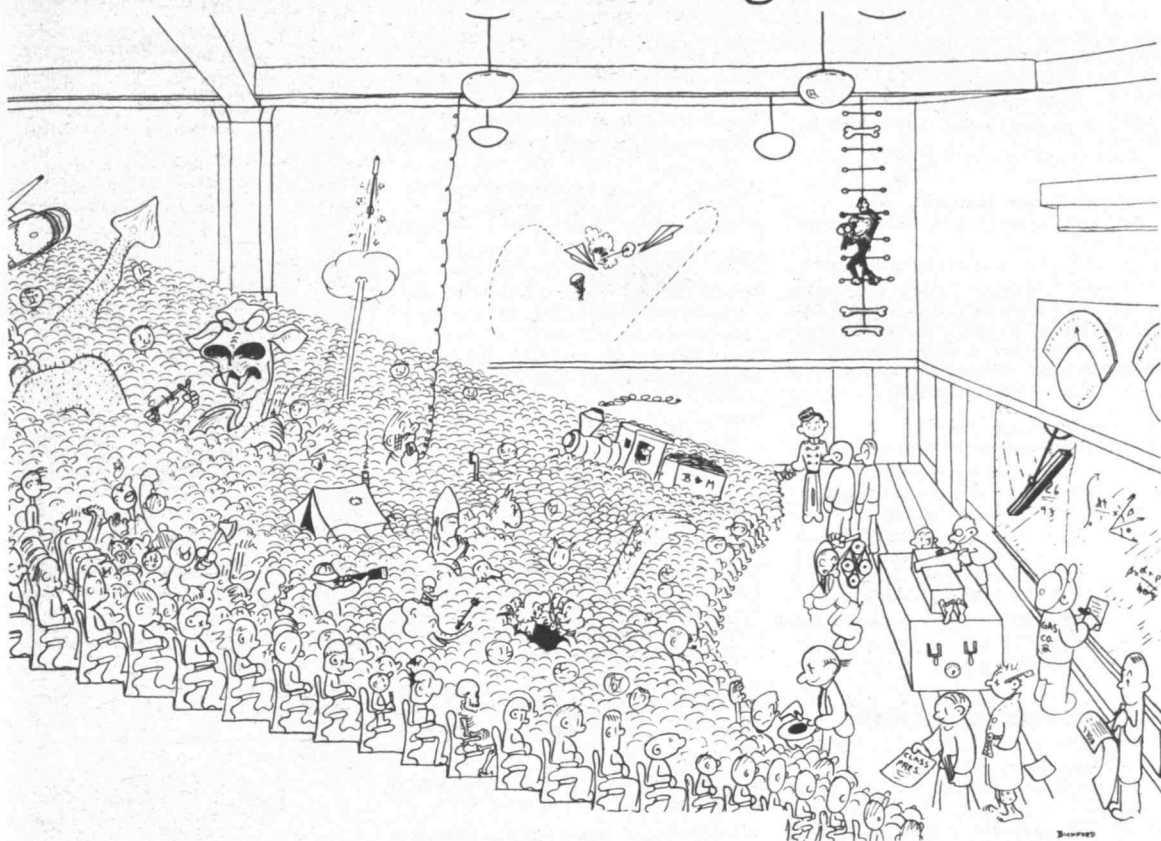


Room 10-250 to Undergo Facelift



OLD 10-250 has been many things to many people as this cartoon attests. The cartoon was done by an alumnus/alumna named Bickford at some unknown time in the past. The original drawing was found last summer

and now is framed and on exhibit at MIT Historical Collections. Anyone with information as to its origin should call x3-4444.

For the first time in its 60-plus year history, Huntington Hall (Rm 10-250), long MIT's major lecture hall, is out of business.

Lectures and meetings normally held there have been moved to other locations for the spring term while the venerable hall undergoes major renovation. Plans call for the rejuvenated Huntington Hall to return to operation when school begins in the fall.

Major components of the renovation include air conditioning the hall, installation of up-to-date audio-visual and television systems, new acoustical and lighting treatments, carpeting and rearrangement of seating and aisles. In the process, the capacity of the hall will be reduced from 520 to 450, eliminating the seating from which visibility is limited.

Renovation of Huntington Hall is part of a \$1.3 million program that also includes development of a new Alumni Center on the first floor of Building 10. Funding for the space changes has been undertaken as a special project of the Alumni Association as part of MIT's five-year, \$225 million Leadership Campaign.

"The Building 10 project is most appropriate for alumni support," said Breene M. Kerr, '51, chairman of the Building 10 Fund Committee, "since virtually every alumnus and alumna has attended classes in Huntington Hall." Development of the Alumni Center on the first floor, near the Admission Office and the Career Planning and Placement Office will enhance the basic relationship of the alumni to the Institute."

Memorial Planned Thursday For Thomas Hill Of Sloan

A memorial service will be held in the MIT Chapel on Thursday (March 10) at 4pm for Professor Thomas M. Hill of the Alfred P. Sloan School of Management who died March 4 at the MIT Infirmary after a long illness. He was 62.

Professor Hill, a member of the MIT faculty for 31 years, had done extensive work in managerial and financial accounting theory and practice, and was the author of two



Campus Architect Harry Portnoy, right, shows model of renovated Huntington Hall to Breene M. Kerr, chairman of the Building 10 Fund Committee.

Building 10 office space will be provided for the president of the Alumni Association, the executive vice president, the secretary, the director of the Alumni Fund, the regional directors and their assistants. The Alumni Records Office and *Technology Review* will be housed in nearby space in Building 12.

Also to be included in the new Alumni Center will be an exhibit hall to be used by various groups in

the MIT community as well as to display memorabilia from the MIT Historical Collections. The exhibit hall will accommodate small gatherings and will be equipped for audio-visual presentations.

Give a Pint, Save a Life

One pint of blood can save one person's life.

It's not a complicated equation, but something to keep in mind during the last three days (March 9-11) of the 30th annual spring blood drive, being held in the Sala de Puerto Rico of the Student Center.

The hours for the drive are varied, so that almost anyone can find time to donate. Today (March 9) the drive will be open from 2:30-8:15pm; Thursday, March 10 from 9:45am-3:30pm, and Friday, March 11, from 11:45am-5pm.

Steven Piet, drive chairman, said that during the first four days of the drive, 743 pints were collected.

accounting textbooks.

Born in Bucksport, Me., he received the BA degree in 1936 from the University of Maine and the MBA degree in 1938 from Harvard University. He was an instructor of economics at Yale University from 1938 to 1940, and a Fellow of the School of Business Administration of Stanford University in 1940-41.

He joined the MIT faculty as
(Continued on page 11)

\$9 Million Pew Grant Aids Health Sciences

The Glenmede Trust Company, trustee of the Pew Memorial Trust of Philadelphia, has approved a grant of \$9 million to MIT toward the construction of a new facility to serve as a campus focus for research and teaching in health sciences and technology at MIT. The Pew Memorial Trust grant is one of the largest single gifts in MIT history.

Announcement of the grant was made by Howard W. Johnson, chairman of the Institute's Corporation, and President Jerome B. Wiesner, at a regular quarterly meeting of the MIT Corporation in Cambridge last Friday.

The Pew Memorial Trust grant applies toward MIT's Leadership Campaign aimed at marshalling \$225 million in new private resources over a five-year period. Mr. Johnson is chairman of the Campaign and Paul F. Hellmuth of Boston, William B. Murphy of Gladwyne, Pa. and Edward O Vetter of Dallas, Tex., are co-chairmen. All are members of the MIT Corporation. With the Pew grant, the MIT Leadership Campaign, announced in April, 1975, now stands halfway toward its goal.

The Pew Memorial Trust was established by the surviving children
(Continued on page 12)

MIT Lecture Series

Brandt Talk Tonight; Bundy Speaks Tuesday

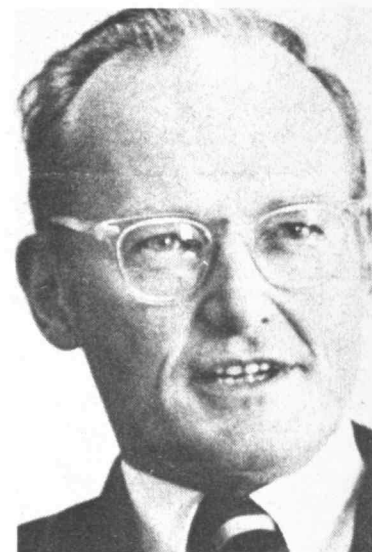
Former West German Chancellor Willy Brandt speaks at MIT tonight (Wednesday, March 9) and Ford Foundation President McGeorge Bundy comes to the campus Tuesday night (March 15) in the continuing MIT Lecture Series on "World Change and World Security."

Both lectures will be given at 8pm in Kresge Auditorium. They are open to the public without charge.

The lecturers in the series are world leaders, each of whom will discuss questions of world security in the time frame of the next two decades and in the context of changes they think might develop or be brought about during these decades.

Mr. Brandt presently is chairman of the Social Democratic Party in West Germany and president of the Socialist International. He won the Nobel Peace Prize in 1971.

Mr. Bundy, who has been president of the Ford Foundation for 11 years, served as Special Assistant to the President for National Security Affairs under Presidents John F.



Mr. Bundy Kennedy and Lyndon B. Johnson. Before that he had been professor of government and dean of the Faculty of Arts and Science at Harvard University.

(Continued on page 4)

Housing Neglected, JCUS Study Finds

The United States—in the face of extraordinary population and economic pressures—is neglecting the housing needs of the American people, according to a new study of U.S. housing announced last week in New York City.

The report, *The Nation's Housing, 1975 to 1985*, prepared by the MIT-Harvard Joint Center for Urban Studies, shows that housing problems formerly limited to the poor have now spiraled upward to affect the average-income family as well.

The study also indicates that: Only 25 percent of all U.S. families could afford to buy a median-priced new home as of 1975. In 1970, almost half of all families could afford the same standard home.

The average selling price for a typical home could reach \$78,000 by the early 1980s.

Housing starts even after the upturn of 1976 are 20 percent below the number necessary to meet household growth and to replace physically obsolete units.

Population growth in non-urban areas nationwide is outstripping

growth in metropolitan areas, an unusual event in American history. Consequently, some urban housing is likely to become unneeded. At the same time, a substantial shortage could occur in swelling small cities and towns.

Since 1970, 10 of the nation's 25 largest metropolitan areas—mostly in the northern sections—have declined in population. During the 1960-1970 decade, only one U.S. city, Pittsburgh, lost population.

The number of low-income families living in physically inadequate units has declined since 1960, but the number paying an unreasonably high percentage of their income for rent increased dramatically.

As of 1973, 16.8 million families—one of every four in the nation—lived with at least one form of housing deprivation. This included four million in unsatisfactory neighborhoods.

Low-income families will be hit hardest if firm action is not taken to improve the housing situation, according to Dr. Arthur P. Solomon,
(Continued on page 9)

INSTITUTE NOTICES

Announcements

I. Austin Kelly II Competition, 1976-1977—Full-time MIT undergraduates (excluding former winners) are eligible for I. Austin Kelly II Prizes for Excellence in Humanistic Scholarship. Two prizes (\$250.00 each) will be awarded for scholarly essays judged to be outstanding in any of the following fields, or in some combination of these: anthropology, archaeology, history, literary studies, musicology. Enter a unified piece, 5,000-10,000 words. Papers written for credit—as is, revised, or expanded—are eligible. Deadline: Mon, May 2, at 5pm. Info: Course XXI Office, Rm 14N-305, x3-4446.

Foreign Students—Non-US citizens with temporary non-immigrant visas must obtain permission for off-campus employment from US Immigration and Naturalization Service in Boston. Planning must be underway by Apr 1. Guidelines and Form I-538 available at Foreign Student Office, Rm 3-107.

Add Date—The last day to add subjects to registration is Fri, Mar 11.

Official Notice—Last day for juniors and seniors to specify an elective to or from pass-fail grading is Fri, Mar 11.

WTBS Special Majority Speaks Program—Elaine Noble's talk, "Women in Politics," given in Rm 26-100 on Tues, Feb 22, will be broadcast on WTBS, 88.1FM, on Wed, Mar 9, 6:30pm.

John Asinari Award in Life Sciences—Accepting undergraduates nominations Courses VII, VII-I, VII-2 & VII-A. Deadline: April 20. Info: Ed Gaudino, Rm 56-524, x3-6715.

Women Cadets Complete Army Airborne Training

Two MIT women, Kathy Lynn Kielemeyer and Karen M. Knoll, spent IAP this year jumping off 34-foot towers and out of airplanes, while completing Army Airborne Training at Fort Benning, Ga.

The first two weeks of airborne school consist of general conditioning and jumping from a 34-foot high tower, designed to give the cadets some idea of what it's like to jump from an airplane before they are airborne. The third week is spent aboard airplanes, where cadets make five jumps each.

Both women agreed that jumping from the tower was more frightening than jumping from the planes. "When you jump from a plane you aren't really aware of how high off the ground you are," said Ms. Knoll, "because you're so far up that the distance is beyond your depth perception. Jumping from the tower is much worse." In fact, the cadets were warned that of all the students who drop out of the program, most do so during the tower phase of training.

Ms. Knoll, '78, joined Air Force ROTC as a freshman, partially for the scholarship, but mostly because she's always been interested in planes. She jumped for the first time last June. Once she has completed graduate study in her major, aeronautics and astronautics, she plans to get her pilot's license while serving on active Air Force duty.

Ms. Kielemeyer, also '78, didn't join the Army ROTC until this year. She became interested in ROTC, and in attending airborne school, while a member of MIT's Pershing Rifles Club. Unlike Ms. Knoll, she had never jumped before going to Fort Benning. "I was sure I would be afraid to make that first jump," she said, "but I really surprised myself. I wasn't nearly as frightened as I thought I would be." She will receive her SB in mathematics, but has not yet decided on a career.

Awareness Group for Children of Holocaust Survivors—Persons interested in forming a discussion group should call the following as soon as possible: Eva, 442-3331 days, 491-7131 evgs; Mona, 964-4355. Sponsored by MIT Hillel.

Upcoming GSC Meetings—Housing & Community Affairs Committee: Wed, Mar 9, 5pm, Walker Intl Stu Lng. Survey Ad Hoc Committee also invited. Academic Project & Policy Committee: Tues, Mar 15, 4:30pm, Walker Intl Stu Lng. Discussion of Sizer Award, Teaching Award, grading issue. Council Meeting: Tues, Mar 15, dinner 5pm, meeting 6pm, (Blue Rm.).

1977 Spring/Summer Environmental Intern Program—Applications for & description of Mass Audubon Society's Intern Program are available Rm 24-207. Application deadline: Wed, Mar 16, 12m. Internship runs approx 12 weeks, stipend ranges from \$1,250-\$1,500. Info: Priscilla Kelly, Rm 24-207, x3-3886.

Preprofessional Opportunities—1977 Medical Education Development Program, University of North Carolina at Chapel Hill: This 8 week summer program sponsored by the Schools of Medicine and Dentistry offers an education experience in academic, clinical, personal and environmental aspects of attending medical and dental school. Available to premedical and pre-dental students with one year remaining before desired admission to a professional school. North Carolina residents will receive preference. US Army Health Professions Scholarship Program: This program offers a unique opportunity for financial support to students in the health professions. Selected students are paid a stipend of \$400 a month. In addition the government pays for books and other related academic expenses. Although you will be commissioned as an officer of the US Army Reserve you will remain in student status until graduation. Once a year you will be called to active duty for 45 days. Total compensation to participants (exclusive of tuition and other academic fees and expenses) is approximately \$5400 a year. Applicants must be accepted or enrolled in an approved professional school and be a US citizen. Additional information is available in the Preprofessional Advising and Education Office, Rm 10-186, x3-4158.

Freshman Handbook—Students who are willing to help edit quotes for '77 Handbook should contact FAC office, Rm 7-103, x3-6771, as soon as possible.

Women Graduate Students Spring Discussion Group—Jane Betts, director of women's athletics, and athletics staff members will lead discussion on "What About Athletics for

Women at MIT?" Tues Mar 15, 4-6pm, Rm 8-314. Info: Jeanne Richard, x3-4869.

New UROP Listing

For more detailed information on UROP opportunities listed, MIT undergraduates should call or visit the Undergraduate Research Opportunities Program Office, Room 20B-141, Ext. 3-5049 or 3-4849 unless otherwise specified in the listing. Undergraduates are also urged to check with the UROP bulletin board in the main corridor of the Institute.

Tunable Dye Lasers
An opportunity is available with a research group working on tunable dye laser experiments. An advanced student in mechanical engineering, electrical engineering, or physics would work on difference frequency generation in a non-linear crystal, which would include design of a dye laser. Prof. Forbes Dewey, x3-2235, Rm 3-250.

Laboratory for Computer Science
The Computer Systems Research Division of the Laboratory for Computer Science has an opportunity for a student to design and construct an ARPA Network IMP Interface for the PDP-11. For this project, the student should have experience in ITL logic design. PDP-11 hardware experience would be helpful, but is not necessary. The project can begin immediately, and should be completed by June. Pay or credit. Dr. David Clark, x3-6003, Rm NE43-511.

Heuristic Computer Modeling
A student is invited to learn and conduct research using QSIM2, a computer simulation language which is reminiscent of DYNAMO, though easier to use. It is desirable that the student have some familiarity with DYNAMO. The project is likely to require coordination of some on-line heuristic modeling by groups of users. Credit or pay available. Prof. S. West, x3-3965, right away.

Movement Control in Man
An undergraduate with experiences in the design of electro-mechanical systems is invited to assist in the construction of an apparatus to study movement control in man. Initially, flexion movements of the thumb will be studied. The research is being conducted through the collaboration of the Neurology Dept. of Peter Bent Brigham Hospital and the Man Vehicle Laboratory of MIT. Juniors or seniors are preferred. Prof. Oman, x3-7508.

Graduate Studies

AAUW Annie Ryder Fellowship
The Boston Branch of the American Association of University Women has announced the availability of the Annie Ryder Fellowship for 1977-78. An award of \$900 will be made to a deserving, full-time woman student with high academic achievement for study in education at the graduate level. An applicant must be a resident of New England. Preference will be extended to those applicants who have had some type of teaching experience and who plan to remain in the field of education. Application deadline: May 1, 1977. Information: Graduate School Office, Rm 3-136.

Student Jobs

On Campus: Research Assistants needed. Must have either good working knowledge of optimal control theory or good working knowledge of TROLL or TSP econometric software systems. 10-20 hrs/wk. Contact Dr. Steve Hnyilicza of the Energy Lab, E40-189, x3-3406.
Part-time clerical work and office duties in Industrial Liaison Office. Flexible hours, up to 20/wk. Contact Albert Saxe, 39-641, x3-5117.
Prepare indexes for transcripts of oral history interviews. Proofreading also. 10 hrs/wk., \$3.00 per hour. Contact Marc Miller, x3-4067.
Off Campus: COBOL programmer, part-time during term, full time during summer. Negotiable hours and salary. Contact Mr. Stanley of Management Techniques, Inc. Newton, Ma. 696-5530.
Traffic survey in downtown Boston, outdoor work involving use of tape recorders. Must be able to work on March 29 and/or March 30.

Possible to work other days in April. \$3.50/hr. Contact Nelson Armstrong, 5-122.
For information on other job possibilities, come to the Student Employment Office, 5-122.

Placement

The following companies will be interviewing during the time period covered by the current Institute Calendar. Those interested may sign up in the Career Planning and Placement Office, Mon-Fri, 9am-3pm, Rm 10-140, x3-4733.
Thursday, March 10—The BDM Corp; Battelle-Columbus Labs; Chrysler Corp; Cincinnati Milacron Chemicals, Inc; Honeywell Inc.; Interactive Data Corp; Grumman Aerospace Corp; Lord Corp; Motorola, Inc.; Semiconductor Group; NCR Corp; Rand Corp; Sandia Labs; Texas Instruments Inc; The Analytical Sciences Corp.
Friday, March 11—AVCO Lycoming Div; The BDM Corp; Battelle-Columbus Labs; Data Resources, Inc; Honeywell Inc; ITT Avionics Div; ITT Defense Communications Div; Microwave Res. Corp; Mitrol, Inc; Rand Corp; Stone & Webster Engineering Corp; Texas Instruments.
Monday, March 14—Bell Telephone Labs; Frito-Lay Inc; Los Alamos Scientific Lab; Plantronics, Inc; Stone & Webster Engineering Corp; Varian/Lexington Vacuum Div.
Tuesday, March 15—Ferm National Accelerator Lab; Fischer & Porter Co; Harris Corp; Inland Steel Co; Northern Natural Gas Co; Penzoil Co; Sperry Marine Systems; Western Union Telegraph Co; Westvaco Corp.
Wednesday, March 16—Boeing Co; Cordis Corp; Gilbane Building Co; Hendrix Electronics, Inc; Schlumberger Ltd; Raytheon Co, Research Division; Sanders Associates, Inc; Sperry Univac; Teradyne, Inc; Thornton Associates; Xerox Corp.
Thursday, March 17—Asarco Inc; Jet Propulsion Lab; Northeast Utilities; Seaward International.
Friday, March 18—Freyberg Associates, Inc.

