for example.

Remanufacturing is also seen by the researchers as an attractive way of providing lower-cost replacement assemblies to repair products still in use. There is an active remanufacturing industry, they note, for major automobile parts, such as alternators, starter motors and water pumps—lower-cost replacement costs that directly contribute to prolonging the lives of automobiles that might otherwise be abandoned.

Lund and Denney concede that a number of issues need to be better understood before remanufacturing can be successfully implemented on a large scale. One of the major problems is the need to establish efficient channels for both collecting discarded products and, at the other end of the line, for distributing and retailing the reprocessed products. It would also be helpful if emphasis were given to new product

designs that allow for easy disassembly for maximum salvage of parts.

To explore these and other questions, a conference on remanufacturing has been scheduled for late November in Washington, D.C., under the sponsorship of several governmental agencies, including the Office of Technology Assessment, the Department of Energy, and the Bureau of Standards. Lund, who is on the conference steering committee, says that the idea of remanufacturing is "growing like a mushroom," the interest in it spurred by such considerations as consumer benefit, resource conservation and the development of new technologies.

"There is excitement in Washington on this," he comments, "and we may soon see the federal encouragement of remanufacturing as a socially beneficial process."

MIT Sky Opera, *Icarus*, to Premiere

(Continued from page 1)

the early stages of the event—projected on the wall of the nearby National Air and Space Museum and on steam screens rising from "Centerbeam."

Performers will be situated on a platform near the sculpture, with music being heard from loudspeakers on and around "Centerbeam" and from the sky. The flying Daedalus will sing and play several instruments, and speakers will be built into the inflatable Icarus sculpture.

The actual task of launching Icarus will require a crew of MIT artists and engineers as well as audience volunteers. The success of *Icarus* will, in fact, depend on the audience's active participation.

"As with all such sky events," says Mr. Piene, "we couldn't do it without the energetic and physical support of the audience."

Greek mythology tells of Icarus, the young boy who would not heed his father's warning and flew too close to the sun, his wax and

feathered wings melting in the heat.

In Mr. Piene's rendition, Icarus will take form in a 15-foot-high inflatable sculpture, built with air-inflated red dacron. Air-filled, clear polyethylene wings with a span of 20 feet will be attached to the Icarus character.

The sculpture will be flown with the support of nine 100-foot-high helium-filled looped tubes. It will interface with a metal frame rigged with nylon ropes, connecting the inflatable to an air-inflated tube, or stem, jutting out 100 feet from earth.

Daedalus, father of Icarus, and here a performing musician, will be similarly lifted 50 feet from earth with an air-inflated stem and helium-filled looped tubes.

The exact timing of the *Icarus* opera is flexible. The 60 minutes of music is designed to be lengthened or shortened according to the needs of the moment.

According to Mr. Earls, composer, *Icarus* "draws its inspiration from the traditions of Baroque

opera, folk outdoor theater, experimental music and media, Greek drama and 20th century technology."

The libretto, also by Mr. Earls, is taken from the works of Ovid, Nietzsche and Gertrude Stein.

Mr. Piene and Mr. Earls agree that the theatrics, the music and the technology of *Icarus* are all integrated into the story.

"It's the cohabitation of earth and sky," they say.

In this way, *Icarus* may actually be in the true spirit of the ancient Greek theater.

Prior to the *Icarus* performances, Mr. Piene plans to launch several of his inflatables during the Labor Day holiday weekend (weather permitting). He has scheduled his "Black Silk Rose" and "Red Anemone" for the afternoon of September 3.

On Monday evening, September 4, Mr. Piene plans to launch his "Milwaukee Anemone" and "Brussels Flower" from the roof of the National Air and Space Museum.

MIT Press Publishes Book On Federal Cable Regulation

Steven Rivkin undertook to explain the Federal Communication Commission's comprehensive regulations regarding cable television back in 1972, soon after those regulations appeared. *Cable Television: A Guide to Federal Regulations* (which was published by the Rand Corporation) was the widely-read book in which Rivkin gave the "intended, likely" meaning of the complex of rules and regulations resulting from five years of deliberation by the FCC about cable TV systems.

A *New Guide to Federal Cable Television Regulations* revisits and updates the subject, now that five more years of elaboration and "fine tuning" in government controls have elapsed. Rivkin, an attorney, examines how the rules and regulations have fared in actual practice; he also details the subsequent changes that have been made in them as a result of citizen and industry feedback since 1972. He has made full use of the thousands of certificates granted by the FCC and a like number of interpretive proceedings it has held to resolve and refine disputed and ambiguous points.

A significant feature of the new book is the material it contains on the expected impact of the new copyright law pertinent to cable television that became effective January 1, 1978.

In outlining the purpose and structure of his book, the author writes: "Whatever the merit of the FCC's accomplishments, the record of federal regulation of cable television during the past five years has become a subject worthy of objective study and analysis, whether as a basis for prescribing some future change, as a case study of regulatory triumph, tragedy, or mediocrity (take your pick), or merely to enable the many interests affected by regulation to cope with the volume of particular details spawned by regulation. Whatever the reader's purpose, making such up-to-date

wisdom available to whomever wishes to use it is the aim of this book.

"As in the earlier volume, that ecumenical aim dictates the format of this book. The presentation will seek to attain objectivity, by both articulating the FCC's regulatory posture and identifying unresolved issues known or suspected to exist. Moreover, this book will again attempt to be practically helpful to users however far they may be from the umbilical center of regulation in Washington, D.C., by including in a single sourcebook all key reference materials and forms. (The rules themselves, as in effect in mid-1977, are reproduced as they relate to this commentary, throughout this book, and other useful and exemplary material is contained in the Appendix, complementing the expository sections of the book.) The plan of the book—presenting a summary overview for the general reader in the first chapter, with detailed exploration of particular rules in the ensuing topical chapters—aims to make sense to readers of various orientations, interests, and professional backgrounds who must develop and maintain a working grasp of federal cable television regulation."