Club Notes

MIT Badminton Club**—Join MIT Team in MBA Div III League matches, MBA Tournaments; or come just for fun. Meetings: Fri, 7-10pm; Sun, 10am-1pm, Du Pont gym. Info: E. To, x3-6780, or x5-9671 Dorm.
MIT Ballroom Dance Club*—All invited to join in the fun. You too can tango. Info or lessons by phone: Fern Crandall, DL5-8534. Volunteers needed.
MIT Bridge Club*—ACBL Open pairs duplicate bridge. Thurs, 7pm, Stu Ctr Rm 407.
MIT/DL Bridge Club**—ACBL Duplicate Bridge. Tues, 6pm, Stu Ctr Rm 473.
MIT Chess Club*—Informal speed chess, analysis, etc., every Sat, 1pm, Stu Ctr Rm 407. Info: Brad, Burton Rm 141G.
MIT Comic Book Club*—Weekly meetings, Wed, 7:30-9pm, Rm 7-102.
MIT Figure Skating Club**—Meetings: Sat, 9-11am, Sun, 11:30am-1pm, Ice Rink, Free. All are welcome. Ability to skate backwards required.
Gays at MIT*—(formerly SHL) Coffeehouse/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.
MIT Madrigal Society**—Group singing, primarily English madrigals. All voices (soprano, alto, tenor, bass) welcome, come add yours. Tues, 7:30-9:30pm, Rm 4-160. Brian Wibecan, Nw Hse 4-312, x5-7570 Dorm.
MIT Shotokan Karate Club**—Rigorous training for intercollegiate competition & self-defense. Given by 6th degree black belt. Thurs, 8pm; Fri, 6pm; Sun, 10am, duPont T Club Lng. Info: x3-7220.
MIT Space Habitat Study Group*—Interdisciplinary studies on space colonization. Thurs, 7pm, Rm 37-252.

Tae Kwon Do Club*—Workouts on Tues, T-Club Lng (W31-125), & Thurs, W31-225, 6-7pm. Info: Jim Cole, x3-3283.

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

MIT Tiddlywinks Association*—Meetings Thurs, 8pm, Stu Ctr Rm 473.

White Water Club**—Pool sessions alternate Tues, 8-10pm, Alumni Pool. Next session March 15.

MIT Word Game Club—Club now being formed, with emphasis on playing Scrabble crossword game. Informal group designed for competition among word game players of varying abilities. Brief organizational meeting followed by games Thurs, Mar 10, 7pm, Burton 1 Lng. If can't attend or need info: Jeff Jackson, 492-6983.

Religious Activities

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

Hillel Services*—Orthodox: Fri, sundown, Rm 50-005; Sat, 8:30am, Rm 10-105. Traditional/Egalitarian: Sat, 10am, 312 Memorial Dr (Religious Counselors Bldg). Reform: Fri, 7:30pm, Chapel.

You are invited to the weekly **Interdenominational worship and holy communion**, Wed, 5:05pm, Chapel. Get-acquainted supper following.

Prayer Time**—Lunch hour Bible classes led by Miriam R. Eccles. Fri, 1-2pm. Rm 20E-207, prayer, music, guest speakers and refreshments. All welcome.

Protestant Worship Service*—Worship, prayer, praise & teaching. Sun, 10:45am, Chapel. Coffee, donuts & fellowship following.

MIT Seekers—Group of students will meet at 9:55am & 4:55pm each Sun in front of McCormick to attend services at Park St Congregational Church.

United Christian Fellowship*—Fellowship meeting Tues, 6:30pm, Rm 1-236, a time of praise, prayer, testimony and teaching. Everyone welcome. Contact: David Hoicka, 5-9649 Dorm.

MIT Vedanta Society*—Meditation and discourses on the Gita by Swami Sarvagatandanda, of the Ramakrishna Vedanta Society of Boston. Fri, 5:15pm, Chapel.

Echoes

March 5-11

50 Years Ago

Color photography as developed by the Eastman Kodak Company will be the subject discussed at the New England Section of the American Chemical Society meeting. Mr. Glyn Matthews, who has been engaged in developmental techniques at the Rochester plant of the Eastman Company, will speak to the assembly.

40 Years Ago

A decision to withdraw boxing from the list of recognized Institute sports was explained by the statement that the "interests" of the school were no longer served by boxing. It is generally believed that the poor showing of the team since its recognition over ten years ago, lack of student support and the trend of universities away from intercollegiate boxing greatly influenced the decision.

25 Years Ago

Dr. Max F. Millikan was appointed Director of the recently established Center for International Studies at MIT. The Center will promote the study of world affairs in the fields of economics and social, political and natural sciences.

Prepared by Marcia Conroy, MIT Historical Collections, x3-4444.

CABLE TV SCHEDULE X3-3625

March 9-15

Channel 8:
Wednesday, March 9
11am-12noon **POLITICS AND TELEVISION #2** With Ed Diamond (R)
12noon-1pm **RHETORIC & JOURNALISM #3** With Ed Diamond (R)
5-6pm **ON LOCATION** With Mike Moser Live
Channel 10:
12noon-8pm **SPORTSWEK**
Thursday, March 10
Channel 8:
11am-12noon **INTRODUCTION TO THERA-**

PEUTIC MASSAGE Produced by Glynis Loman
7:30-8:30pm
POLITICS AND TELEVISION #3 With Ed Diamond Live from 9-350.

Friday, March 11
Channel 8:
9:30-10:30am
RHETORIC AND JOURNALISM #4 With Ed Diamond Live from 9-350

Channel 10:
12noon-8pm
LOOKAROUND

Monday, March 14
Channel 8:
12:15-12:45pm
8-9pm
MITV NEWS Live from 9-355.
BASEMENT VIDEO production.

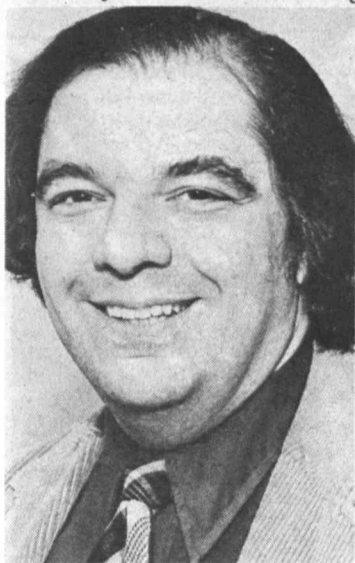
Channel 10:
1-8pm
MITV NEWS

Tuesday, March 15
Channel 8:
11am-12noon
12noon-1pm
1-2pm
2-3pm
3-4pm
POLITICS & TELEVISION #3 With Ed Diamond (R)
BASEMENT VIDEO production.
RHETORIC & JOURNALISM #4 With Ed Diamond (R)
INTRODUCTION TO THERAPEUTIC MASSAGE Produced by Glynis Loman
BASEMENT VIDEO production (R)

Keyser Appointed To Head Linguistics and Philosophy

Dean Harold J. Hanham of the School of Humanities and Social Sciences has announced the appointment of Professor Samuel J. Keyser as head of the Department of Linguistics and Philosophy (Course 24) and professor of Linguistics. Professor Keyser comes to MIT from the University of Massachusetts at Amherst, where he was Head of the Department of Linguistics.

A native of Washington, D.C., Professor Keyser received a BA in Eng-



Professor Keyser

lish literature from George Washington University in 1956, BA and

MA in English language and literature from Merton College in Oxford in 1958 and 1962, and MA and PhD in linguistics from Yale University in 1960 and 1962.

Professor Keyser's first professional appointment was a research staff member in MIT's Research Laboratory of Electronics in 1961-62, and he has maintained close affiliations with MIT's linguists and philosophers ever since. He is founder and editor of *Linguistic Inquiry*, a journal published by the MIT Press since 1970, which is widely read by philosophers as well as linguists.

After service in the U.S. Air Force, Professor Keyser was on the faculty at Brandeis University, which he left in 1972 to head the Department of Linguistics at the University of Massachusetts, Amherst. During his tenure, that department developed into a leading center for the study of language.

Professor Keyser's main research interests are in phonological theory, the history of the English language and poetics. He is the co-author of two books and has published numerous articles in professional journals.

He is married to Margaret Joan Horridge Keyser, whose professional interest is in modern movement education. The Keyser family has three children, Rachel, 17; Beth, 14, and Benjamin, 11.

Bora and Liba Mikic Named Senior House Residents

Bora Mikic, professor of mechanical engineering, and his wife, Liba Mikic, have been appointed faculty residents of Senior House, Dean for Student Affairs Carola Eisenberg recently announced.

The Mikics will succeed Professor Murray Eden and his wife, Pat. They resigned last summer when Professor Eden accepted a post at the National Institutes of Health in Washington, D.C. Dr. Eden, professor of electrical engineering, is currently on leave from MIT.

Professor Mikic and his wife, Yugoslavian natives, came to Cambridge in 1964 when Professor Mikic was a research assistant in mechanical engineering. Liba Mikic has taught and studied comparative literature.

In addition to faculty residents, Institute houses and independent living groups also have graduate residents. The Dean's Office is accepting applications through Friday, March 11, from single or married graduate students who are interested in participating in the graduate resident program.

Supportive, positive people are needed. They act as advisors to undergraduates, in both academic and personal matters. Previous experi-

ence with the MIT community is particularly helpful.

Graduate residents receive their room free of charge, and several plans for meal compensation are available.

Students interested in applying for positions as graduate residents call the Dean's office, x3-4051.



Richard Frothingham, a junior in biology and a student assistant in the MIT Libraries, promotes the annual MIT Libraries Book Sale.

Libraries to Hold Annual Book Sale

The annual MIT Libraries book sale will be held Wednesday, March 9, and Thursday, March 10, from 10am to 4pm in the Library Conference Room (Rm 14-0615).

Over 4,000 items will be up for sale, including books on science, technology, economics, religion, history, political science, architecture, art, literature and other areas. Some records and music scores also will be sold.

Most items will range in price from \$0.25 to \$2.00, although some special reference books, art books, and a set of *Encyclopedia Britannica* will cost more. Plan to stop by more than once, as prices are usually lowered and additional material offered as the sale progresses.

The Library Conference Room, located in the Hayden Library building basement, can be reached from the basement corridor that runs between the library and the humanities department.



MIT SYMPHONY ORCHESTRA rehearses under the direction of Dalia Atlas (standing, far right) for concerts to be given March 10 at Wellesley College, March 12 in MIT's Kresge Auditorium, and March 15 in Boston's Faneuil Hall. The orchestra will perform works by Ben-Haim, Mozart, Ravel and Sibelius. WTBS-FM, 88.1, will broadcast the concert at 4:45pm on

Tuesday, March 15, and at 4pm on Thursday, March 17. Earlier this year the orchestra marked its recording debut with the release on the Vox/Turnabout label of Copland's *Dance Symphony* and Piston's *Suite from the Ballet The Incredible Flutist*. Three more records will be released in 1977. The first record is available at the Tech Coop.

Hayden Gallery to Exhibit Stuart Works

An exhibition of works on paper and handmade paper objects by Michelle Stuart will be on view in Hayden Gallery from March 12 through April 8. The presentation is sponsored by the MIT Committee on the Visual Arts.

A public preview will be held on Friday, March 11, from 8-10pm, and the artist will give an informal gallery talk at 7pm. An illustrated catalogue organized by the CVA staff and a recently published book by Stuart, *The Fall*, will be available.

Stuart makes large paper scrolls and handmade paper books using a method symbolically analogous to the geological process of erosion. Rocks and earth are pounded to varying textures and impressed on rag paper backed with muslin, causing mineral indentations and tones to effect a surface appearance of earth-like terrain.

Large sheets—some 12 feet high—are never framed but hang freely from the top corners and sometimes extend onto the floor. Created in a similar fashion are handmade paper books, called *Rock Books*, unadorned and often bound shut with twine, not meant to be opened. Each work is titled by the site where the artist

gathered the loose earth and rocks used in its making. The raw materials are transformed but preserve their earth color, texture, and mineral light, and thus their history—allowing an aura of time to accrue to the work.

The exhibition will also include a "site drawing" composed of photographs, maps, and earth materials from a particular location, and a wall piece that was a precedent for the *Rock Book* series.

Stuart's inventive method finds its major source in the experiences of her childhood. Born to well-travelled parents, her father an engineer involved in mapping inland California, Stuart became strongly attached to the aesthetics of uninhabited earth. After art school she worked as a typographical draughtswoman. In the late 1960s she began to incorporate drawings of the moon's surface into her art. Later she focused on the earth's surface and on a greater sensibility for color.

A journal, *Return to the Silent Garden*, begun in 1970 records her explorations of the countryside, and includes poems, site photographs, fragments from her artwork, notes, earth samples, scientific descriptions, and entries on specific geolo-

gical phenomena. The journal will be included in the exhibition as will photodocumentation of a 420-foot-long scroll executed for Artpark in Lewiston, New York, in July, 1975.

Stuart has recently participated in major exhibitions in California, Philadelphia, and New York, and will take part in *Documenta 6* in Kassel, Germany, this summer. In April she will be artist-in-residence at Williams College.

Born in Los Angeles where she attended Chouinard Art Institute, Stuart spent time in France and Mexico before settling in New York.

She has received grants and fellowships from the MacDowell Fund, the Tamarind Institute, the National Endowment for the Arts, the Creative Artists Public Service Program, and the John Simon Guggenheim Foundation.

Hayden Gallery, located at 160 Memorial Drive in Cambridge, is open Mondays through Saturdays, 10am to 4pm.

African Textiles In Corridor Show

An exhibition of African textiles, "The Dyer's Art: Indigo Cloth from West Africa," will be shown in Hayden Corridor Gallery at MIT from March 12 to April 8.

Marietta Joseph of the African Studies Center at Boston University is curator of the exhibition. The show will display cloth from various regions and ethnic groups of West Africa. A public opening for the exhibition, sponsored by the MIT Committee on the Visual Arts, will be held in Hayden Gallery on Friday, March 11, from 8-10pm. Marietta Joseph will give a gallery talk on Friday, March 18, at 2pm.

Indigo, a blue dye extracted from plants, is used widely by African societies to color textiles. The presentation will feature cloth from Mali, Sierra Leone, Nigeria, and Cameroon. Richly dyed and patterned material is appreciated in these countries for its symbolic and aesthetic values, and is associated with wealth and prestige. The exhibition will include examples of dyeing techniques and will explore the use and meaning of cloths of different construction.

Irregularities of hand-patterned and hand-dyed textiles have attracted Western eyes as a refreshing alternative to machine-made, mass-produced domestic goods that give little scope to the imagination. "The Dyer's Art: Indigo Cloth from West Africa" will offer creative designs of dyers working intuitively within a tradition on individual cloths used as clothing and hangings to enhance daily life.

Dorothy Blank Paintings

Acrylic paintings by Dorothy Summers Blank of Newton are on exhibit at the MIT Faculty Club through March.

All but one of the paintings are abstract. Bright, shiny colors predominate and in several instances the paint is built up, lending texture to the works.

"I don't follow any one method of painting," Mrs. Blank said. "I like to experiment."

Sometimes she pours paint on the canvas; other times she throws or flicks it on, as in "The Big Celebration." She also will run her fingers through the paint and at one time passed a broom over the canvas.

Even using these methods, Mrs. Blank said, "I have most of the control. Obviously I do not have all of it. I can always scrape off the canvas or repaint, if need be."

Mrs. Blank studied at the Nelson Gallery of Art in Kansas City, Missouri, where she grew up. Locally she has taken courses at the Museum School and at the de Cordova Museum. At various times she has worked in oils, plastic on gauze and cement, ceramics, and sculpture. She now works exclusively in acrylics.

She has participated in group shows at the Boston and Newton City Halls, the First Unitarian Church in Newton, the Hebrew Rehabilitation Center for the Aged in Roslindale, and Mt. Auburn Hospital.

CAVS Exhibits Newman Works

"Double Articulation," new reliefs, drawings, and prints by CAVS Fellow John Avery Newman are on exhibit at the Center for Advanced Visual Studies (CAVS) through April 1.

Some drawings and prints, hung in corridor exhibition space, are studies for the wall reliefs, hung in the Exhibition Room. Others, conceived two to three years before the wall reliefs, are still related to them thematically.

"All of my work is concerned with opposites, contradictions, paradoxes," Newman said. Of the works on display, each design is stated twice, sometimes in mirror image and other times with modification. Each is based on carefully controlled geometric forms, one built onto another.

The wall reliefs, designed specifically for the Exhibition Room, relate in size and shape to the room's four walls. Always in pairs, they build simple geometric forms into layers of proportional relationships. Painted the same shade of white as the walls, the reliefs are the walls.

Newman was a Fellow at the Whitney Museum Independent Study Program and received the MFA degree from the Yale School of Art and Architecture. In 1975 he won a New York State Council on the Arts grant for sculpture. He has been a CAVS Fellow since 1975.

CAVS is open Monday through Friday, 9am to 5pm.

New World Duo In Benefit Concert

The New World Duo—Boston Symphony Orchestra violinists Emmanuel Borok and Victor Yampolsky—will give a concert at 3pm on Sunday, March 13, in MIT's Kresge Auditorium.

They will perform works by Prokofiev, Isaye, Wieniawski, Paganini, and Sphor.

The concert, a premium of the BSO Musical Marathon, was won by David Bird, president of the Center for International Visitors of Greater Boston and a member of the BSO Board of Overseers. Mr. Bird decided to make the concert a fund raiser for the Center. The Center coordinates arrangements for foreign visitors in the Boston area.

Tickets cost \$3 for students or \$5 for others and will be available at the door or by calling 742-0460.

Mr. Borok and Mr. Yampolsky played with the Moscow Symphony Orchestra before immigrating to the US and joining the BSO. Mr. Borok is assistant concertmaster and Mr. Yampolsky principal second violin of the BSO.

Braille 'Video Display' Developed

A blind person's alternative to a computer terminal's video display has been developed at MIT's Sensory Aids Evaluation and Development Center.

The device provides information in Braille through a set of solenoid-operated pins that the blind computer operator reads by feeling.

Dr. Derek Rowell, director of the Sensory Aids Center, said the Braille display is expected to expand job opportunities for the blind.

The initial job application is at Southwestern Bell Telephone Co. in Little Rock, Ark., where a blind person is being trained to use the Traffic Service Position System (TSPS) through which most operator-assisted calls are handled.

The Rehabilitation Services Administration of the Department

of Health, Education and Welfare has estimated that 200 to 300 blind people could be employed nationally as TSPS phone operators, Professor Rowell, an assistant professor of mechanical engineering, said.

Grants from the Rehabilitation Services Administration and the E. Matilda Ziegler Foundation supported the work that led to the development of the Braille device.

TSPS operators use a computer-operated console with approximately 90 lamps and push buttons that indicate the nature and status of the calls they are handling.

The primary obstacle facing the blind is their inability to read the console in order to determine what action to take.

"What we have done," said Dr. Rowell, "is to carefully analyze the

sequence and hierarchy of operations of the TSPS console, and to define a set of discrete messages that will alert the operator to any change in the status of the console.

"The messages are then encoded as a 12-character Braille message that is presented to the blind operator through a set of solenoid operated pins."

The new device uses a micro-computer to continuously scan the lines of the conventional TSPS display and to encode the message.

"We expect the blind operator to act as efficiently as the sighted counterpart," said Dr. Rowell.

George Dalrymple, the engineer at the Sensory Aids Center who developed the Braille display, said the device can make it possible for blind people to work as computer programmers, reservation clerks, inventory clerks and tax-payer service representatives.

"In short," he said, "any job that enters, manipulates or retrieves data or programs stored in a remote computer could be filled by a blind person, if he is provided with a terminal using a Braille display."

The Braille display is an outgrowth of the center's long interest in vocational rehabilitation of the handicapped. The concept grew from earlier work done at the center under the general supervision of Professor Robert W. Mann, Whitaker Professor of Biomedical Engineering.

That work led to the Brailleboss, developed during the 1960s, the first computer terminal for the blind, which produces embossed Braille on a page format from any standard communication link.

Together with a specialized computer program, DOTSYS, this device provided the first English text to Braille conversion by computer. More than 15 Braillebosses are in use.

"We are happy to say," said Dr. Rowell, "that a company seized upon the concept and is now manufacturing faster and improved versions."

From this experience, the MIT engineers realized that "hand-copy" Braille was not always necessary, and in many cases was undesirable. The result was a program to develop a refreshable display with "pop-up" pins to communicate a single line of text, as a possible blind person's alternative to the ubiquitous cathode ray tube terminal.

"Our new TSPS console is a successful application of this new technology," said Dr. Rowell.



A BLIND PERSON'S alternative to a computer terminal's video display has been developed at the MIT Sensory Aids Evaluation and Development Center. Dr. Derek Rowell, rear, director of the center, said the device is expected to expand job opportunities for the blind. George Dalrymple, engineer at the center, tests with his fingers the pins that provide the Braille display. The computer terminal is a mock-up of the Bell System's Traffic Service Position System. A blind telephone operator will be trained to use the MIT device with the TSPS at Southwestern Bell Telephone Co. in Little Rock, Ark., where Dalrymple is installing the Braille-pin equipment.

Brandt, Bundy Speak Here

(Continued from page 1)

Mr. Bundy received his AB from Yale University in 1940 and became a Junior Fellow at Harvard the following year. He entered the Army as a private in World War II and advanced through grades to the rank of captain before his discharge in 1946. Following the war he served from 1946 to 1948 as assistant to Henry L. Stimson and was co-author with Mr. Stimson of the book, *On Active Service in Peace and War*.

In 1949 Mr. Bundy returned to Harvard as visiting lecturer in government. He was advanced to associate professor in 1951 and to professor in 1954, maintaining the latter position until 1961.

In 1960, Mr. Bundy was appointed by President-elect Kennedy to the post of Special Assistant to the President for National Security Affairs. In this capacity Mr. Bundy served as a staff officer on foreign and defense policy for Presidents Kennedy and Johnson until March 1, 1966, when he became President of the Ford Foundation.

Mr. Bundy is editor of *Pattern of Responsibility* (1952), and the author of *The Strength of Government* (1968). Honorary LLD degrees have been conferred upon him by Brown University, Harvard University, Oberlin College, Hofstra College, the University of Notre Dame, Brandeis University, and Boston University, and an honorary LHD degree by Yale University.

The lecture series was started during the Bicentennial year as part of a program of studies to

create better understanding of how to deal with changing world conditions the United States will face in its third century.

The lectures will be published by the MIT Press this summer.

Seven lectures are scheduled after Mr. Bundy's, all starting at 8pm:

March 21, Rm. 26-100—David A. Hamburg, President of the Institute of medicine of the U.S. National Academy of Sciences.

March 24, Rm. 26-100—Sigvard Eklund, Director General of the International Atomic Energy Agency.

April 4, Rm. 26-100—Roberto de Oliveira Campos, Brazilian Ambassador to Great Britain.

April 11, Rm. 26-100—Georgi A. Arbatov, director of U.S. and Canadian Studies of the Academy of Sciences of the U.S.S.R.

April 20, Kresge Auditorium—Robert S. McNamara, President of the World Bank.

April 27, Rm. 26-100—Canon Burgess Carr, General Secretary of the All Africa Conference of Churches.

May 2, Rm. 26-100—United States Senator Frank Church, Democrat of Idaho.

The Bicentennial lecture series has been planned by a committee which includes: Mason Benedict, Jagdish N. Bhagwati, Lincoln P. Bloomfield, John M. Deutch, Bernard T. Feld, Ted R.I. Greenwood, Amelia C. Leiss, George W. Rathjens, Walter A. Rosenblith, Jack P. Ruina, Eugene B. Skolnikoff, Leon Trilling and Norman C. Dahl, chairman.

ADP-IX Classes Are Underway

The Office of Personnel Development has announced the beginning of the ninth session of the Administrative Development Program. Classes began Wednesday, Feb. 23.

Instructors for the organizational psychology section of the program are Drs. Maureen and Adam Yagodka and Ellen O'Hara of the Office of Personnel Development.

Participants selected for ADP-IX are:

Ethel Andrews, Center for Cancer Research; Jean Bonney, Information Processing Services; Rosemary Carpenter, Alumni Association; Roberta Carrara, Resource Planning; Marshall Cheverie, Campus Patrol.

Chathan Cooke, Electrical Engineering and Computer Science; Mary De Sesa, MIT Press; Josephine DiCicco, Sloan School; Charles Ellis, Audit Division; Martin Frey, Laboratory for Nuclear Science; Stephen Gorman, Comptroller's Accounting Office.

Maureen Hayes, Earth and Planetary Sciences; Constance Holland, Faculty Club; Marilyn Katz, School of Humanities and Social Science; Karen Keefe, Energy Laboratory; Luise Keohane, Housing Office.

Eileen Kibrick, Libraries; Mitchell Kloza, Lincoln Fiscal Office; Patricia Mahon, MIT Press; Lewis Redding, Personnel Services; William Risinger, Information Processing Services.

Brian Schwartz, National Magnet Laboratory; Robert Shaw, Information Processing Services; Marilyn Walker, Libraries; Patricia Williams, Personnel Services, and John Woodbury, Housing Office.

When is U a V? 'Reading' Computer Can Tell Difference

Children are taught to recognize letters by being shown samples of each letter. Based on these samples, the brain evolves rules that allow the child to recognize thousands of variations of the letter.

These unconscious rules are the objects of a search by Dr. Barry A. Blesser, associate professor of electrical engineering, and staff researcher Dr. Robert Shillman, both in the MIT Department of Electrical Engineering and Computer Science, who hope to incorporate them into a computer program that will allow a computer to read block-style hand printing.

Already the scientists have written a program that allows a computer to distinguish between hard-to-differentiate hand-printed U's and V's more accurately than humans can do.

"Human subjects, who read random samples, were correct 91 percent of the time, while the computer was correct 95 percent of the time," Dr. Shillman said. The research is funded by the National Science Foundation and is being carried out in MIT's Research Laboratory of Electronics.

To help the computer recognize changes in patterns, graduate student Theodore Kuklinski designs rule modifications that allow the computer to adapt to a person's unique way of printing. (For example, someone who doesn't close his O's will probably not close his P's.)

The scientists reason that the millions of

people with diverse backgrounds must all use similar rules to distinguish between the letters that look alike (such as U's and V's and A's and R's).

"A number of different experiments that combine concepts from the fields of psychology and engineering are required to uncover the recognition rules for each letter," Dr. Shillman said. "Since each of these psychophysical experiments must be repeated for each letter, the work tends to be tedious, but our initial success with U and V gives us confidence in our techniques."

The idea of a machine capable of reading hand-printing is not new. "For 20 years people have seen the need for a machine that reads hand-printing," Dr. Blesser said. "All the early designs and most of the current ones can only read machine printing that fulfills specific criteria: very clean typing, a specific typeface, and printed on a specific kind of paper."

But Drs. Blesser and Shillman expect their machine to read both machine- and hand-printing because the program will be based on the rules people use rather than ad hoc rules designed for specific typefaces.

The scientists are taking a new approach to the problem of computerized reading.

"We're doing the difficult letter first," Dr. Blesser said. "For example, it is easy to teach a machine to differentiate be-

tween a hand-printed X and a hand-printed O, but it is much more difficult to teach a machine to differentiate between U and V.

"Many other engineers solve the easy problems first then base their time schedule for all the letter differentiations on that," he said. "Then they can't extend their techniques to the harder problems."

Still, Drs. Blesser and Shillman are not sure how long it will be before they have a marketable computer program capable of reading hand-printed material, but at the present rate, they say, it will take about five years.

Ultimately, they think their system would find applications in such areas as mail handling, where it would read hand-printed zip codes; in restaurants and stores, where it would read credit card receipts; and in businesses where it would aid in billing and bookkeeping.

Government agencies such as the Internal Revenue Service might also find the computer's reading ability useful because forms could be fed directly into the computer without going through an expensive key-punching operation.

Dr. Shillman, who is also an assistant professor at Tufts University, thinks that there is a distinct advantage in direct entry to the computer since "90 percent of the information entered into a computer originates in hand-printed form that must be translated by key punch operators."

"By eliminating the tedious keypunch-

ing step, fewer employees are needed," he said. "That lowers overhead and reduces error since computers make fewer mistakes than humans."

Dr. Blesser said that there may be some loss of key punch jobs, but many are presently unfilled anyway because competent key punchers are hard to find—a situation that is especially true during tax season. "So our computer will help solve that problem."

He illustrates the necessity by comparing key punch and computer with the telephone operator and long distance telephone network. If we had today's volume of calls with the phone technology of the past, when operators aided each call, we'd be a nation of telephone operators, he said. By the same token, if we don't develop new forms of information entry, as computer uses continue to grow, everyone will have to be a key puncher.

In addition, "key punch operations account for 50 percent of the cost for processing insurance claim forms and computer time accounts for the other 50 percent. Five years ago 10 percent went to key punching and 90 percent went for the computer. We expect this trend to continue until computer time is virtually free relative to key punch costs," Dr. Blesser said.

According to Dr. Blesser the situation is similar to the price scale of pocket calculators—expensive when first introduced and now quite inexpensive.

Ole Madsen To Be Doherty Professor

Dr. Ole S. Madsen, associate professor of civil engineering, has been named the third Henry L. Doherty Professor in Ocean Utilization at MIT. Announcement of the award was made by MIT Provost Walter A. Rosenblith.

Professor Madsen's primary research interests are in fluid mechanics and coastal engineering, particularly wave mechanics and sediment transport. Recently, his research has produced results which allow predictions of sediment movement in the coastal zone where wave action and wave-generated currents may both be important.

As a Sea Grant Program principal investigator, Professor Madsen will undertake this year a field investigation of surf zone hydrodynamics on Cape Cod. The Doherty Professorship will enable him to devote more attention to this program, and to augment his Sea Grant research with a complementary set of laboratory experiments.

Professor Madsen received his ScD in civil engineering from MIT in January 1970. Before accepting a position as assistant professor of civil engineering at MIT in January 1972, Professor Madsen was employed by the U.S. Army Corps of Engineers at its Coastal Engineering Research Center in Washington, D.C. He also holds an MSc degree (1964) in civil engineering from the Technical University of Denmark, where he was a teaching assistant at the Coastal Engineering Laboratory.



Dr. Madsen

The Doherty Professorships were established in 1973 through a grant from the Henry L. and Grace Doherty Charitable Foundation, Inc., to encourage and assist the professional development of MIT junior faculty who are involved in expanding society's responsible uses of the ocean and its resources. The MIT Sea Grant Program, focal point at the Institute for marine-related activities, administers the professorships.

"Doherty Professorships support young and promising faculty members who can bring a broad interdisciplinary background to research on new opportunities for using ocean and coastal resources," said Dean A. Horn, director of the Sea Grant Program. Each professorship is initially awarded for a term of two years. Renewal for a third year is optional.

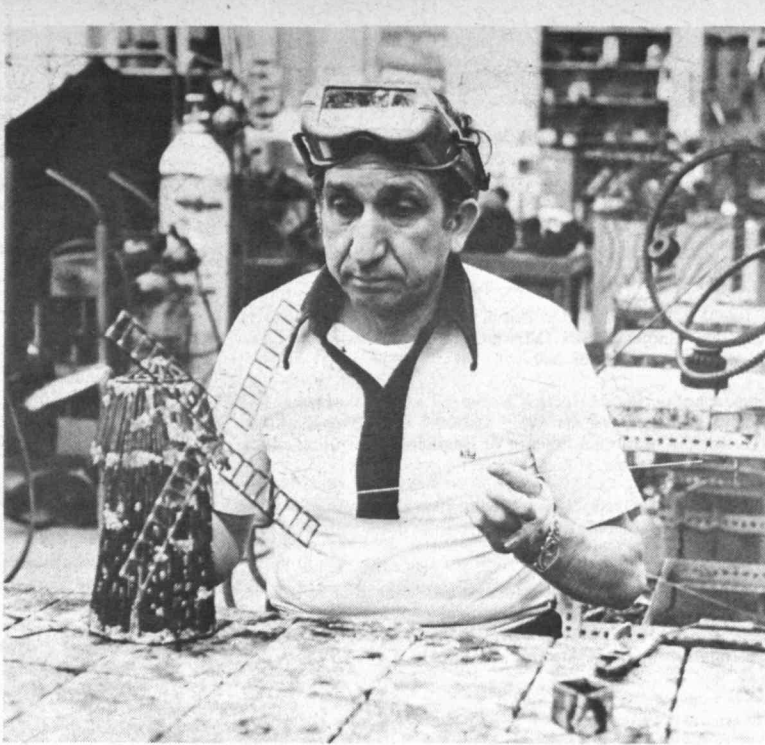
The two previous Doherty professors, Dr. J. Kim Vandiver, assistant professor of ocean engineering, and Dr. Francois M. M. Morel, associate professor of civil engineering, are serving their first and third years, respectively.

Professor Vandiver is studying vibration characteristics and dynamics of structures at sea, both ships and offshore rigs. Recently, he has been studying strumming, or vibration, of underwater cables in currents. His research under the Doherty award applies advanced statistical techniques to predict the dynamic response of offshore structures to ocean waves.

Professor Morel has been engaged in developing theoretical models to predict the biochemical behavior of coastal waters. He has particularly studied the effect of trace metals in sea water on phytoplankton growth, and the mechanism that may cause the onset of destructive dinoflagellate blooms known as red tides.

Chief Olivieri Honored By Elks

Campus police chief James Olivieri, a well-known member of the MIT community, has been the recipient recently of the Massachusetts State Elks Association "Elk of the Month" award for the Circle District for his outstanding achievements in Elkdom.



Metal sculptor Tony Zona shows his most recent creation, a windmill music box. Mr. Zona is arranging the Employees Open House arts and crafts exhibit.

—Photo by Reg Fortier

Arts Exhibit Draws Interest

A quilter, a wood carver, a painter and a potter are among the artists who have expressed interest in exhibiting their work at Employees Open House Saturday, May 7, at MIT.

So far eight of MIT's artists-by-avocation have called to inquire about the arts and crafts exhibit being arranged by Tony Zona of Materials Science and Engineering. There is still time for others to sign up by calling Mr. Zona, x3-5297.

"Since this is the first time we have tried such an exhibition," Mr. Zona said, "we are not aiming for a big show, but we'd like as much variety as we can find." The exhibit will be held in the Bush Building Lobby.

The exhibit is one of some two

dozen events planned for the second biennial Employees Open House, which will also feature MIT's Bicentennial display on space probes that was seen by half a million tourists last summer at the Kennedy Space Center in Florida.

Some 5,000 MIT employees, their families and guests are expected to attend this year's event which will run from 10am to 5pm. They will be greeted at the door with Employees Open House balloons and buttons. Also available in the lobby will be maps showing the locations of the exhibits and events.

A highlight of the afternoon will be a reception with music and refreshments hosted by MIT President and Mrs. Jerome B. Wiesner in the Sala de Puerto Rico.

Conference Considers Limitations on Housing

Several MIT people will participate in a conference on "The Influence of Limited Resources on Housing Production and Delivery," March 27-April 1, at the Asilomar Conference Grounds, Pacific Grove, Calif.

Eric Dluhosch, research associate in the Department of Architecture, is serving as chairman of the conference, which is sponsored by the Engineering Foundation of United Engineering Trustees, Inc., with

headquarters in New York.

The speakers for the conference include: N. J. Habraken, professor of architecture and head of MIT's

Department of Architecture; Sandra C. Howell, associate professor of behavioral sciences in the Department of Architecture; and Albert G. H. Dietz, professor of building engineering, emeritus, and senior lecturer in the Department of Architecture.

Symposium Hears Thomson Thuro

Two MIT professors, Judith Jarvis Thomson and Lester C. Thuro, participated at a symposium on "Social Justice and Economic Equality" held last week at Reed College in Portland, Ore.

Dr. Thomson, professor of philosophy in the Department of Linguistics and Philosophy, discussed "A Conservative View of Social Justice and Economic Equality" on Thursday, March 3, at 8pm. Dr. Thuro, professor of economics and professor of management in the Sloan School of Management, spoke on Saturday, March 5, at 10am. His topic was "The Case for Taxation as a Method of Redistributing Income and Wealth."

Shakespeare Ensemble to Perform

The MIT Shakespeare Ensemble will perform nine scenes—all but two of them new to their repertoire—in the MIT Chapel on Monday and Tuesday, March 14 and 15.

The performances, at 8pm, are free and open to the public.

The scenes are taken from *Measure for Measure*, *Henry IV*, part 2, and *Othello*, by Shakespeare; *Agamemnon* by Aeschylus; *The Changeling* by Middleton, a contemporary of Shakespeare's; and four modern plays—Shaw's *Caesar and Cleopatra*, Samuel Beckett's *Footfalls*, Edward Bond's *Bingo*, and Peter Shaffer's *Equus*. *Footfalls* and

Bingo had their American premieres in 1976.

The scenes are all essentially dialogues exploring the personal relationship between the two speakers. In each case the scene awakens one or both speakers to the harshness of reality.

In the coming month the Shakespeare Ensemble will give two performances off campus. It will perform five scenes at noon on Thursday, March 24, at Wellesley College's Schneider Center. On Wednesday, April 6, it will perform another five scenes at Brookline High School.

Expert Cites Need For 'Energy Stamps'

By CHARLES H. BALL
Staff Writer

An MIT expert on natural gas regulatory policy believes that natural gas prices should be deregulated in three stages and that "energy stamps," similar to food stamps, should be issued to low-income consumers to help defray the increased cost.

Dr. Robert S. Pindyck says that deregulation is the "only hope" under present circumstances to reverse the recent trend of growing natural gas shortages, which were aggravated by the abnormally cold winter of 1976-77.

"Current shortages in natural gas markets are largely the result of field price regulation by the Federal Power Commission, and these shortages are likely to grow considerably if restrictive price policies are maintained," he asserts.

Gas producers now withhold much of their gas from shipment across state lines, where the price is controlled by the FPC, and sell it instead within state boundaries at considerably higher prices.

Elimination of the controls is seen as a way of encouraging gas producers to search out and develop new sources of gas and thus alleviate chronic shortages.

Dr. Pindyck, co-developer of a computer model that measures the effects of regulatory policy on natural gas markets and on the economy as a whole, advocates a three-stage deregulation of interstate shipment prices.

He would let them go from the present level of 60 cents per thousand cubic feet to \$1.70 this year, \$1.85 next year and \$2 the year after that. (\$2 is approximately the equilibrium—or "free market"—price of natural gas.)

Because this would increase prices to consumers by about 30 or 40%, he suggests an "energy stamp" program for the 20 percent of consumers with lowest incomes. He calculates that this might cost the federal government \$2 billion a year—less, by far, he thinks, than the cost of unemployment and lost production caused by present shortages.

Dr. Pindyck, associate professor of management at MIT's Alfred P. Sloan School of Management, says the Carter administration and Congress should act now to begin ending the price controls.

Ripple effects from worsening shortages will spread beyond the consumers and producers of natural

gas, he warns.

The shortages are of "broader importance," he said, "because of the indirect effects on other energy markets and on the macroeconomy as a whole. Shortages of low-priced gas, for example, result in demand pressure in the markets for oil, coal and electricity. Natural gas shortages can also result in added unemployment and reduced Gross National Product."

Professor Pindyck notes that the FPC last year had proposed that the interstate price of natural gas be raised to \$1.42 per thousand cubic feet. As the result of suits brought by gas users, however, the FPC has been blocked by the courts from raising the price.

However, Professor Pindyck says, the FPC may now be backing down from its proposal "and currently there is no guarantee that, through FPC action, the price will rise significantly above its current level."

"Right now the only hope for significant increases in the price lies in legislation to deregulate new contract prices (the price for new commitments of gas to pipeline companies). "It is now time for such legislation to be proposed by the Carter administration and be passed by Congress."

Dr. Pindyck says the increase in price to \$1.42 proposed by the FPC wouldn't eliminate natural gas shortages in any event—but would reduce them after two or three years as more gas was produced and users switched to more abundant, lower-priced fuels.

According to computer projections, the three-stage deregulation he has proposed would increase production sufficiently to meet the needs of all current users by 1980 and, by 1982, all those who want gas but have been unable to obtain it because of the shortages.

The econometric computer model of the natural gas industry being used by Dr. Pindyck and his colleagues at the Sloan School is a recently revised version of an earlier one developed almost four years ago in a project financed by the National Science Foundation.

Political Science Classes on Cable

Regular class meetings for two subjects in the MIT Department of Political Science are being shown live and then reshown by videotape later over MIT's cable television system as an experiment.

The subjects, taught by senior lecturer Edwin Diamond, are 17.30/21.940 *Rhetoric and Journalism* (9am Fridays) and 17.27 *The President and the Press* (7pm Thursdays). Both deal with the influence of television on politics. Working journalists and politicians attend as guest speakers. Each subject has an enrollment of 25. The classes appear in color on Channel 8.

The idea of cablecasting class sessions originated with William C. Johnson who took both subjects last year and who now works with the cable TV system.

"The students discussed it," Diamond said. "What effect would lights and cameras have on them? On me? On the guests? Would it be disruptive? Would anyone watch? We decided to try it for a while as an experiment."

Recent guests whose appearances were put on the cable live and videotaped for showing later include Phyllis Malamud, Boston bureau chief for *Newsweek*; Curtis Wilkie, *Boston Globe* Washington political reporter who covered President Jimmy Carter's election campaign; and Mary Thornton, MIT '70, a member of *The Globe's* Spotlight team of investigative reporters.

NASW Honors Mattill, Cowen

John I. Mattill, editor of MIT's *Technology Review*, and Robert C. Cowen, '49, science editor of the *Christian Science Monitor*, and a *Technology Review* columnist, have been made Life Members of the National Association of Science Writers, the national organization of science editors, writers and reporters for popular, trade and professional newspapers and journals.