This study was undertaken with the support of the National Science Foundation.

John S. Szurley

John S. Szurley, a security guard at the Lincoln Laboratory since 1962, died August 14 at the age of 64.

Mr. Szurley, who lived in Tewksbury, is survived by his widow Victoria T. (Suslowicz) Szurley; two sons, James F. Szurley of Jefferson, N.H., and Peter P. Szurley of Tewksbury; four sisters, Mrs. Helen Davidowicz of Bradford, Mrs. Adam (Grace) Bernat of Tewksbury, Mrs. Mary Seymour of Lowell, Mrs. Michael (Sophie) Urbanowicz of Tewksbury; and a brother, Joseph Szurley of Tewksbury.

Casdin-Silver Wins Rockefeller Grant

One of the nation's leading holographers, Harriet Casdin-Silver, has been awarded a grant from the Rockefeller Foundation to continue work as a fellow at the MIT Center for Advanced Visual Studies.

A hologram may be described as a sculpture of light. In the laboratory, a holographic plate or film is exposed to the interference pattern caused by a split laser beam. The plate or film is then re-exposed to a light source and the three-dimensional imagery is reconstructed in space.

Ms. Casdin-Silver has been working with the art and technology of holograms for about eight years. While she does make use of objects in the manipulation of some of her work, she is also credited with the concept of using

laser light alone, without an object, to create holographic imagery.

In 1969, Ms. Casdin-Silver began exploring holography in the research laboratories of the American Optical Company in Framingham, Mass.

"Using the laser to shape and form space is magical," she says. "The light is very fascinating . . . the work allows me to integrate all my creative experience."

Writing about the spirit of holography, Ms. Casdin-Silver said, "It is light . . . mystery . . . energy . . . eternity."

The artist arrived at holography from a mixed background of theater, broadcasting, audio-visual arts and environmental art.

She has held teaching positions at Clark University and the Worcester Art Museum, was assis-

tant professor (research) of physics at Brown University and is presently at MIT, where she teaches holography as an art form.

This summer she held classes at Tufts University as part of the Summer Film and Media Institute and conducted a five-day workshop, "Holography: Art and Application," for Harvard Graduate School of Design and the MIT School of Architecture and Planning.

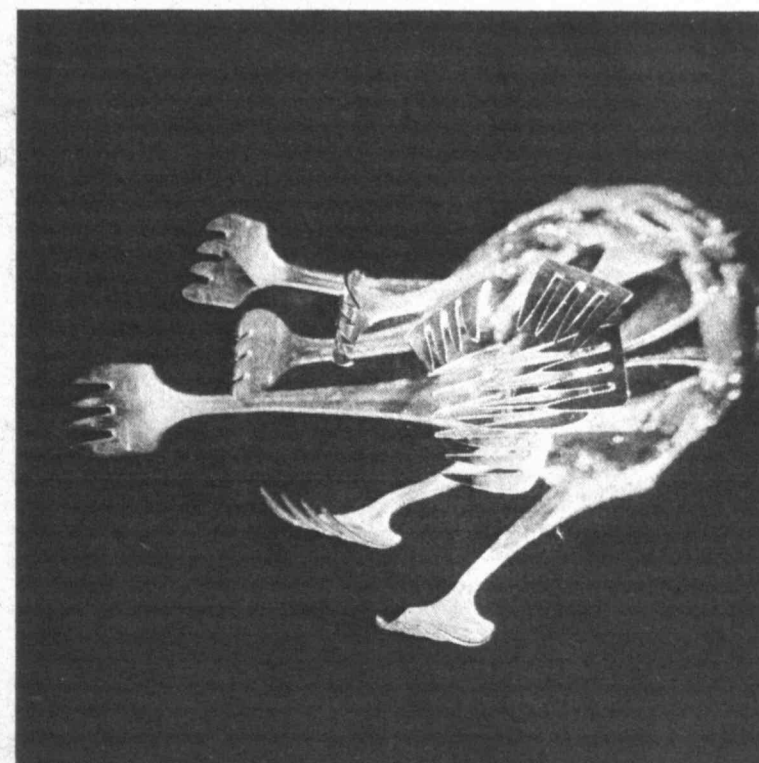
Today (Wednesday, Aug. 30) Ms. Casdin-Silver will lecture at the Hirshhorn Museum in Washington, D.C., in a program sponsored by the Smithsonian Institution's Resident Associates.

Her unique solar-tracked holograms are presently on public display in Washington as part of the summerlong exhibit "Centerbeam," a group work by the fellows at MIT's Center for Advanced Visual Studies. She is also showing four holographic pieces in an international exhibition in Tokyo.

According to Rosemary Jackson, director of the Museum of Holography in New York City, Ms. Casdin-Silver's work represents "the most advanced use of holography as an art form." The museum's first one-person show, "Harriet Casdin-Silver: Holography," was a major exhibition there in 1977.

While the Rockefeller Foundation award is not designated for work on a particular project, Ms. Casdin-Silver does have goals for the future. She is interested in the development of holographic movies and holography as a communications medium.

"From the beginning," she says, "I have intended to integrate my theater and media experience with my holography. Imagine a movie projecting from a screen in three dimensions. Pasara . . . it will happen."



Equivocal Forks, a hologram by Harriet Casdin-Silver.