Both have been NASW members for 25 years. They were made Life Members at the group's recent annual meeting in Denver held in conjunction with the annual meeting of the American Association for the Advancement of Science. NASW president is George Alexander, science editor of the *Los Angeles Times*.

Pistol Course

A course in basic pistol marksmanship will be conducted by the MIT Pistol & Rifle Club on five consecutive Thursdays at 6:30pm beginning March 17.

The instruction is aimed at those with no previous shooting experience who wish to learn safe firearms handling and shooting technique. The charge for the course is \$20, payable at the first class. All equipment and materials are provided and students are asked not to bring their own firearms.

Since enrollment is limited, prospective students are asked to preregister by calling Bruce D. Wedlock, x3-4895.

THE INSTITUTE CALENDAR X3-3270

March 9
through
March 20

Events of Special Interest

Swimming Program for Parents and Children — Sign up now for swimming program for parents & children (2-5 yrs) sponsored by Child Care Office. Classes Sat, Mar 19-May 21, 10 or 11am. Fee: \$30. Info: Child Care Office, x3-1592.

MIT Spring Blood Drive — Thru Fri, Mar 11, Sala. Make appointments in advance if possible. Forms available in living groups, TCA office, Bldg 10 Lobby. Hours: Mar 9: 2:30-8:15pm; Mar 10: 9:45am-3:30pm; Mar 11: 11:15am-2pm. Info: x3-7911.

World Change and World Security Seminar Series* — **Wed, Mar 9: Willy Brandt**, chairman of Social Democratic Party of Germany, president of Socialist International, 8pm, Kresge. **Tues, Mar 15: McGeorge Bundy**, president of Ford Foundation, 8pm, Kresge. Free.

MIT Libraries Book Sale** — Sale of library duplicates and discards will be held Wed, Mar 9 & Thurs, Mar 10, 10am-4pm, Rm 14-0615 (Library Conference Rm.)

Seminars and Lectures

Wednesday, March 9

Amino Acids: Key Nutrient in the Metabolic Response to Injury* — **Dr. George L. Blackburn**, director of nutritional support service, New England Deaconess Hospital; surgery, Harvard Medical School. Clinical Research Center Seminar. 9am, Rm E18-408.

Urban Energy* — **G. Pine**, G. Energy Assessment Group Seminar. 12n, Rm 12-142.

The Mean Circulation in Lakes Driven by Large Fluctuations of Thermocline Depth* — **John Bennett**, physical oceanography. Oceanography Sack Lunch Seminar. 12n, Rm 54-915. Coffee, bring lunch.

Speckle in Optics* — **Lee Estes**, Southeastern Mass University. EECS Optics Seminar. 1pm, Rm 36-428.

Opportunities and Challenges for New Aircraft* — **Walter Swan**, director of technology, Boeing Aerospace Corp. Aero/Astro General Seminar. 3pm, Rm 37-252. Coffee 2:30pm, Rm 33-222.

Autonomous Technology — A Conversation* — **George Kateb**, Kenan Professor of Political Science, Amherst College; **Langdon Winner**, technology studies & political science; **Leo Marx**, Kenan Professor of American Cultural History. Technology Studies Seminar. 4pm, Rm 20D-205. Coffee 3:30pm.

A Fresh Look at Cardiac Output Measurement* — **Ron Newbower**, anesthesia, MGH. Biomedical Engineering Center for Clinical Instrumentation Seminar. 4pm, Rm 36-428. Refreshments 3:45pm.

Fault Tree and Reliability Analysis Using the Modular Approach* — **J. Olmos**, G. Nuclear Engineering Doctoral Seminar. 4pm, Rm NW12-222.

What is a Liquid* — **Victor Weisskopf**, Institute Professor & professor of physics, emeritus. Undergraduate Physics Colloquium. 4:15pm, Rm 4-339. Social hour following.

On Being a Photographer, Past and Present* — **Elaine Mayes**, photographer. Creative Photo Lab Photography Lecture Series. 4:30pm, Rm W31-310. Lecture & slides. Free.

Thursday, March 10

Ultra-precision Hyperfine Study by Laser Spectroscopy* — **D. J. Larson**, Harvard University. RLE & Spectroscopy Laboratory Seminar on Modern Optics & Spectroscopy. 11am, Rm 66-110. Coffee 10:30am.

Group Technology Applied to the Orienting of Small Parts* — **G. Boothroyd**, U Mass Amherst. Laboratory for Manufacturing & Productivity Special Seminar in Manufacturing. 3pm, Rm 37-187.

Chemical Mutagenesis in Mammalian Cells* — **William Thilly**, toxicology. Nutrition & Food Science Seminar. 4pm, Rm 16-134.

Darwinism and the Social Propensities of Man** — **Richard C. Lewontin**, Alexander Agassiz Professor of Zoology, Harvard University. Darwinism and Culture Seminar sponsored by Technology & Culture Seminar and Cambridge Humanities Seminar. 4pm, Rm 9-150.

Quark Dynamics* — **Robert Jaffe**, physics. Physics Colloquium. 4:15pm, Rm 26-100. Refreshments 3:45pm, Rm 26-110.

Friday, March 11

Optical Bistability in a Solid at 300K* — **T. N. C. Venkatesan**, Bell Laboratories. Special EECS Optics Seminar. 11am, Rm 36-428.

Improving Urban Mass Transit Productivity* — **Tony Gomez-Ibanez**, Harvard University. Center for Transportation Studies Luncheon/Seminar. Lunch 12n (\$1), lecture 12:45pm (free), Stu Ctr Mezzanine Lng.

Effect of Processing Conditions on the Mechanical Properties of Extruded Protein Model System* — **M. R. Hajaligol**, G. Chemical Engineering Doctoral Seminar. 2pm, Rm 66-110.

Robert Hooke's Theory of Capillarity* — **K. G. Hellyar**, G. Chemical Engineering Doctoral Seminar. 3pm, Rm 66-110. Coffee.

The Pathology of the Natural Gas Shortage* — **Thomas Stauffer**, economics, Harvard University. Mechanical Engineering Seminar. 3pm, Rm 3-133.

Microbiology: at Toray: From 6-Aminopenicillanic Acid to Lysine* — **Kioeki Kato**, Toray Industries, Inc, Tokyo, Japan. Industrial Microbiology & Biochemical Group Engineering Seminar. 4pm, Rm 66-144. Consultation: A. L. Demain, x3-1711.

Paris Archives and Italian Composers: A Ramble Through Some 19th Century Sources* — **Andrew Porter**, music critic of the *New Yorker*. Humanities & Social Science Seminar on Music, Linguistics & Aesthetics. 4pm, Music Library.

Monday, March 14

Feedback Invariants and Vector Bundles* — **Clyde Martin**, Ames Research Center, NASA. ESL Control & Communications Seminar. 4pm, Rm 39-400.

Analysis of a FEP Packet Removal Scheme, with Emphasis on Inequity of Service* — **Ted Eckberg**, Bell Laboratories. ESL Control & Communications Seminar. 4pm, Rm 39-500.

High Field Superconducting Materials Research at Westinghouse* — **A. I. Braginski**, Westinghouse Research Laboratories. Joint National Magnet Lab/Center for Materials Science & Engineering Seminar. 4pm, Rm NW14-2209. Coffee 3:45pm.

A Generalized Theory of Fixedpoints of Recursive Definitions* — **Adi Shamir**, mathematics. Applied Mathematics Seminar. 4pm, Rm 2-338. Tea 3:30pm, Rm 2-349.

Fluid Mechanics and the Russian Revolution; and Award of Arthur T. Ippen Fellowships* — **Donald R. F. Harleman**, civil engineering, Ford Professor of Engineering. Ralph M. Parsons Laboratory Water Resources & Environmental Engineering Seminar. 4pm, Rm 48-316. Coffee 3:45pm, Rm 48-410.

What do Theoretical Chemists Do?* — **Robert Silbey**, chemistry. Chemistry Undergraduate Seminar Series. 4pm, Rm 2-390. Refreshments following, Rm 6-321.

Evaluation of the Stretch Reflex Function in Human Motor Control* — **Gyan C. Agarwal**, systems engineering, Univ of Illinois at Chicago Circle. Harvard-MIT Rehabilitation Engineering Center Seminar. 4pm, Rm 10-105. Coffee 3:30pm.

Tuesday, March 15

Acoustic Emission/Elastic Stress Constitutive Behavior* — **James H. Williams, Jr.**, mechanical engineering. Applied Mechanics Seminar. 3pm, Rm 3-133. Coffee, Rm 1-114.

Tchebycheff Bounding Techniques in Queuing Theory* — **Ted Eckberg**, Bell Laboratories. ESL Control & Communications Seminar. 4pm, Rm 39-500.

Physical Organization of Lateral Transport Processes on Mammalian Cell Membranes* — **Watt Webb**, engineering physics, Cornell University. Seminar in Physical Chemistry. 4pm, Rm 4-370. Coffee 3:45pm, Rm 6-321.

Statistical Problems in Seismological Data Processing* — **Keiiti Aki**, geophysics. Mathematics Seminar. 4pm, Rm 2-333. Refreshments 3:30pm, Rm 2-349.

Measurements of Equivalence Ratio in a Combustor* — **David Bigio**, research assistant. Fluid Mechanics Laboratory Seminar. 4pm, Rm 3-134. Coffee 3:50pm.

The Regulation of Heterochromatic Activity by Autosomal Genes in Drosophila* — **Larry Sandler**, genetics, University of Washington, Seattle. Biology Colloquium. 4:30pm, Rm 6-120. Coffee 4pm, Bldg 56, 5th fl vestibule.

Wednesday, March 16

Clinical Research Center Seminar* — **Dr. Henry Brown**, surgery, Harvard Medical School; chief of hand clinic, New England Deaconess Hospital. 9am, Rm E18-408.

Stochastic Climate Models: Application to Sea-Surface Temperature Anomalies* — **Claude Frankignoul**, meteorology. Oceanography Sack Lunch Seminar. 12n, Rm 54-915. Coffee, bring lunch.

Thorium Utilization in Light Water Reactors* — **K. Garel, F. Abtahi**, G. Energy Assessment Group Seminar. 12n, Rm 12-142.

Managing Political Participation in Kenya* — **Suzanne Mueller**, Harvard Center for International Affairs; **Nelle Temple**, G. MIT-Harvard Joint Africa Luncheon Seminar. 12:30pm, HCFIA, 6 Divinity Ave, Rm 1.

Resonant Infrared Third Harmonic Generation in Gases and Liquid CO Systems* — **Helge Kildal**, Lincoln Laboratory. EECS Optics Seminar. 1pm, Rm 36-428.

Recent Developments in Probabilistic Theory of Potential* — **E. B. Dynkin**, Moscow University & Cornell University. Special Mathematics Colloquium. 4pm, Rm 2-131.

A Computer Program for Advising on Digitalis Therapy* — **Peter Szolovitz**, computer science & engineering, Laboratory for Computer Science. Harvard-MIT Program in Health Sciences & Technology Biomedical Engineering Center for Clinical Instrumentation Seminar. 4pm, Rm 36-428. Refreshments 3:45pm.

PWR Blowdown Heat Transfer* — **T. Bjornard**, G. Nuclear Engineering Doctoral Seminar. 4pm, Rm NW12-222.

Island Arc Magnetism* — **Bruce D. Marsh**, Johns Hopkins University. Earth & Planetary Sciences Colloquium. 4pm, Rm 54-915. Tea 3:30pm, Rm 54-923.

Neutral Hydrogen: A Probe of Galaxies and Extragalactic Space* — **Morton Roberts**, National Radio Astronomy Observatory. Astrophysics Colloquium. 4:15pm, Rm 37-252. Refreshments 3:45pm.

Understanding my Photographs* — **Chris Enos**, photographer. Creative Photo Lab Photography Lecture Series. 4:30pm, Rm W31-310. Lecture & slides. Free.

Lecture on the State of the Arts in Israel* — **Leah Porak**, chairperson, Council of the Arts in Israel. MIT Hillel Lecture. 8pm, Stu Ctr West Lng.

Thursday, March 17

The Optical Ramsey Effect and its Application* — **J. Hall**, Joint Institute for Laboratory Astrophysics. RLE & Spectroscopy Laboratory Seminar on Modern Optics and Spectroscopy. 11am, Rm 66-110. Coffee 10:30am.

The Links Between Economic and Political Change in Latin America During the Past Decade* — **Albert Hirschman**, Institute for Advanced Study. History of Industrial Society Workshop. 4pm, Rm 20D-205.

Momentum, Light and Modern Laser Spectroscopy* — **John Hall**, Joint Institute for Laboratory Astrophysics, Boulder, Colo. Physics Colloquium. 4:15pm, Rm 26-100. Refreshments 3:45pm, Rm 26-110.

Friday, March 18

The Mood of Britain: Misplaced Gloom or Blind Complacency?* — **Dick Taverner**, director, Institute for Physical Studies, Great Britain. CIS Seminar. 12n, Rm E53-482.

Mass Transfer Effects in Slurry Reactors for the Fischer-Tropsch Synthesis* — **G. A. Huff**, G. Chemical Engineering Doctoral Seminar. 2pm, Rm 66-110.

Aerosols for Lung Therapy* — **Z. Katz**, G. Chemical Engineering Doctoral Seminar. 3pm, Rm 66-110.

General Overview of the Agribusiness System** — **Fred Besley**, Arthur D. Little, Inc. Seminars on the Agribusiness System. 3:30pm, Rm 16-134.

Style: Speculations about its Nature, Analysis and History* — **Leonard B. Meyer**, music & humanities, University of Pennsylvania. School of Humanities & Social Science Seminar on Music, Linguistics & Aesthetics. 4pm, Music Library.

Organic and Polymeric Metals* — **Anthony F. Garito**, physics, University of Pennsylvania. Center for Materials Science & Engineering Colloquium. 4pm, Rm 10-105. Refreshments 3:30pm.

Community Meetings

Informal Shakespeare Reading Group — You're invited to come & read Shakespeare Wed, 7pm, Wood 211, East Campus. Mar 9: *Cymbeline*, continued Mar 16. Info: Nina, x5-6241 Dorm.

International Cooking — Sponsored by TWO. Cindy Rodrigues from Canada will cook Wed, Mar 9, 8pm, Rm 10-340. Members 50¢, nonmembers \$1. Info: Jenny Gordon, 547-6471 evgs, x3-3450 days.

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, Stu Ctr Mezz Lng. Babysitting Stu Ctr Rm 473. Cheryl, x3-4911. **Mar 9:** Rose Moss, novelist & lecturer, Wellesley College, will speak on "What is America? American Novelists, Questions and Answers."

Women's League 1977 Evening Dinner*** — Guest speaker at dinner Thurs, Mar 10 will be John Collins, consulting professor of urban affairs, former Boston mayor. Cocktails 6pm, dinner 7pm, Faculty Club main dining room. Cost: \$7/person. Reservations: Mary Dinneen, 216 Garfield Rd. Concord, 01742.

MIT Community Players** — Former Players members will join us for a concert reading of selections from the poetry and drama of Bertold Brecht. Directed by Hal Brown. Fri, Mar 11, 8pm, Stu Ctr Mezzanine Lng.

Medieval University* — Sponsored by Harvard & MIT Societies for Creative Anchronism. A recreation of a medieval university, including lectures on philosophy, medicine, rhetoric & law; a medieval marketplace, crafts and players. Sat, Mar 12, Sanders Theatre, Harvard. Admission \$1.50 at door. Pre-1650 A.D. attire encouraged.

Christian Workshop* — discussion, Bible study and prayer concerning the interactions of Christians as a body on campus. Sat, Mar 12, 10am-5pm, Ashdown Dining Hall. Info: Mark, 354-6897 or Karl, x5-6301.

Women's Forum Medical Series** — Mon, 12n, Rm 10-105. **Mar 14:** Social meeting to rap on medical concerns. If enough interest is shown, additional speakers from Medical Dept can be scheduled.

Medical Department Prenatal & Parent Education Group Meeting** — **Connie Bean** & **Elizabeth Hormann**, health educators for Medical Department, will speak on "New Trends in Hospital Care: Hospitals are for Families", and will show film, "When Your Child Enters the Hospital." Tues, Mar 15, 12n-1:30pm, Infirmary 3rd floor conference rm. Directions & babysitting: x3-1316.

MIT-Cambridge Chapter AARP — Board of directors meeting Wed, Mar 16, 10am, Walker blu rm.

GSC Activities Luncheon — First Graduate student activities luncheon will be Thurs, Mar 17, 12n-2pm, Stu Ctr Mezzanine Lng. Talks by Dean Holden, Harvie Branscomb, GSC vice president, and representatives of student organizations. All activities recognized by GSC (and those seeking recognition) and all department student organizations invited to send representatives (contact GSC if didn't receive invitations). RSVP Rm 50-110, x3-2195, by Fri, Mar 9. Info: GSC, Mark Gottlieb (activities chrnm), x3-3889.

MIT Employees Federal Credit Union Annual Banquet*** — Banquet Sat, Mar 19, Montvale Plaza, Stoneham. cocktails 7pm, dinner 8pm, dancing 8:30-11:45pm.

Low Back Problem Exercise Class* — Thurs, 1-2:30pm, Stu Ctr West Lng. Bring 3 pillows and an OK from your doctor. 015/ea class. Info: x3-4138, Mon, 9am-5pm.

TOPS* — Tech Organization of Professional Secretaries. Meetings Thurs 12n, Walker blue rm.

Social Events

Faculty Club Special Dinners*** — **Mexican Nite** Wed, Mar 9. El Grande Mexican Buffet, \$6.25 + tax. RSVP x3-4896. **St. Patrick's Day:** corned beef & cabbage served at lunch and dinner Thurs, Mar 17.

Disco-Tech — Some of us who want MIT to be a healthy, happy place are getting together to help make it just that. Disco-Tech organizational meeting/party will be Fri, Mar 11, 8pm, Ashdown West dining hall. There will be music, bring food or drink — and KEEP SMILING.

Strat's Rat — Sponsored by Student Center Committee. Fri, Mar 11, 8:30pm-1am, Sala. Light & dark beer only 35¢/16 oz. We play requests all night. Free with college ID.

MIT Hillel Bagels & Lox Brunch* — The Honorable Ra'anan Sivan, Counsel General of Israel, will speak on "What's on the Agenda?" Sun, Mar 13, 11am, Rm 10-105. Admission \$1.50, \$1.25 Hillel members.

The Mezz** — MIT talents give performances in relaxed coffeehouse atmosphere. Wine, cheese, coffee & donuts. Come relax & enjoy! Fri, Mar 18, 8:30pm, Stu Ctr Mezzanine Lng.

MIT Coffeehouse III* — MIT Hillel. Sat, Mar 19, 9pm, Stu Ctr Mezzanine Lng. Food, entertainment, music. Admission \$1.50, Hillel members \$1.25.

Springtime Ball* — Sponsored by MIT Ballroom Dance Club. Celebrate spring in style Sat, Mar 19, 7:30pm, Sala. Instructions available. Refreshments. Come by yourself or bring friends. Semi-formal dress. Admission \$1.50/person. Info: Sharon Pastoriza, x5-8678 Dorm.

Movies

The Life of Trotsky* — Young Socialists Movie. Thurs, Mar 10, 7:30pm, Rm 4-231. Admission \$1.

Lies My Father Told Me** — LSC. Fri, Mar 11, 7 & 7:30pm, Rm 26-100. Admission 75¢, MIT or Wellesley ID required.

Capricious Summer (Menzel)* — Film Society. Fri, Mar 11, 7:30 & 9:30pm, Rm 6-120. Admission \$1.25.

The Adversary (Ray)* — International Film Festival sponsored by ISA. Sat, Mar 12, 2pm, Rm 26-100. Free.

Make the Money and Run* — LSC. Sat, Mar 12, 7 & 9:30pm, Rm 26-100. Admission 75¢, MIT or Wellesley ID required.

Time of the 1000 Days** — LSC. Sun, Mar 13, 6:30 & 9:30pm, Rm 26-100. Admission 75¢, MIT or Wellesley ID required.

Kameradschaft (Pabst); Zero for Conduct (Jibo)* — MIT Film Section. Tues, Mar 15, 7:30pm, Rm E21-010. Free.

One with the Wind** — LSC. Fri, Mar 18, 5:30 & 10pm, Kresge. Admission 75¢, MIT or Wellesley ID required.

Vitelloni (Fellini)* — MIT Film Society. Fri, Mar 18, 7:30 & 9:30pm, Rm 120. Admission \$1.25.

Now for Something Completely Different** — SCC MidNite Movie. Fri, Mar 18, 12m, Lobdell. Free, bring blanket to sit on.

The Sunshine Boys** — LSC. Sat, Mar 19, 7 & 9:30pm, Rm 26-100. Admission 75¢, MIT or Wellesley ID required.

Rememory's Baby** — LSC. Sun, Mar 20, 6:30 & 9:30pm, Rm 26-100. Admission 75¢, MIT or Wellesley ID required.

Lobby 7 Events

Greg Greenway* — Singing folk songs & playing the guitar. Sponsored by Lobby 7 Committee. Wed, Mar 9, 12n. Free.

Patrick's Day Celebration* — The Brattle Street Band will play appropriate music, sing, and dance. Thurs, Mar 17, 12n. Free.

Black Dance Club* — Will be dancing Fri afternoons in Lobby 7 throughout winter months. Come and join in! Fri, 12n-2pm, Bldg 7 Lobby. Free.

Music

Thursday Noon Hour Concert Series* — Concerts in Chapel, 12n, free. Mar 10: Commonwealth Quintet. Mar 17: Elizabeth Jones, Baroque Ensemble.

Chamber Music Concert* — Laurence Berman, piano; Amy Teare, violin; Jean Rife, horn. Music by Schumann, Beethoven and Brahms. Wed, Mar 9, 5:15pm, Music Library. Free.

Jazz Concert* — MIT Festival Jazz Ensemble directed by Herb Pomeroy, MIT Concert Jazz Band directed by Everett Longstreth, Harvard Jazz Ensemble directed by Tom Everett & University of Lowell Studio Orchestra directed by Nat Paella. Fri, Mar 11, 8:30pm, Kresge. Free.

MIT Symphony Orchestra* — Conducted by Dalia Atlas. Sat, Mar 12, 8:00pm, Kresge. *Fanfare to Israel* by Ben-Haim, French Horn Concerto in E flat Major, K. 447 by Mozart, with soloist James Impara, and *Daphnis and Chloé Suite* No. 2 by Ravel and Symphony No. 1 in E Flat Minor by Beethoven. Tickets free in Bldg 10 Lobby, \$1 at door. Concert also given Thurs, Mar 10, 8pm, Houghton Memorial Chapel, Wellesley College.

New World Duo* — Violinists Emmanuel Borok & Victor Yampolsky of the Boston Symphony Orchestra performing works by Prokofiev, Isaye, Wieniawski, Paganini & Sphor. Sun, Mar 13, 3pm, Kresge. Tickets: \$5, \$3 students, available at door. Advance sale: 742-0460.

Marek Zebrowski* — Recital of works by Beethoven, Bach-Rachmaninoff, Debussy, Szymanowski and Chopin. Chamber Music Society Concert. Wed, Mar 16, 5:15pm, Music Library. Free.

Song-Cycle as Entity* — Lecture/recital with Arthur Komar, instructor of music, assisted by Rufus Hallmark, tenor. Schumann's *Liederkreis*, Op. 39. Thurs, Mar 17, 5:15pm, Music Library. Free.

Renaissance Vocal Music* — Sponsored by Chamber Music Society. Auditions & rehearsal Sun, 7:30pm, Rm 4-160. Yues, x3-5810.

Theater and Shows

An Evening of One Act Plays* — Dramashop productions of *Embers* by Samuel Beckett, directed by Alanna Connors and *A Slight Ache* by Harold Pinter, directed by Susan Morgello. Fri & Sat, Mar 11 & 12, 8pm, Kresge Little Theatre. Coffee & critique following performances. Free.

MIT Shakespeare Ensemble* — Scenes from 9 plays by Shakespeare, Aeschylus, Middleton, Shaw, Beckett, Edward Bond and Peter Schaeffer. Mon, Mar 14 & Tues, Mar 15, 8pm, Chapel. Free.

Dance

MIT Ballroom Dance Club Workshops* — Foxtrot Workshop Sun, Mar 13, 2pm, Sala. Add rhythm to your walk, we'll review swing, latin & waltz in preparation for "The Big Dance". No partner necessary, beginners welcome. Info: Sharon Pastoriza, x5-8678 Dorm.

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.

Renaissance Dance* — Sponsored by MIT SCA. Beginners welcome. Wed, 8pm, Burton dining hall. Info: Beth Parkhurst, 964-1840.

MIT Dance Workshop — Sponsoring a number of different projects for second term. Please check Workshop bulletin board, duPont Armory, Bldg W31.

Exhibition

Exhibition and Sale of Original Oriental Art* — Marson Galleries exhibition & sale sponsored by MIT Student Art Association. Wed, Mar 9-Fri, Mar 11, Stu Ctr West Lng. Info: x3-7019.

Hans Christian Lischewski* — Photographic variations of textile objects. Rotch Library Visual Collections, Rm 7-304, thru Fri, Mar 11.

Faculty Club Exhibit* — Acrylic paintings by Dorothy Blank on exhibit during March, 9am-11pm.

Double Articulation* — Exhibition of new wall reliefs, prints and drawings by John Avery Newman, CAVS Fellow, Thurs, Feb 17-Fri, Apr 1, CAVS. Hours: Mon-Fri, 9am-5pm.

Photographs by Larry Fink and Jim Stone* — Creative Photography Gallery exhibit Tues, Mar 8-Fri, Apr 1, Bldg W31. Hours: Mon-Fri 9am-10pm; Sat 10am-6pm; Sun 12n-8pm. Free.

The Dyer's Art: Indigo Cloth from West Africa* — Hayden Corridor Gallery exhibit Sat, Mar 12-Fri, Apr 8. Public opening Fri, Mar 11, 8-10pm. Gallery talk by Marietta Joseph, Fri, Mar 18, 2pm. Free.

Michelle Stuart* — Works on paper and handmade paper objects. Hayden Gallery exhibit Sat, Mar 12-Fri, Apr 8, Mon-Fri, 10am-4pm. Public opening Fri, Mar 11, 8-10pm; Gallery talk by the artist, 7pm. Free.

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 Wiener, and 1876 Exhibit, Bldg 4 corridor. **The New Technology Exhibit** 2nd floor balcony of Lobby 7. **Energy Exhibit** Bldg E40, 1st floor. **Radiation Laboratory Exhibit** main corridor, Bldg 8.

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

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.

Music for Winter* — Compositions on the theme of winter. Music Library, Rm 14E.

Athletics

Home Schedule* — Saturday, March 12 & Sunday, March 13 — Pistol. College Sectional, 9am, duPont pistol range.

Maggie's Self-Designed Fitness Calcs — Classes 12n-1pm, du Pont fencing & wrestling rms; 5-6pm, du Pont T Club Lng. PE credit course, but all are welcome.

Women's Ice Hockey — Just forming, all women welcome. Practices Wed, 7am. Info: Elizebeth English, 354-2781 or Mimi Kellogg, 783-2588.

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 Mar 16 through Mar 27 to the Calendar Editor, Room 5-111, Ext. 3-3270, before noon Friday, Mar 11.

Library Plans Chamber Concert

Laurence Berman, piano; Amy Teare, violin, and Jean Rife, horn, will give a chamber music concert on Wednesday, March 9, at 5:15pm in the MIT Music Library (Room 14E-109). The public is invited free of charge.

The program will include Schumann's *Phantasiestücke*, Opus 73, Beethoven's Sonata, Opus 12, No. 1, and Brahms's Trio, Opus 40.

Dr. Berman, chairman of the music department at the University of Massachusetts-Boston, has studied piano with Erwin Bodky, Alexander Borovsky, and Miklos Schwalk; and harmony and composition with Nadia Boulanger in Paris. He received the PhD degree from Harvard and has taught at Earlham College, Hunter College, and Harvard University. He performs frequently in New England and will soon perform the Brahms D Minor Concerto with the Wellesley Orchestra.

Ms. Teare, a 1974 graduate of the New England Conservatory, has studied violin with Robert Brink and Joseph Silverstein. She is a member of the Springfield Symphony, the New Hampshire Sinfonietta, and the Emmanuel Chamber Orchestra. She performed the Mozart Quintet, K. 407, with the MIT Chamber Players in the spring of 1976.

Ms. Rife is a coach for the MIT Chamber Music Society and on the MIT Music Library staff. A graduate of Oberlin, she has studied horn with Robert Fries, Joseph Singer, and David Krehbiel. She is a member of Banchetto Musicale, the Emmanuel Chamber Orchestra, the New Hampshire Sinfonietta, and the MIT Chamber Players.

Choral Society to Perform Bruckner's F Minor Mass

The MIT Choral Society, under the direction of John Oliver, will sing Bruckner's Mass in F Minor at a 7:30pm concert on Sunday, March 13, in Sacred Heart Church (47 Sixth St.) in East Cambridge.

Soloists will be Cheryl Studer, soprano; Susan Watson, alto; Karl Dan Sorensen, tenor, and Gordon Holleman, bass.

The Mass in F Minor, the last of Bruckner's seven Masses, was completed in 1868 and received its first performance under the composer's direction in 1872. It is conceived on a large scale, with full orchestra, chorus and solo voices. Adhering strictly to liturgical principles, it follows the classical layout of the Mass in six main sections: Kyrie, Gloria, Credo,

Sanctus, Benedictus and Agnus Dei. Bruckner set the full text of this Mass to music, leaving no words to be intoned by the priest. This suggests that when he composed the Mass, he had concert performances in mind.

The 170-member MIT Choral Society, formed in 1947, annually gives three performances of major choral works, both classical and contemporary, in association with a professional orchestra and soloists.

John Oliver is director of the Tanglewood Festival Chorus and head of the vocal music program at the Berkshire Music Center.

Tickets for the concert, available at the door or by calling 253-2906, cost \$4 or \$2 for students with IDs.

Four Jazz Ensembles To Play in Kresge Concert

A jazz concert featuring four ensembles from three Boston area universities will be held at 8:30pm on Friday, March 11, in Kresge Auditorium at MIT.

The ensembles are the MIT Festival Jazz Ensemble directed by Herb Pomeroy, the MIT Concert Jazz Band directed by Everett Longstreth, the Harvard Jazz Ensemble directed by Tom Everett, and the University of Lowell Studio Orchestra directed by Nat Paella.

The 20-member Festival Jazz Ensemble will play *Dancin' in the Snow* by Toru Okoshi, *A Tritone a Day Keeps the Doctor Away* by Mike Hughes, *Paper Dragon* by Rob Mounsey, and other selections.

Okoshi, Hughes, and Mounsey are all Boston area composers. Mr. Pomeroy, the Ensemble's director, is chairman of the Jazz Composition Department at the Berklee School of Music. Soloists with the Ensemble include Paul Bangser, guitar; Keith Reid, trumpet; and Lampros Fatsis and Seth Rubin, saxophone.

The 22-member Concert Jazz Band will play swing blues under the direction of Everett Longstreth, an instructor in music arrangement at the Boston Conservatory of Music.

The concert is open to the public. Free tickets will be distributed at MIT in the lobby of Bldg. 10 from Monday, March 7, through Friday, March 11. Remaining tickets will be sold at the door for \$1.



ARTHUR KOMAR of the MIT Music Section will give a lecture recital on Schumann's *Liederkreis*, Opus 39, on March 17 and accompany at the piano tenor Rufus Hallmark who will sing the collection of songs.

Schumann Program Set

A lecture recital, "The Song Cycle as Entity: Schumann's *Liederkreis*, Opus 39," will be held in the MIT Music Library (Rm. 14E-109) at 5:15pm on Thursday, March 17.

Arthur Komar will give the lecture and will accompany at the piano tenor Rufus Hallmark who will sing the collection of songs. Dr. Komar and Dr. Hallmark are both members of the Music Section in the MIT Department of Humanities. The lecture recital is sponsored by the MIT Music Section and will be open to the public free of charge.

Although instrumentalists normally do not tamper with the several movements of a sonata, singers have traditionally excerpted individual songs from complete cycles, altering keys of various songs at will. Dr. Komar will demonstrate in his lecture the integrity of the 12 songs of Schumann's Opus 39 as components of a single large-scale work.

After receiving graduate degrees at Yale and Princeton Universities, Dr. Komar taught at Swarthmore and Bryn Mawr Colleges. He has lived in the Boston area for eight years, teaching at the New England Conservatory and Northeastern University. He is editor of Robert Schumann's *Dichterliebe* in the Norton Critical Scores Series.

Professor Hallmark came to MIT several years ago after teaching at Brown University. His doctoral dissertation is about Schumann's *Dichterliebe* cycle and he has performed Schumann lieder in Boston on several occasions. He sings in the Bach Cantata Series at Emmanuel Church and is a member of the Boston Camerata.

'Logs' for Hire

Celebrate St. Patrick's Day on Thursday, March 17, by engaging the MIT Logarithms to serenade your colleagues or friends.

The Logarithms, a men's a cappella singing group, must raise several hundred more dollars before leaving on a spring tour to Florida. They serenaded several groups of people on St. Valentine's Day with such success that they have decided to repeat the service on St. Patrick's Day. Anyone at MIT who would like someone serenaded on March 17 should call Dan Nolet at 492-6983 or Mike Harlan at 536-3931 by March 16.

Child Care Tax Changes Notice

The 1976 Tax Reform Act has changed the child care tax deduction to a child care tax credit and for the first time makes the tax credit available to student families, part-time employees and those with incomes in excess of \$18,000.

The major change in the new law is in the difference between a tax deduction and a tax credit, according to Margaret Sand, MIT child care coordinator. A tax deduction reduces the amount of income on which your tax is calculated. A tax credit is a dollar-for-dollar reduction in the amount of tax you owe.

A flyer describing the change is available in the Child Care Office, Rm 4-144.

Autograph Party

Philip M. Morse, professor emeritus of physics, will autograph copies of his autobiography, *In at the Beginnings: A Physicist's Life*, Thursday, March 17, from 12:30-1:30pm at the Tech Coop. The book, describing many breakthroughs in physics during Professor Morse's career, was recently published by the MIT Press.

'Total Energy Study' Is Underway

What energy sources are available to MIT? How is energy distributed and how effectively is it used on the Cambridge campus? What are the alternative ways of providing for MIT's future energy needs?

The first phase of a comprehensive effort to obtain answers to these and other critical questions related to how MIT can produce, use and store energy was launched during the January Independent Activities Period.

The one-year, preliminary study, costing \$50,000, is a cooperative effort involving the Energy Laboratory, several academic departments and the Department of Physical Plant. Commissioned and funded by the Physical Plant, it is part of a "total energy study" that will provide a long-range assessment of MIT's present and future energy needs.

"Possibilities exist for improving the present balance of the electrical and thermal requirements of our buildings, storing thermal energy for better use of our heating capacity, and increased self-generation of electric requirements," Thomas E. Shepherd, superintendent of utilities in the Department of Physical Plant, said.

"We expect this initial stage of the study to provide a model of MIT's present and future energy needs and to identify two or three of the most advantageous alternatives to our present system. These alternatives will then be investigated in more detail by Physical Plant staff," he continued.

"Our aim is to marshal the resources we have available to us at the Institute—both intellectual and technical—to establish the guidelines of a campus energy development program during what is forecast to be an era of energy restrictions and rapidly escalating costs," Mr. Shepherd said.

In their investigation of energy alternatives, the researchers will consider types and availability of fuel, improved efficiency of consumption, thermal energy storage and the environmental impact of various systems on the community.

The study consists of two independent but related research projects to be carried out by Dr. A. Douglas Carmichael, professor of power engineering in the Department of Ocean Engineering, and Dr. Michael W. Golay, associate professor in the Department of Nuclear Engineering.

Five graduate students are also in the effort. They are: Webster L. Benham of Albuquerque, N.M., ocean engineering; David P. Erickson of South Weymouth,

Mass., naval construction and engineering; Raymond L. Mathewson, Jr., of Trumbull, Conn., naval construction and engineering; James D. Palmer of Winchester, Mass., nuclear and mechanical engineering, and Gary S. Was of Livonia, Mich., nuclear engineering.

Drs. Carmichael and Golay share a pooled data base and are involved in a regular exchange of information. The two or three models of alternative energy systems developed in this process—the ultimate goal of the study—will be prepared in common by the two research teams.

Dr. Carmichael, assisted by Benham, Erickson and Mathewson, is concerned with the configuration of the physical plant system. He will be involved primarily in an investigation of the physical constraints of the present system while evaluating alternative means of providing the mix of energy—heat and electricity—that will best fulfill the Institute's needs.

"Our starting point," Dr. Carmichael said, "is to gather data on our current energy usage in order to model MIT as a system using energy. With this model in mind, we can evaluate the alternative technologies and select the one or two considered best."

"We will also investigate such aspects as the availability and costs of fuels—oil, gas, or possibly coal—and the environmental impact that each will be likely to have on the community," Dr. Carmichael said.

"Energy conservation will inevitably be part of our overall evaluation," he continued. "Our aim will be to maximize the energy provided by the chosen fuel and physical system, keeping in mind both cost effectiveness and energy efficiency."

Dr. Golay, working with Palmer and Was, will approach the problem in similar ways, but his emphasis will be in the areas of waste heat utilization and disposal, and thermal energy storage.

"The research done by the two teams is complementary," Dr. Golay said. "While the main concern of my research team will be an investigation of the most efficient use and storage of the energy produced by a power plant, an initial examination of the system is necessary to model energy requirements based on a careful selection of the proper mix of heat and electricity-using apparatus. "The consumption rate of any energy system is dependent upon the apparatus in use and the nature of the consuming sectors."

"Our common goal is to design the least expensive power system to serve existing requirements," Dr. Golay said. "Thermal energy storage, in the form of a pressur-

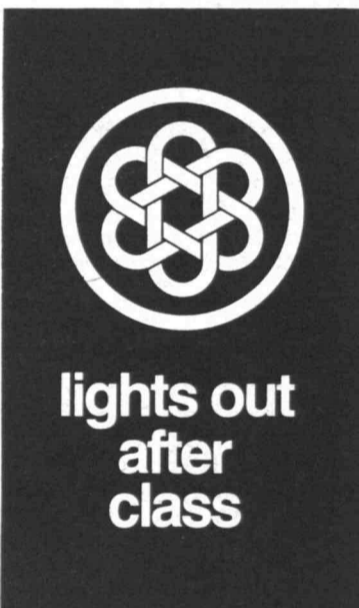
ized tank of hot water, will be one of our main concerns. An efficient tank of this kind would enable us to store heat from peak electrical generation times for later use, reducing, somewhat, the size of the apparatus and increasing its full efficiency."

"Our experience of other studies of this nature gives us confidence that a substantial savings can be achieved with a total energy system at MIT," Dr. Golay said.

According to Dr. Leon R. Glicksman, research coordinator for the Energy Laboratory and a lecturer in the Department of Mechanical Engineering, a number of total energy studies have been done in the past, but their cost effectiveness on a large scale is a recent development in the field of energy research.

"MIT has actually come full circle," he said. Although the term—total energy system—was not in use at the time, the Institute originally was powered by a system of this type—on a smaller scale. There came a time, however, when this type of system was no longer cost effective for a large institution and was abandoned."

"This total energy study offers the Energy Laboratory an opportunity to gain practical experience in an area in which a wide range of research opportunities exists on a broader scale," Dr. Glicksman continued. Research aimed at the design of a feasible system which is capital intensive and energy efficient has an integral place in the goals of the Energy Laboratory and will further our investigation of end use technology—optimum production and most efficient use of energy from available fuels," he said.



lights out
after
class



SMILE, NESSIE—Repaired and improved sonar-camera equipment, being checked at MIT by Professor Harold E. Edgerton and Charles W. Wycoff, who collaborated on its design and development, is now deployed in Loch Ness waiting for you know who. Professor Edgerton, Institute Professor, emeritus, and professor of electrical measurements, emeritus, in the Department of Electrical Engineering and Computer Science, and Mr. Wycoff, owner of Applied Photo Sciences, Inc., of Needham, are members of the Loch Ness investigation team headed by Robert H. Rines, dean and professor of law at the Franklin Pierce Law Center in Concord, N.H., and head of the Academy of Applied Science. The sonar will watch the area in front of the underwater camera. A computer attached to the sonar will turn on the camera if something large swims into the area.

—Photo by Calvin Campbell

BSO to Premiere Harbison Work

The Boston Symphony Orchestra will give the premiere performance of *Diotima* by MIT composer John Harbison at an 8:30pm concert on Thursday, March 10, in Symphony Hall.

Two subsequent performances, both to be broadcast on WGBH-FM, will be given on Friday, March 11, at 2pm and on Saturday, March 12, at 8:30pm. Mr. Harbison of Cambridge is associate professor of music in the MIT Department of Humanities.

Diotima, composed for large orchestra, is based loosely on a poem written about 1790 by Holderlin, an early romantic German poet.

"A long melodic line runs through the piece," Mr. Harbison said. "*Diotima* is closer to a tone poem than to

a symphony or a concerto. The piece will strike most hearers as being closer to the romantic orchestra than to the 20th century orchestra."

Mr. Harbison said he composed the piece so that the instruments will be played more in sections than as solos.

Diotima, completed in January, 1976, was composed on commission from the Koussevitsky Foundation in the Library of Congress. Sergei Koussevitsky, BSO conductor in the 1940s, was a leading champion of new music.

The BSO concerts, under the leadership of concertmaster and associate conductor Joseph Silverstein, will also include Hayden's Symphony No. 92 and Schumann's Symphony No. 1.

Winner's Book To Be Discussed

MIT professors Leo Marx and Langdon Winner will be joined by Amherst College professor George Kateb in a discussion of "Autonomous Technology—A Conversation" in today's (March 9) Technology Studies Seminar at 4pm in Rm 20D-205.

This week's seminar will be based on a book written by Professor Winner, *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought*, recently published by the MIT Press. The three professors will discuss the political problems posed by modern technology, as well as the idea of technolo-

gy having "a life of its own." They will also explore in what sense, if any, technology is out of control today.

Dr. Winner is assistant professor of technology studies and political science. Dr. Marx is William R. Kenan, Jr., Professor of American Cultural History in the School of Humanities and Social Sciences. Dr. Kateb, Kenan Professor of Political Science at Amherst, is the author of *Utopia and its Enemies*.

The seminar is open to the public without charge.

LNG Refrigeration Seen As Energy Source

A system that would use a seldom-tapped energy source—the refrigeration potential of liquid natural gas (LNG)—to desalinate sea water may prove to be economically feasible, according to engineers at MIT.

In the past, most proposed energy recovery systems have not been economically practical, and as a result, LNG refrigeration energy is now usually dissipated into the sea or atmosphere, said Professor Ernest G. Cravalho of the MIT Department of Mechanical Engineering.

Today, however, with the current world energy crisis, scientists are eager to find new energy sources, and the refrigeration potential of LNG appears to be a promising new source. The use of LNG refrigeration energy to desalinate sea water is especially attractive in communities where fresh water is in short supply.

Professor Cravalho, associate dean for educational programs in the School of Engineering, worked on the proposal for the energy-conserving system with Dr. William M. Toscano of CTi-Cryogenics, a

firm in Waltham, Mass., and John J. McGrath, a graduate student in MIT's Department of Mechanical Engineering. (In September Professor Cravalho was also named Matsushita Professor of Mechanical Engineering in Medicine.)

Dr. Toscano presented a paper describing the engineers' proposed system at the International Cryogenics Energy Conference held in France last May.

The desalination plant proposed by the three engineers would make use of the refrigeration energy available when LNG is converted back into the gaseous phase. Natural gas is liquefied after it is taken from the earth because a liquid is easier to store and transport than a gas, Dr. Cravalho said.

The low temperature (-253 degrees F) inside LNG holding tanks keeps natural gas in its liquid form. Yet, before LNG from these tanks can be used by industry and consumers, it must be converted back into a gas.

At most natural gas plants, a small amount of LNG is burned to heat and re-gasify LNG as it passes through a series of

coiled pipes located near the LNG holding tanks.

During this process, energy is consumed and the refrigeration potential available from LNG is not used. Instead,

the refrigeration energy is dissipated into the atmosphere or ocean.

In contrast, the system proposed by the three engineers would use thermal energy flowing from a stream of warm water towards a stream of colder LNG to drive a heat engine. Then, a processor run by the heat engine would separate the cooled sea water into two fractions—ice (fresh water) and a brine slurry. This heat engine would drive a second heat pump that would cool a second stream of water also flowing into the processor.

Dr. Cravalho estimates that if such a system were used, three-quarters of a gallon of fresh water could be produced for every pound of LNG that is regasified.

Besides desalinating sea water, engineers have proposed several other possible methods to recover LNG refrigeration energy. In some places these methods are already in use. For example, in both

France and Japan, LNG refrigeration energy is used to produce liquid oxygen and liquid nitrogen, which can be stored for later use. However, Dr. Cravalho points out that it is expensive to build storage facilities to house these extremely cold liquids.

In Japan, LNG refrigeration energy has also been used as a coolant in frozen food processing plants. A major problem with this system, however, is that unless a food processing plant is excessively large, only a small fraction of the available refrigeration energy can be recovered, according to Professor Cravalho.

Because the refrigeration energy available during regasification cannot be exactly matched to the energy demands of industry and consumers, a system is needed that can convert refrigeration energy into a product that is easily and cheaply stored. Fresh water is such a product, Dr. Cravalho explains, because it can be consumed from storage at any time without regard to regasification cycles. Also, he added, it is much cheaper to store water than to store a refrigerant, such as liquid nitrogen or liquid oxygen.

Housing Neglected, JCUS Study Finds

(Continued from page 1)

director of the Joint Center. "As the cost of rent and homeownership continues to accelerate, the plight of the urban poor, who are struggling now to keep up with inflation, will worsen," he said.

"A strong national housing policy—with a constructive partnership between the public and private sectors is clearly needed to alleviate America's present and future housing problems. It should focus on better, more affordable housing for the poor, with secondary emphasis on improving the home buying climate for the young and for people with average incomes."

The study, headed by MIT Professors Bernard J. Frieden and Arthur P. Solomon, identifies several developments and trends as the source of the nation's housing problems.

— Major changes in the underlying demographic factors that shape housing demand. These include life-style decisions affecting migration patterns and the number and size of households.

— The rising costs of housing. Since 1970, sales prices of new and existing housing and the costs of homeownership (fuel, repairs and other operating costs) have all outpaced the growth in income.

— The recent recession in the housing construction industry, the worst since the 1930s. Housing starts dropped precipitously from a peak rate of 2.4 million annually in the first quarter of 1972 to a low of 990,000 units per year in the second quarter of 1975 when the current recovery began. Unemployment in the construction labor force went from 7½ percent to 21½ percent, which was the highest unemployment rate in any sector of the economy.

— Abrupt changes in the national economy and in public policy. These included the worst general economic recession since World War II, the suspension of all major federal low-income housing subsidy programs, sudden and substantial increases in housing costs, and periodic withdrawals of funds from mortgage credit institutions.

COST SQUEEZE ON HOMEOWNERS

Dr. Frieden said that the cost of single-family houses is of special concern in the US because the deeply held commitment to homeownership for the average family has been a cornerstone of national housing policy since the 1930s. He added that strong consumer demand, rising incomes, and federal policy have made the US "a nation of homeowners," with two-thirds of all families owning the houses they lived in by 1970.

Since 1970, however, he said, the average-income family has lost ground as the costs of homeownership—the sales price of a house, mortgage and interest payments, taxes, insurance, maintenance and repair, and heat and utilities—have

outstripped increases in income.

With a record increase in young families now occurring, as a result of the baby boom in the 1940s and 1950s, the number of potential first-time home buyers caught in a severe financial squeeze is very large, Dr. Frieden added. Many of these families are being pushed out of the market for new housing, and are choosing to rent or to renovate existing homes.

Both new and existing housing are affected by the cost increases, according to the study, although new housing prices have accelerated more rapidly.



Dr. Frieden Dr. Solomon

Sale prices of new housing almost doubled between 1970 and 1976, with the median increasing from \$23,400 to \$44,200. The median price of existing housing increased to \$38,100 by 1976, when less than 10 percent of existing house sales were for prices under \$20,000.

The researchers said that the only families who could still find an ample supply of housing for sale at prices they could afford had incomes of \$20,000 or more—the top quarter of the nation.

In 1976, 58 percent of those buying new homes had incomes above \$20,000; the median home-buying family had an income of \$21,615. Ten years earlier, in contrast, families of moderate income dominated the market.

"If trends from 1971 to 1976 were to continue for another five years," they went on, "the United States would enter the 1980s with typical new homes selling for \$78,000 and only the most affluent groups would be able to afford them."

Dr. Frieden noted that, despite the cost squeeze, the market for new homes is still substantial, with single-family housing starts in 1976 near record levels. "The shrinking purchasing power of the home buyer is not yet a crisis," according to Dr. Frieden, "but it is a warning signal, especially in view of the strong drive of blue-collar and middle-income families who are now renters to become owners."

DRAMATIC SHIFTS IN CONSTRUCTION

According to the Joint Center study, the problem of rising housing costs has been seriously aggravated by insufficient housing construction in recent years, in which production dipped to its lowest levels since World War II... about 20 percent below what has been needed.

The report estimated that for the future 20.2 to 22.6 million new hous-

ing units would be needed between 1975 and 1985. It said 11.9 to 13.6 million of these would be required because of expected growth in the number of households; most of the rest would be to replace physically obsolete units and to allow families to upgrade existing housing.

Professors Frieden and Solomon predicted that housing demand would remain strong through the 1970s, primarily because of the impact of post-war babies in the housing markets, but would level off in the early 1980s.

Helping to keep the demand high through this decade, their analysis showed, is a long-term trend in the United States toward ever higher rates of household formation; that is, Americans have tended to split up into smaller and more numerous housing units.

There were several reasons for this: a larger number of widows and widowers have been living alone rather than with relatives or friends; young people have been leaving home earlier; people have been marrying later and, therefore, living alone longer; and the proportion of divorced people in the population has been rising.

Most of these forces, however, will either abate or actually reverse direction during the next decade, the study suggested, accounting for the anticipated leveling off of housing demand after 1980.

The report gives these examples of expected changes: there will be fewer large families because of lower birthrates since the 1960s; as a result of fluctuations in past birth rates, the elderly of the next 25 years will have substantially more relatives to live with than did those who were elderly during the past 25 years; the price of splitting off and establishing separate living quarters appears to be rising; and the available supply of smaller rental units is falling relative to the need indicated by population growth.

The housing picture also will be affected by changing migration patterns, Professor Solomon said, raising the question of where new construction should take place.

One major trend, he said, will be the continued rapid population growth of the "Sunbelt" areas in the South and West. In fact, population growth in the South should be greater than in all other regions combined.

An emerging but important trend, he found, is the movement of increasing numbers of people to small communities, particularly those beyond the periphery of metropolitan areas, such as in New Hampshire and upstate Michigan.

"Except in the South, growth in non-metropolitan areas will be larger than in metropolitan areas," Professor Solomon commented. "Suburban sprawl" was the word for the '60s; the movement to the Sunbelt for the '70s; now "back to the country" is the world for the

'80s."

HIGH COSTS REPLACING SLUM CONDITIONS

On the subject of housing deprivation as it affects the poor, Professor Frieden said that while the number and proportion of families living in physically inadequate units has declined sharply since 1960, the number of those paying an unreasonably high percentage of their incomes for rent has increased rapidly. This meant that the number of families affected by housing deprivation remained large—an estimated 16.8 million households or 24 percent of the total population.

Professor Frieden said that physically inadequate housing—that which lacks adequate plumbing or heating, or is in an extreme state of physical disrepair—is a problem primarily in rural areas and small communities.

"Families living in such housing are concentrated disproportionately outside metropolitan areas," he said. "Families with high rent burdens and inadequate living environments, on the other hand, are

located overwhelmingly within the country's metropolitan areas."

"The decline of slum housing as a problem, and its replacement by the cost squeeze as the dominant form of housing deprivation," he said, "suggests that the nation's housing policies for the disadvantaged need to be accompanied by programs to provide additional income for the poor."

The report added that inadequate neighborhood environment is also a major problem in the area of housing deprivation. "Many families that are housed adequately, not overcrowded, and not burdened by excessive rent payments, nevertheless live in neighborhood settings that fall below minimum standards of acceptability in our society, because of inadequate public services or conditions on their streets such as noise, traffic, odors, litter, street crime and poor lighting." According to Professors Frieden and Solomon, "substandard neighborhood conditions affect both the poor and middle-income groups to about the same extent."

Major Effort Needed to Curb Post-Harvest Food Losses

A major international effort should be mounted to find ways of curbing serious post-harvest losses of food crops in tropical third world countries, a team of researchers from MIT and the United Nations has reported.

"It is increasingly recognized," they said, "that one of the most effective means of improving food supplies is to prevent, through the application of post-harvest technology, the quantitative and qualitative food losses that occur during handling, storage, milling, and other processing, as well as during distribution and ultimate use."

Estimates of these losses in the tropical countries—because of waste, fungi, insects, rodents and other predators—vary widely, the researchers said. In most cases, they added, the losses are put at between 20 and 40 percent, but apparently are much worse in some extreme cases.

"In 1953-54 in the Philippines, for example," they said, "rats were estimated to have consumed 90 percent of the rice, 50 percent of the maize and 50 percent of the cane sugar. In India, one graphic summary suggested that it would take a train 3,000 miles long to haul the grain eaten by rats in a single year."

The researchers, in a paper presented at the annual meeting of the American Association for the Advancement of Science in Denver, Colo., said that studies should be made to establish the true nature and scope of such losses and to find ways of preventing them.

The paper, prepared for a symposium on World Food Pest Losses and the Environment, was written by Dr. Max Milner and Dr. Nevin S. Scrimshaw of MIT, and by H.A.B. Parpia of the UN's Food and Agricultural Organization in Rome, Italy.

Dr. Milner, senior lecturer at MIT and formerly scientific secretary and director of the secretariat for the Protein-Calorie Advisory Group of the United Nations System, is associate director of the Institute's International Planning (INP) Program. Dr. Scrimshaw, Institute Professor and head of MIT's Department of Nutrition and Food Science, is director of INP.

The researchers said that "very little international effort is applied to the question of what happens to food after it has been produced. Most research and applied science relating primarily to agricultural production stops at the farm gate."

The researchers said that efforts to bring about greater post-harvest food conservation should include more efficient storage and processing of food at home and village levels.

"Many traditional technologies exist in developing countries for the conservation and processing of

food, but social and economic conditions are reducing their effectiveness," they said. "It is desirable to survey, identify and understand these technologies with a view of transforming them into modern, science-based ones."

The main thrust, however, they said must come from "post-harvest food and agricultural technology."

They described this as "an interdisciplinary science whose functions begin after crops are harvested, animals slaughtered or fish caught. It covers handling, storage, processing, packaging and transport, as well as the distribution, marketing and ultimate use of food. Its main objective is to contribute towards solving world food problems through interdisciplinary application of science and technology and management practices in order to conserve food and improve, to the extent possible, its nutritional quality to meet human needs."

The researchers said a start already has been made "in this important area so vital to increasing world food supply," and that momentum appears to be growing.

Among the internationally oriented agencies and groups now involved in studies to prevent post-harvest losses, they said, are the United Nations University, the Tropical Products Institute of the United Kingdom, the International Development Research Center in Canada, Kansas State University and the US State Department's Agency for International Development.

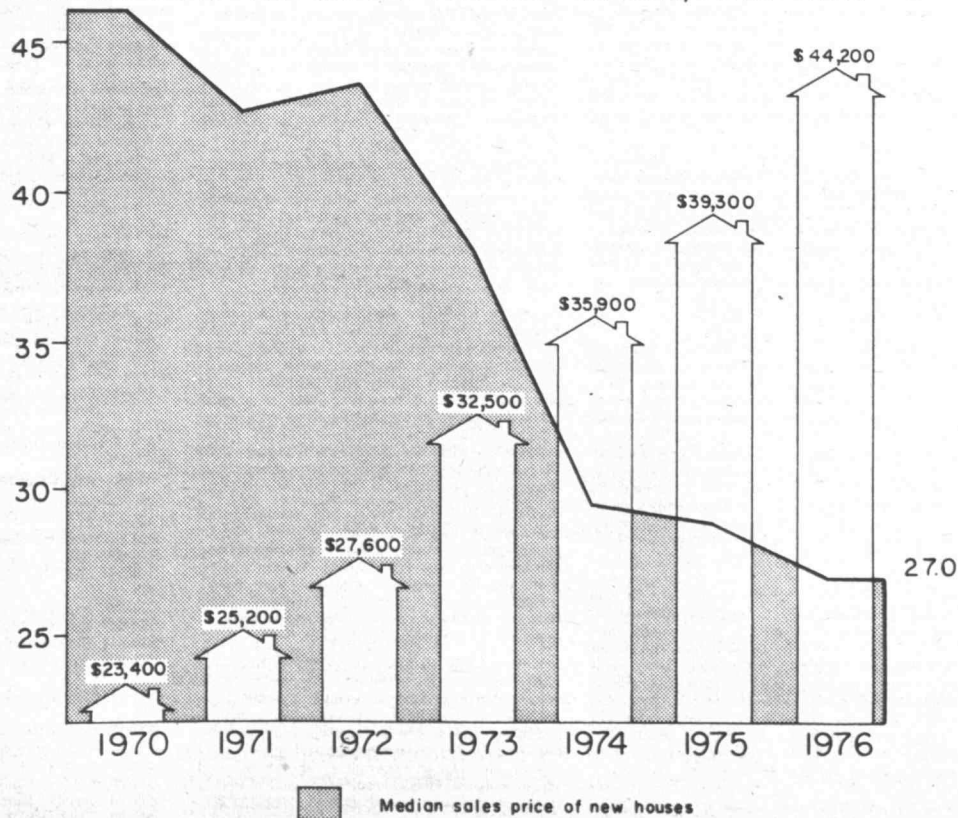
Pye to Chair East-West Panel

Dr. Lucian W. Pye, Ford International Professor of Political Science at MIT and senior staff member of the Center for International Studies, has been appointed chairman of a committee of the East-West Center in Honolulu, Hawaii, that will direct the work of an international advisory panel.

Professor Pye is a member of the Board of Governors of the East-West Center. The national educational institution was established by Congress in 1960 to promote better relations between the US and the nations of Asia and the Pacific through cooperative study, training and research.

The committee headed by Professor Pye will nominate seven members of an international advisory panel to help evaluate East-West Center programs and advise on long-range planning.

NARROWING OF THE MARKET FOR NEW HOUSES, 1970-1976



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. Please submit all ads before noon, Friday, Mar 11. They will be printed on a first come first serve basis as space permits.

For Sale, Etc.

Bw wint Child-line crib & Simmons matt, nvr used, orig \$90, ask \$60. x3-6334.

Thistle class sloot #2311, race rigged & consistently gd perf, all latest equip & trlr, \$1,800. R. Taylor, x3-5142.

Dining tbl, 36x35", \$25; 2 brn & wht chhn chrs, \$25/ea; upright piano, \$350. Call 923-0979, evgs.

Realistic Navaho CB set, compl w/mike, coaxial cable & antenna, slightly used, pd \$260, ask \$150. Ralph, x3-2527.

Old upright piano, gd cond, \$120. Call 876-8591, late afta or evgs.

BSR 310 trmbt w/Shure cmtg, gd cond, \$20. Carl, x3-4363.

Pr nw radials, GR 78x15, mtd Chrysler whls, \$100. Dick, x5548 Linc.

Cstm made qn sz oak platform bed, no matt, 1 1/2 yrs, \$115. Gail, 266-7333, evgs.

Slvr Cross Eng pram (baby carriage), all access, exc cond. Marcie, 436-0232.

Pioneer 424 rcvr, 12 W/ch, 2 yrs, exc cond, \$105; pr Acousti-phase Microphase spkrs, 6 1/2" bass reflex woofer, 1" mylar dome tweeter, 48Hz-20kHz response, v effc, 1 1/2 yrs, exc cond, \$65/pr. Andrew, x5-9440 Dorm.

Telephoto Vemar Auto 200 mm lens, f3.5, exc cond, Miranda Bayonet mnt, \$70; auto washer, nds motor repair, free. Cooney, x3-3108.

Toastmaster deluxe broiler oven, 5 yrs old but used only 4 mos, exc cond, \$25; Rayette salon hrdrtyr, 3 temps, old but works well, \$5; Army-style dbl breasted m raincoat, sheds water, hrdly worn, sz med, \$5. Sue, x3-3270.

(72) pin wire wrap edge connectors, 44 on 1 brd, \$40; fixed spd phi-deck, \$100. x5-9411 Dorm.

Reduced price ski tkcts for Tyrol & Mt. Cranmore. John, x8-2001 Draper.

'74 VW shop manual; 2 VW Clymer books (perf & effc tuning); (2) 4 lug VW whls w/exc tires. Dick D, x282 Linc.

Ham equip: mdl 15 page printer, exc cond, \$50. Harry, 899-8858.

Farfisa elec organ-combo-compact & Ampeg B-15 bass amp. Rich, 787-5288, evgs.

Realistic TM 101 amfm stereo tuner, nw, was \$60, \$35; Toastmaster buffet ranges, sgl element \$15, dbl element \$20. Don, x8-1425 Draper.

(2) m 3 spd Rudge bikes, gd cond, nw br, 1 has hd & tail lights, gen & pump, \$105/pr or w/ sell indiv. Mitch, x3-5128.

O'Day 22 sloop, 4 sails, instruments, hd, etc, ask \$6,000. Mike, x3-2411, afta.

HP 65, \$250. x3-7283, aft 4:30pm.

Nikkor 28-45mm zoom lens, f4.5, nvr used, full grnty, orig \$500, \$370. Call 547-7350.

Long low tbl, \$25; cin lg rug, \$60; sm sq tbl, \$10; sq acrylic wht tbl, \$45. Rita, x5-7676 Dorm, evgs.

Crib w/matt, exc cond, \$50. Ron, x8-4569 Draper.

Ski equip: leath bckl boots, 7 N, \$15; 180 cm skis w/bndgs, \$10; 54" poles, \$5. Ada, x159 Linc.

Nordica sz ski boots, nw \$195, gd cond, \$65. Don, x5-8439 Dorm.

Used 8 trk tapes, exc cond, list avail on request or given on phone (20-25 tapes), \$2.50/ea. Gene, x3-5316.

Car seats, perf cond, fulfill all govt regulations: GM infant carrier, 0-12 mos, \$15; Ford Tot Guard 1-4 yrs, \$15; \$25/both. Ted, x3-5263.

(9) pc stereo, \$150; Frigidaire refrig, \$150; HP 25, \$70; slvr trumpet, \$150; nw K2 skis w/poles & bndgs, \$80; Panasonic 12" TV, \$30; 20 gal aquarium w/access, \$10. Walter, x5-8273 Dorm.

LR 3 pc set: 6 chhn sofa, mtch chr, ottoman, \$50. Joe, x3-3834.

Sgl matt, \$10; dresser, \$25. Call 661-4959, evgs.

Alum 24" bike frame, Campy hdst, 531 fork, Dura-Ace crankset, pkg dcd \$250; Hexel Sundance 195 cm skis, unused, unmtd, \$180; Look bndgs, used 2 wks, \$55; Rossignol Strato 102's, 195 cm, Look bndgs, \$60. Jay, 494-0293, aft 6pm.

Salton bun warmer; lg, rnd porcelain Leo zodiac ashtray; Sony trmbt; Farberware 12 c elec coffee pot; Assnt flower pots; Lady Schick elec razor; lg wd crates; alum trunks; mtl birdcage. Dieter, 547-4040.

Renault 10 parts: nw clutch, \$50; starter, \$15; alt \$10; 4 Michelin X radials, \$10/ea; misc body & eng parts; Bauer Supreme hcky skates, mdl 92, sz 9 1/2 M, \$40. Bob, x7306 Linc.

Slvr plate coffee srvc w/tray, \$40; casserole holder, \$5. Call 354-5910.

Magnavox hi-fi console, \$10. Ray, x3-7235.

Tires, 4, fit 1.75x14 or 6.95x14, gd cond, 4 ply nylon, \$50. Paul, x3-6061.

Pr D78x14 tires, mtd, \$50 or best. Wayne, x3-6107.

Util trlr, 8x6x6', encl, ramp tailgate, can haul 2,000 tare, gd cond, \$200. Wade, x347 Linc.

Pr used H78x15 Gdry cstm power polyglass ww tires, \$25. Jack, x8-3235 Draper.

IBM Selec typwrtr, red, + ribbons, \$200. x3-4046.

'66 Chevy Caprice, p st & br, auto, eng v gd cond, body fan, recent tune-up, always starts, reliable, \$300 or best. Erland, x5-6413 Dorm.

'68 Chevy Camaro, yel w/blk int, 6 cyl auto, bckt seats, gd run cond, \$800. Arthur, 891-7499, aft 5pm.

'69 Ply Fury wgn, recently renewed, runs well, \$400 or best. Call 536-0819, evgs.

'69 VW Fstbk, mech exc, body dents, \$300 or best. x8-3379 Draper.

'69 Impala wgn, p st & br, nw snows, gd cond, \$450. x5-9581 Dorm.

'69 VW Bug, gd ride, nds some fixing, compl w/snows, \$500 or best. x3-2489.

'70 Olds Delta 88, auto, 4 nw tires, gd cond, \$650 or best. Call 482-8971.

'71 VW Beetle, cream yel, 15 K on 2nd eng, gd tires, exc cond, ask \$1,050. Mr. Fu, x3-2284.

'71 Volvo 142, blu, std, 51 K, \$1,800 or best. Donatus, 494-8284.

'71 Cadillac Cpe de Ville, lo miles, exc cond inside & out, amfm w/tape, vinyl top, ask \$2,550. x3-2772, next wk.

'71 Vega, auto, 48K, amfm, nw exh, shocks & radiator, little body rust, must sell, best. Sahrat, x3-7027.

'72 Vega, reliable, gd cond, inexpensive, 44 K, std, xtra snows, \$850. x3-2386.

'72 Toyota Corolla, works well, nds body work, \$450 or best. Call 547-5055.

'74 VW Camper, compl outfitted, wht, v well cared for, v cln, 4 spd, recently installed ht exchangers, muff, 4 radials, AC avail, \$2,500 firm. Lee, 494-0360, evgs.

'72 Toyota Mark II, 90 K, body terrible, runs, nds muff, tires, chn, \$400. Call 433-5325, evgs.

'72 Dodge Colts (2): economy, maintained, exc cond, 68 K, \$1,100; economy, mech gd cond, front fndr nds repairs, \$800. Bill, x5367 Linc.

'73 Audi LS 100, auto, AC, stereo tape deck, vinyl roof, exc cond, 49 K, \$3,000. Peggy, x8-1592 Draper.

'73 VW Bus, exc cond, best. Betty, x3-7008.

'74 Dodge Dart Sport, 360 auto, Cragars, fog lites, Holley Offenhauser Fairbanks, front spoiler, 28 K, \$2,600 or trade for 4 spd Pinto, late mdl, & cash, no wgn. Ed, x8-1811 Draper.

'74 Peugeot, 4 spd 504 sed, 4 nw Michelin radials, rustproof, amfm stereo cassette, brgr alarm, 51 K, exc body & run cond, \$3,900 firm. x3-4204.

'74 VW pop top camper. Tony, x3-4351.

'71 Honda CB100 mtrcyl, comple reblt, \$200. Lee, 262-5090.

Housing

Bri, 5 rm mod apt in 2 fam hse, exc cond, nr bus & Mass Pike, avail now, \$285 + ht. Call 254-6297.

Brockton, State Hwy, 6 rm apt, on bus, \$150. George, x8-3531 Draper.

Camb, 3 rm apt, sub on short notice in MIT bldg nr Orson Welles, conv loc, nice bldg, \$202 htd. Call 492-1661.

Camb, BR furn apt, avail 4/1, \$180 incl util. Mahvache, 547-5394.

Camb, 3 rm apt avail 4/1, conv to MIT, \$105 + util. x3-2421.

Charlestown, recently renovated 5 rm apt, nr T, \$150 + util. Jean, x3-2361.

Medford, avail 4/1, 5 rm apt, ww, nr Medford Sq, bus, gd loc, \$250 + util. Call 395-9078.

Sugarbush, Vt condo avail Sun-Fri for grps up to 15 prns, frpl & all mod conv, on mtn, ski to & from lifts, \$10/prsn/day min charge \$500. Linda, x3-7023.

Animals

Doberman Pinscher pups, m & f, \$110. Donna, x3-3471.

Lost and Found

Lost: last Dec in Bldg 9, Eng library book: Galin's Contact Prob in Theory of Elasticity, '61. Paul, x3-3559.

Lost: bge T-shirt w/"Cinnamon Bay Camp" on it, in brn paper bag in Medical Dept, Feb 28, sentimental value. Lynn, x3-1541.

Found: textbook in Rm 26-100 after Fri nite movie (2.25), pls claim Rm 2-108. x3-4977.

Wanted

Used dbl or qn sz matt, cheap. Dale, x3-1559.

Rental for Aug, lg hse on s shore of cape. Jerry, x8-1271 Draper.

Going south for spr break? Nd ride to Durham, NC (also rtn), w/share driving & exp. Chip Farley, x3-6050.

Balance scale, gd cond. Helen, x3-4897.

Garage to rent in Milton, nr Mattapan Sq, price nego. Linda, x5769 Linc.

Sm, light-duty snow-blower, elec or gas. Don, x7298 Linc.

Someone capable of examining stereo (Panasonic) rcvr & diagnose & repair, w/ pay for estimate & repair. Call 262-6153, 7-9am.

Prof fam w/2 grown chldrn & well-mannered irish setter wd like 3 BR sgl home to rent w/opt, res area in/nr Camb. Judy, x3-2686, aft 1.

M bike, pref 3 spd. Mark, x3-6030.

Sabbatical? Lve? Fam seeks 4-5 BR hse in Camb for yr beg 9/77. x3-7896.

Writing desk & chr, other furn for apt. Shafi, 776-4787, evgs or lve msg.

Visit prof nds furn BR apt, 3/13-4/19, nr MIT. E. Kampits, x3-6216.

Rims, 13", for '74 Mustang II. x3-6116.

Panasonic amfm digital clock radio, mdl RC-6001, wht. Nancy, x3-7649.

(3) 48" fluorescent fixtures. Denise, x3-2685.

Roommates

Beac Hill, 2 f seek f to share spac 5 rm apt to 8/31, avail immed, \$165 incl ht, ht wtr. Beverly, x3-6580.

F, 3rd wanted to share 3 BR furn twnhse in Waltham, 20 min MIT, outdr pool, tennis cts, \$148. Call 891-6561, aft 7pm.

(2) prof f w/dog seek prof m or grad stu, late 20's, to help find & share suburban home, must be neat & responsible. Sandy, x3-2022.

Rmrate for lg 2 BR apt nr H Sq, LR, DR, balc. Bon Foster, x3-1356.

Rmrate to share Waltham hse w/2 grad stus, avail immed til 6/1, \$100 + util. Dave, 894-3381, evgs. F, 25+, share spac Belmont duplex, nr T, pkg avail, non-smoker pref. Call 484-8289.

Rmrate for lg Som apt, w/ get 2 priv rms, nice apt & nrhd, fr & bck porches, yard, nr T, grad stu pref, \$100 + 1/2 util. Alan, x3-7219.

Carpools

Nd ride Beverly, Ma-MIT, work 9-5. Susan, x3-4701.

Miscellaneous

Hrdwd floors sanded & refinished prof, 45¢/sq ft. Chris, x3-2743.

Typing, theses, reports, manu, fast & accurate. Sue, x3-1381.

Editing. Joan, x3-2672.

Babysitter avail, full or pt time. Eastgate, 494-8209.

Tech typing, theses, manu, articles, gd rates. x3-1566.

Argentine f fluent in Spanish & Fr avail for tching, translating &/or interpreting from/to Eng in any of these languages. Call 266-5484, evgs or bef 11am.

Typing theses, papers, reports, etc. Anne-Marie, 494-9218.

Carpenter-painter nds wknd work while attending MIT, repair & odd jobs my specialty, prof work, refs. Charles Swenson, x5-9412 dorm, evgs.

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, in the Center for Transportation Studies to develop software for freight transportation analysis and planning; develop and maintain data bases for model estimation and forecasting. A thorough knowledge of Fortran IV and IBM 370 OS JCL required. Experience with PL/I and familiarity with statistics and econometric modeling methods helpful. R77-42 (3/9).

Admin. Staff, Assistant to the Director, of the Admissions Office will do analytical studies of the admissions market and selection process. Will also assist in regular functions of the admissions process; interview prospective students; prepare related correspondence; travel to recruit students. A minimum of a bachelor's degree with a background in mathematics and statistics is required. The ability to write under time pressure, experience with computers, management and social science course work is desirable. A77-11 (3/9).

Academic Staff, Assistant Science Librarian, part-time, temporary to provide information and library services to Department of Transportation: compile bibliographies and answer reference questions in areas such as traffic management, economic and technical aspects of various modes of transportation; train and supervise support staff. MLS from an accredited library school is required. Reference experience preferred. Familiarity with transportation-related subjects (such as those indicated above) is helpful. 17 1/2 hr./wk. C77-3 (3/9).

Academic Staff, Technical Asst., in Chemistry. Primary responsibility will be operation, alignment and adjustment of a high resolution mass spectrometer. Will also have responsibility for final preparation of samples for analysis, developing photographic plates, vacuum system documentation of work, and assist in development of new methodology. A B.S. in Physics or Chemistry required. Familiarity with electronics and vacuum systems is desirable. C77-2 (3/9).

Sponsored Research Staff, Sr. Electrical Engineer, in the Plasma Fusion Center to write specifications for all power supplies for the Alcator Thermonuclear experiment. (Main magnet supply will be a 200 MW alternator driving a solid state rectifier.) Will also supervise design, installation and operation of all power supplies and control equipment. A Bachelor's degree in electrical engineering, or equivalent, plus extensive experience in heavy electrical machinery, and the ability to assume responsibility for procurement and operation of power supplies and control equipment required. R77-43 (3/9).

Sponsored Research Staff, temporary, in the Energy Lab to assist in development of mathematical system models for fluidized bed combustors: gather component models developed by others and integrate into model; collect data from literature to test models. A master's degree in Chemical Engineering with strong fluid dynamics, heat and mass transfer and thermodynamics background required. Applicants should be familiar with fluidized beds and experienced in mathematical model development, computer simulation, data analysis, model testing, evaluation and preparation of technical reports. Temporary through 1/31/78. R77-39 (3/2).

Sponsored Research Staff, temporary, in the Center for Theoretical Physics to do postdoctoral

research in nuclear or particle theory through the Laboratory for Nuclear Science. A Ph.D. in nuclear or particle theoretical physics required. Temporary for 1 year, but may be extended. R77-33, R77-34, R77-35, R77-36 (3/2).

Sponsored Research Staff, in the Laboratory for Nuclear Science Bates Linear Accelerator, Middleton, Mass. to do postdoctoral research primarily on the development and application to research of experimental equipment; development and upgrading of the beam switchyard and the accelerator. Ph.D. in Experimental Nuclear, Intermediate or High Energy Physics required. D76-232, D76-233 (12/15), R77-37 (3/2).

Metal Shop Supervisor, Exempt, in Physical Plant to supervise metal workers, shadeworkers and glaziers; assign work and instruct employees in procedures; schedule work to meet quality, budgetary and time requirements. At least 5 years experience in metal work including welding sheet metal forming and ornamental iron required. Familiarity with plan reading, work layout and work scheduling, as well as a minimum of 3 years supervisory experience also necessary. E77-10 (3/9).

Admin. Asst., Exempt, in the Center for Advanced Engineering Study, Marketing and Sales section will assist in developing marketing strategies; supervise customer service order processing, billing activities; assist in determining pricing and other policies; prepare sales literature and perform other duties to support marketing and sales functions. A bachelor's degree in business administration or marketing, or the equivalent combination of education and related experience required. E77-9 (3/2).

Admin. Asst. V in Civil Engineering to perform several duties to support active research group. Budget management duties include review of expenditures against budgets; projection of future expenses; authorization of expenditures. Will also coordinate preparation and production of academic and research reports and documents; work with research staff to assure that reports are prepared to meet sponsoring agency and/or printer deadlines; supervise temporary typists and draftspersons; manage related budgets. Will also independently compose correspondence; arrange extensive travel; handle all administrative aspects of workshops and conferences. Excellent financial management skills, the ability to coordinate several activities simultaneously, and editorial skills are required. B77-75 (3/2).

Secretary IV-V to the Director and staff members of the Office of Facilities Management Systems to type proposals, correspondence, reports; maintain accounts and prepare payrolls; assist in organizing conferences and training sessions. Secretarial or business school training plus 3-5 years secretarial experience, excellent typing, shorthand or speedwriting, and machine dictation skills required. Ability to work independently and under occasional pressure also necessary. B77-79 (3/2).

Secretary IV to faculty member in the Laboratory for Computer Science: type correspondence, memos from machine dictation; arrange meetings and travel; answer phones. Position includes student and faculty contact. Will be trained to computer edit. Typing and machine transcription skills required. B77-97 (3/9).

Secretary IV, part-time, in the Clinical Research Center will take and transcribe meeting minutes; arrange monthly coverage schedules for physicians; schedule weekly seminars; maintain Center library; type manuscripts and other material. Excellent typing skill required. Shorthand/speedwriting and familiarity with medical terminology preferred. 20 hrs./wk. B77-94 (3/9).

Secretary IV to an Industrial Liaison Officer will perform secretarial duties to support services offered to Program member companies which are based in Europe. Type extensive correspondence; handle telex and telephone communication; schedule appointments for visiting Program members as well as for supervisor; coordinate arrangements for short courses; maintain statistics. An experienced secretary with excellent shorthand, typing and machine transcription skills required. Applicants must be able to work independently and to handle a demanding work load. B77-86 (3/2).

Secretary IV, part-time, to two Civil Engineering faculty members working in water resources. Will prepare course material; type correspondence, manuscripts, theses which include technical material; maintain accounts. Good typing skill, ability to maintain and monitor financial records and to work effectively with faculty and students required. 20-25 hr./wk. B77-73 (3/2).

Secretary IV in Resource Development Office of Proposals and Publications to a group of 4 writers: will type varied material; set up and maintain filing and reference systems as well as a log of project status. Excellent organization and typing skills, secretarial experience required. Applicants must be able to work independently and be willing to learn operation of IBM Mag Card II machine. Non-smoking office. B77-84 (3/2).

Secretary IV in the Information Center to handle secretarial duties for Director of Center and Assistant for International Visitors. Answer inquires (through phone, direct contact and mailing of printed materials) concerning MIT programs, activities and facilities. Handle related clerical and secretarial duties. Excellent typing, ability to handle detailed work, desire and skill to assist a wide variety of people required. Applicants should also have secretarial school training or equivalent experience. Familiarity with MIT desirable. B77-14 (1/19).

Secretary III-IV to 3 faculty members and research staff in Ocean Engineering: type correspondence course materials and manuscripts which include technical data; arrange appointments and travel; monitor research expenditures; assist in organizing weekly seminars; maintain supplies for seminars. Technical typing skill, ability to establish priorities required. B77-90 (3/2).

Secretary III-IV in the Undergraduate/Graduate Office of Aeronautics and Astronautics. Will type correspondence; maintain files; answer phones; handle duties related to registration and class scheduling. Excellent typing, command of English language, previous office experience required. Candidates should also be able to organize detailed work. Non-smoking office. B77-74 (3/2).

Secretary III-IV in the Center for Advanced Engineering Study, Marketing and Sales section will provide secretarial support for section director and administrative assistant; assist customers through direct contact; take orders; resolve problems; assist in compiling data to support marketing activities and in preparing promotional material. Applicants must have at least 1 year secretarial experience and excellent typing skills. The ability to write and prepare promotional material for production is desirable. B77-82 (3/2).

Secretary III-IV to faculty and research staff members in Chemical Engineering will handle general secretarial duties to support research and teaching activities: type reports, correspondence; maintain files; arrange meetings and travel; transcribe machine dictation. Excellent typing skill, the ability to set priorities and to work independently required. B77-87 (3/2).

Secretary III-IV, in Mechanical Engineering. Will independently answer routine inquires; monitor accounts; arrange conferences and social meetings; prepare course materials, correspondence, reports including some technical material; maintain student and faculty groups. Secretarial school training or equivalent experience, shorthand and machine dictation skill required, as well as ability to type technical material. B77-15 (1/19), (1/26).

Secretary-Receptionist III in Graphic Arts to handle all aspects of telephone system (ie. receive calls, take messages, etc.); handle general

secretarial duties for several staff members; handle clerical duties for accounting section. A high school graduate, or equivalent, with good typing skill and ability to operate adding machine required. 37 1/2 hr./wk. B77-72 (3/2).

Secretary III to handle secretarial duties for the Energy Policy Study Group; type technical reports, correspondence; maintain office supplies, files; arrange travel and handle routine accounting duties. Two years secretarial experience and English grammar skills required. B77-80 (3/2).

Secretary III, part-time, in the Center for Transportation Studies to handle general secretarial duties including typing of technical materials; prepare course materials; assist other Center secretaries and administrative assistant, as necessary. Will be trained in several aspects of Center's operation in order to provide vacation, sick leave coverage. Good typing skill, ability to work under occasional pressure required. B77-81 (3/2).

Section Head V in the Libraries Collections Development Department to handle the Monograph Receipts Section: Coordinate processing of incoming library materials, the searching for out-of-print materials; correspond with vendors concerning monographs and related billing; oversee file maintenance; compile statistics. College training and a minimum of 1 year library experience, preferably in acquisitions, required. Applicants must be able to compose business correspondence, to supervise others; typing skill also necessary. B77-83 (3/2).

Sr. Library Asst. IV in the Libraries Cataloguing Section will catalogue monographs in all languages and subject fields using OCLC data base and terminal; implement MIT cataloguing practices; establish name and series authority records. Will also handle filing duties and participate in maintenance of various files and authority records. College training, capacity for cataloguing detail, typing skill required. Library experience helpful. B77-93 (3/9).

Library Asst. IV in Nutrition and Food Science to search, process and organize materials for reference center; secure bibliographic information; assign subject classifications to items. Will also construct subject classification scheme, search literature; act as liaison with other libraries; do full descriptive cataloguing for monographs; handle circulation of library materials. Typing skill and previous library experience required. B77-96 (3/9).

Sr. Library Asst. IV, in the Rotch Library to process all new book materials, microforms, theses, monographs; assist in cataloguing and maintaining large pamphlet collections; supervise card corrections; maintain accuracy of card catalog; assist in special projects as necessary. Will rotate with others in providing evening coverage on prearranged schedule. Previous library experience or training in processing/cataloguing is required. Typing skill is also necessary. College training preferred. B77-88 (3/9).

Sr. Clerk IV to handle general clerical duties in the fiscal office of the Laboratory for Computer Science: type letters, fiscal reports; file; answer phones; perform some accounting related duties. Ability to handle work involving figures accurately, as well as good typing skill required. MIT experience preferred. B77-95 (3/9).

Accounting Clerk/Secretary III in the Student Accounts Office to assist in the preparation of degree list candidates; assist in the review of students' financial status, perform typing of letters, filing, maintain office supplies, petty cash; answer general questions. Ability to deal with students in a very busy atmosphere required. B77-18.

Clerk Typist III in Physical Plant purchasing section: type and distribute purchase orders; review requisitions for accuracy; maintain related logs; handle a variety of other clerical duties as necessary. Excellent typing skills, one year's clerical experience or comparable business education required. Experience in purchasing field helpful. Position is preferably for 40 hours per week, but could be adjusted to 35 hours to accommodate selected candidate. B77-89 (3/2).

Clerk III in the Graphic Arts Offset Office will handle general clerical procedures; answer phones; act as receptionist; refer customers to department personnel or divisions as necessary. A high school graduate or equivalent plus 2 years office experience and typing skill required. B77-85 (3/2).

Clerk II, part-time, in Ocean Engineering will handle routine clerical duties in headquarters office: file; type file folders; pick up and deliver materials to campus locations; operate mimeograph machines. The capability to handle a complex filing system and other routine clerical duties is required. Typing skill helpful. Position is for a minimum of 10 hrs./wk., Mon.-Fri. B77-91 (3/2).

Waiter/Waitress, hourly, part-time, in the Faculty Club to take orders; pick up and serve food; clear and reset tables; bus trays and load dishes in racks; perform other related work as necessary. Applicants must be able to read and speak English. Related experience helpful. 20 hrs./wk. 11am-3pm, M-F, including some possible weekend work. H77-37 (3/2).

Hourly, 2nd Class Firer, in Physical Plant. Must have Mass. license and experience in equipment related to license. Duties include keeping Power Plant in orderly condition. Applicants must be willing to work all shifts, and have the ability to obtain 3rd Class engineer's license. H77-28 (3/2).

Hourly, 2nd Class Engineer, in Physical Plant must have Mass. Second Class Engineer's license (stationary) or higher, and experience on high pressure boilers, oil and gas fired with automatic combustion controls; turbine driven auxiliaries, AC and DC generation. Experience on turbine driven refrigeration and water treatment systems also necessary. Must be willing to do all kinds of work and work any and all shifts consistent with the self sufficiency of the Power Plant. H77-29 (3/2).

Ambulance Attendant, hourly, part-time, to respond to ambulance calls as an assistant to assigned Campus Patrol officer. Must be National Registered EMT with valid CPR card, Mass. Driver's license and 1 year related experience. 15-20 hrs/wk, evenings and nights, as needed. H77-34 (3/2).

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:

A76-46, District Officer, Resource Devel. (11/10)

A76-52, Applications Programmer, Off. of Admin. Info. Syst. (12/1)

A76-59, Asst. Dir., MIT Assoc. Prog. (1/12)

A77-3, Systems Prog., Info. Processing Serv. (2/16)

A77-4, Liaison Officer, Off. of the Vice Pres. for Res. (2/9)

A77-8, Asst. Dir./Prog. Admin., Off. of Spons. Prog. (3/2)

BIWEEKLY:

B76-334, Sec. III, Sloan School (8/25)

B76-609, Sec. IV, Sloan School (12/1)

B76-613, Sec. IV, Ctr. for Policy Alternatives (12/1)

B76-636, Sec. IV-V, Health Sci. & Tech. (1/12)

B76-637, Sec. IV, Medical Dept. (1/2)

B76-644, Sr. Clerk III, Admissions Office (1/12)

B76-656, Sr. Clerk IV, Summer Sessions Off. (1/12)

B77-11, Clerk III, Div. of Lab. Animal Medicine (1/26)

B77-15, Sec. III-IV, Mech. Eng. (2/2)

B77-25, Asst. Computer Oper. III, Off. of Admin. Computer Serv. (2/2)

B77-26, Sec. IV, Civil Eng. (2/2)

B77-28, Sec. IV, Earth & Planetary Sci. (2/2)

B77-50, Clerk III-IV, Admin. Computer Serv. (2/16)

B77-53, Sec. III-IV, Elec. Eng. & Comp. Sci. (2/16)

Memorial Planned Thursday For Thomas M. Hill, 62

(Continued from page 1)

assistant professor of management in 1946, became associate professor in 1952 and professor in 1963.

He served in the Army during World War II and held the rank of lieutenant colonel at his discharge.

In 1956 Professor Hill was a visiting fellow in economics at Leeds University in England. He was a Fellow of the Institute of Basic Mathematics at Harvard University in 1959-60, and a visiting scholar at the Administrative Staff College at Henley, England, in 1976.

Professor Hill went to Calcutta, India, in 1961, where he served for two years as first head of a Sloan School group helping to establish the India Institute of Management there. During that time he had the critical assignment of developing the plans and laying the groundwork for the Institute, which was chartered by the Indian central government for advanced work in management education.

Professor Hill was a member of Phi Beta Kappa, the American Accounting Association, American Economic Association and the Institute of Management Sciences.

Dean William F. Pounds, in a message to Sloan School faculty, students and staff, said that Professor Hill's death had deprived the school of "one of the most dedicated members of its faculty." He continued:

Herbert Perry

Herbert Perry, 87, a retired desk clerk in the MIT dormitories, died Monday, February 14. Mr. Perry, a Wellesley resident, worked at MIT from February, 1945, until his retirement in 1956.

"Professor Hill spent the major portion of his career at Sloan School and had a substantial influence over the years on the development of some of its major programs. From October, 1969, to September, 1975, Professor Hill also served as associate dean for administration at the school."

Dean Pounds said that Professor Hill's concern for students "was manifested in his willingness to serve as a member of major Institute committees concerned with academic performance, graduate school policy and educational policy."

Professor Hill leaves his wife, Hildreth, of Winchester; a son, Thomas M. Hill, Jr., of Boston; a daughter, Joanna, of Winchester, and a brother, Marion F. Hill of Bucksport.

Contributions can be made to the Thomas M. Hill Memorial Fund in care of dean's office, Sloan School of Management.

Hundreds Attend Service For Jeffrey Pressman, 33

Several hundred persons, including many of his students, attended a memorial service Thursday (March 4) at Kresge Auditorium for one of MIT's most popular teachers, Dr. Jeffrey L. Pressman, associate professor of political science.

Professor Pressman, a Watertown resident, died in Boston Tuesday (March 1) at the age of 33. Authorities said the death was a suicide.

Professor Myron Weiner, head of the Department of Political Science, said at the memorial service that Professor Pressman was widely regarded "as the leading young scholar of American politics in this country" and "leaves behind a legacy more befitting a senior scholar of 75 than a young man of 33."

"But above all," Professor Weiner said, "he engaged the intellect of our students, graduates and undergraduates. His concern with the lives of our students, both their intellectual and their personal, is already legendary. Within two years after Jeff arrived, he was our most popular teacher at both the graduate and undergraduate level."

Professor Pressman was selected for the MIT Graduate Student Council Teaching Award in 1975.

The memorial service, which was shifted from the MIT Chapel because of the large number of mourners, was conducted by Rabbi Daniel Shevitz, MIT religious counselor.

Others who spoke, besides Professor Weiner, were Walter D. Burnham, professor of political science; Professor Aaron Wildavsky of the University of California at Berkeley; Thomas W. Wolf, a graduate student in the Department of Political Science; Michael Lipsky, professor of political science; Professor Robert Nakamura of Dartmouth College; and Lucian W. Pye, Ford International Professor of Political Science.

Professor Pressman, a native of Los Angeles, received a BA from Yale in 1965 and held a Henry Fellowship to Oxford University in 1965-66. He earned his MA and PhD degrees from the University of California at Berkeley in 1967 and 1972.

During his student years he had been a legislative intern to US Senator Lee Metcalf (D-Montana) and US Senator George McGovern (D-South Dakota) and an aide to Mayor John Reading of Oakland, Calif.

His awards included a Phi Beta Kappa at Yale, the John M. Patterson Prize in American Politics at Yale and the Graduate Career Prize at Berkeley.

He became an assistant professor at Dartmouth College in 1972 and was appointed to the faculty at MIT, as an assistant professor, in 1973. He was promoted to associate professor in 1975.

This Week In Sports Fencing Team Wins 8th N.E. Championship

MIT hosted the New England Men's Intercollegiate Fencing Association Championships on Saturday, Feb. 26 and successfully defended its championship title for the eighth year in a row. Earlier in the week the Tech team had ended its regular season with a 15-12 win over Brandeis, giving them a 10-3 win/loss record.

Tech led the championship scoring with 52 victories, fully ten points ahead of Trinity's 42. Dartmouth placed third in the competition with 41, followed by Brandeis with 38, and a tie for fifth place between Brown and SMU with 31 victories each.

In the foil, senior Rich Reimer (New York, N.Y.) took top honors with junior Rich Hemphill (New York, N.Y.) taking the number two spot. Tech also took number one and two spots in the sabre competition with junior Mark Smith (New York, N.Y.) last year's winner in the foil, and senior Bob Shin (Montebello, Cal.) taking top honors. Smith, who

was undefeated throughout Saturday's competition, and Shin also won the Silvio Vitale Trophy. The trophy, presented this year for the first time, goes to the best weapon showing, in this case, Tech's 19 out of a possible 20 victories in sabre. MIT took second and fourth place in the epee, losing out for top honors to Frank Sommers of Dartmouth. Senior Captain Arlie Sterling (Norfolk, Mass.), placed second. Freshman John Rodrigues (Woonsocket, R.I.), took fourth place for MIT.

MIT will travel to Columbia for the Intercollegiate Fencing Association Championships on March 11 and 12. Seniors Bob Shin, Arlie Sterling and Rich Reimer, and junior Mark Smith are expected to perform quite well in the competition. Then, on March 24-26, Tech will compete in the NCAA Fencing Championships at Notre Dame.

Swimming & Diving

The MIT men's swimming team competed in the New England Championships held at Springfield College this past weekend. The Tech team placed eleventh in a field of thirty, scoring 49 points and breaking several old MIT records in the process.

Freshman John Dieken (Kansas City, Mo.) took eleventh place in the 1,650 yd. Freestyle with a time of 17:30, almost a minute better than the existing MIT mark. The MIT 400 Medley Relay team took eighth place in the competition, bettering the old record of 3:48.0 with a new time of 3:45.6. The relay team, consisting of junior Sam Senne (Melbourne, Fla.), sophomores Greg Floro (Quezon City, Philippines) and Preston Vorlicek (Falmouth, Me.) and freshman John Dieken, qualified for the National Championships with their performance.

Sophomore Preston Borlicek had a great day, placing seventh in both the 200 yd. Breaststroke and the 400 yd. Individual Medley and in doing so became a National Championships qualifier. Vorlicek broke the old breaststroke record of 2:20.3 by four seconds with a 2:16.3 and set a new 400 I.M. standard of 4:28.5, eight seconds faster than the previous record. To top off his MIT record-breaking performances, Vorlicek beat the old 200 yd. Individual Medley record by one second, with a time of 2:06.3.

MIT's divers also performed well this weekend. Senior Rick Ehrlich (Wilmette, Ill.) took eighth place in the 1 Meter competition and fourth in the 3 Meter. Sophomore Bob Hone (Plainfield, N.J.) placed seventh in the 1 Meter. Both Ehrlich and Hone qualified for the Nationals.

Six members of the MIT men's swimming and diving team will travel to the National Championships to be held at Oberlin, Ohio on March 17-19. They are Dieken, Floro, Senne, Vorlicek, Ehrlich and Hone.

Men's Basketball

The MIT men's basketball team wrapped up the 1976-77 season on Saturday, Feb. 26, with a 70-64 win

over Connecticut College. This win gave the Tech team a final 8-13 win/loss record. Earlier in the week the Tech team took to the road and suffered crushing defeats at the hands of Bowdoin 91-78 and W.P.I. 119-80.

Senior Captain Pete Maimonis (Brookline, Mass.) broke several MIT records in Saturday's game. He shattered both the single season and four-year career assist records. This year Pete accumulated 161 assists, breaking the record of 148 set by Al Epstein '75. He also set a new MIT career assist record of 377, topping Epstein's record of 376 by just a point. Maimonis also led the scoring this year with 286 points, averaging 13.6 points per game.

Freshman Ray Nagem (San Diego, Cal.) set a new MIT all-time field goal percentage record of .587. Nagem was also right behind Maimonis in the scoring column, racking up 279 points for a 13.3 point per game average.

Senior John Cavolowsky (Dedham, Mass.) ended his collegiate career by claiming the most games played in a four-year career record of 93. Cavolowsky followed Nagem closely in field goal percentage with a .571 and was also Tech's number three man in scoring this season.

Women's Rugby

There's a new sports club at MIT this spring, the women's rugby club. The new women's rugby club has been organized and is still welcoming all female staff and graduate students who are interested in practicing and playing. The club has been working out regularly in Rockwell Cage since early January, and will continue to do so on Tuesday and Wednesday nights at 7:30 until mid-March, when practice sessions will move outside.

Several games and tournaments have already been scheduled for the spring season. The club will be competing against other women's clubs in the Boston area. Anyone interested in joining the team should attend any practice. For more information, please call Robin Reenstra at 646-7754 or Connie Cotton at ext. 3-4784.

Track

Senior Frank Richardson (Sac City, Iowa) finished off the finest indoor season ever by a MIT distance runner, smashing the Tech two and three mile run varsity records. Two weeks ago, Frank ran an 8:54.4 two mile, breaking the 1969 mark of Ben Wilson '70 by .2 tenths of a second, while placing second in the Eastern College Division Championships. A week later in the New England Championships, Richardson ran fifth in the two mile with a time of 9:03.2. Then, this past weekend, Frank capped off his great indoor season with an IC4A sixth in the three mile. His time of 13:49 smashed the old mark set by Ben Wilson in 1969 by 31.2 seconds. Richardson and the outdoor trackmen open their spring season on April 9 against Bates and New Hampshire at New Hampshire.

Dr. O'Neill Speaks on Space

The use of electromagnetic fields to move large quantities of materials in outer space will be discussed Tuesday, April 12, by Dr. Gerard K. O'Neill, Jerome Clarke Hunsaker Professor of Aeronautical Engineering at MIT.

Widely known for his studies on the humanization of space, Dr. O'Neill, during his year as Hunsaker Professor, has concentrated on the theoretical development and practical experimental test of electromagnetic mass-accelerators.

Professor O'Neill, a professor of physics at Princeton University, will deliver the 14th Minta Martin Lecture in Rm. 26-100 at 5pm April 12. His subject is "Electromagnetic Rocketry and the Humanization of Space."

He will explore how electromagnetic fields can be applied to the transfer of payloads from the

Space Shuttle, scheduled to make its first flight in 1980, into lunar or synchronous orbit and to the transfer of lunar surface materials into space for industrial use. He concludes that these methods will make it possible to establish space manufacturing despite the low orbital lift capability of the Shuttle.

The Minta Martin Lecture is named for the mother of the late aeronautical pioneer Glenn L. Martin.

The lecture is arranged by the MIT Department of Aeronautics and Astronautics in cooperation with the Boston Section of the American Institute of Aeronautics and Astronautics.

Cambridge Forum To Hear Ruina

MIT professor Jack P. Ruina will participate in the Cambridge Forum Lecture Series on Ethical Issues in America on Wednesday, March 16.

Dr. Ruina, professor of electrical engineering in the Department of Electrical Engineering and Computer Science, will speak on, "Should We Be Alarmed by Recent Soviet Nuclear Programs?" He is a former director of the Advanced Research Projects Agency for the US Department of Defense.

The Forum, open to the public without charge, is held every Wednesday at 8pm at 3 Church St., Harvard Square.

B77-54, Sec. IV, Sloan School (2/16)
B77-55, Sr. Clerk IV, Acctg. Office (3/2)
B77-57, Sr. Clerk III, Personnel Relations (3/2)
B77-58, Sec. IV, Urban Studies Planning (3/2)
B77-59, Sec. IV, Civil Eng. (3/2)
B77-69, Sec. IV, Tech. Adaptation Prog. (3/2)
B77-70, Sec. III-IV, Elec. Eng. & Comp. Sci. (3/2)

ACADEMIC STAFF:
C76-23, Tech. Asst., Biology (1/21)

SPONS. RES. STAFF:
D75-48, Economist/Econometrician, Energy Lab. (1/25)
D76-17, Biochemist, Res. Lab. of Elec. (2/25)
D76-49, Plasma Physicist, National Magnet Lab. (4/14)
D76-71, postdoc. res., Physics, Lab. for Nuclear Sci. (5/5)
D76-115, Immunologist, Clinical Res. Ctr. (7/14)
D76-121, Res. Engineer, Energy Lab. (7/28)
D76-123, Staff Biophysicist or Biochemist, National Magnet Lab. (7/28)
D76-126, Immunologist, Clinical Res. Ctr. (8/11)
D76-140, Operations & Instrumentation Manager, National Magnet Lab. (8/11)
D76-175, Scientific Prog., Earth & Planetary Sci. (10/6)
D76-180, postdoc. res., Physics, Lab. for Nuclear Sci. (10/13)
D76-182, Staff Engineer, Elec. Eng. & Computer Sci. (10/13)
D76-188, Postdoctoral Scientist, Ctr. for Space Res. (10/13)
D76-212, Fusion Reactor Res., National Magnet Lab. (11/10)
D76-220, Research Analyst, Ctr. for Policy Alternatives (11/24)
D76-225, Sci. Applications Prog., Lab. for Nuclear Sci. (1/5)
D76-232, High Energy Physics Res., Bates Linear Accelerator (1/5)
D76-233, High Energy Physics Res., Bates Linear Accelerator (1/5)
D76-239, Systems Theory Res., Elec. Syst. Lab. (1/2)
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)
R77-5, Energy Syst. Analyst, Energy Lab. (1/9)
R77-6, Staff Scientist, Arteriosclerosis Ctr. (1/19)
R77-9, Systems Analyst, Elec. Eng. (1/26)
R77-12, Immunologist, Ctr. for Cancer Res. (2/2)
R77-13, Programmer, Lab. for Nuclear Sci. (2/2)
R77-14, Staff Petrographer, Earth & Planetary Sci. (2/2)
R77-16, Program Mngnr., Energy Lab. (2/9)
R77-17, Systems Theory Res., Elec. Syst. Lab. (2/9)
R77-21, Energy Analyst, Energy Lab. (2/16)
R77-22, Astro Physics Res., Ctr. for Space Res. (2/16)
R77-25, Communications Officer, MIT Sea Grant Prog. (3/2)
R77-26, Planetary Radar Data Analysis, Earth & Planetary Sci. (3/2)
R77-27, Admin. Asst., Energy Lab. (3/2)

EXEMPT:
E76-41, Principal Oper., Physical Plant (12/1)
E77-1, Food Serv. Super., Food Service (1/19)
E77-3, Mech Shop Super., Physical Plant (1/26)
E77-5, Real Time/Diagnostic Syst. Prog., Haystack Observatory (2/2)
E77-7, House Manager, Housing Dept. (2/16)

The following positions have been FILLED since the last issue of TECH TALK:
D76-108 Spons. Res. Staff
B76-498 Sec. IV
B77-68 Sec. V
A77-1 Admin. Staff
B77-33 Sec. IV
H77-33 Ambulance Attendant
B77-29 Sec. III-IV
B77-56 Sec. IV

The following position are on HOLD pending final decision:
B77-78 Admin. Asst. V

\$9 Million Pew Grant Aids Health Sciences

(Continued from page 1)

of the late Joseph N. Pew of Philadelphia. Mr. Pew, who died in 1912, founded the Sun Oil Co. in 1886. Seven members of the Pew family through three generations have attended MIT.

The \$9 million grant for a health sciences and technology facility is the second major grant the Pew Memorial Trust has made to MIT in recent years. The Trust made a gift of \$1,250,000 to MIT in 1974 to establish the Fuels Research Laboratory in MIT's new Ralph Landau Building for Chemical Engineering.

In commenting on the Pew Memorial Trust gift, President Wiesner said: "It is especially significant that MIT should reach the halfway mark in its Leadership Campaign with a major grant for the health sciences and technology. These are fields which are clearly of great national importance, and MIT is making special contributions to their contemporary character and continuing evolution."

Dr. Paul E. Gray, Chancellor of the Institute, noted that health-related research now accounts for approximately one-third of MIT's total research volume on the campus with teaching and research related to health being carried out in all five of MIT's Schools and in numerous interdepartmental laboratories and centers. Moreover, medicine is now among the most popular fields for advanced study for graduating MIT seniors. Of the MIT seniors who apply to medical school, he said, more than 80 percent are admitted, compared to a 30 percent national norm; 11 percent of MIT's graduating seniors entered medical schools in 1975.

Professor Walter A. Rosenblith, MIT Provost, who in 1964 had been the chairman of MIT's first Committee on Engineering and Living Systems, said that "this new facility will allow MIT to bring together in a new cooperative framework—as well as in a physical setting—interrelated efforts, in both education and research, in the health areas. We have foreseen for some time the benefits that might come from consolidating and intensifying these efforts, and we are most grateful to the Pew Memorial Trust for this munificent grant which will very much help us move toward this goal."

The new health sciences and technology facility will be part of a new \$25.5 million complex which will serve not only as a focus at MIT for research and teaching in health sciences and technology but also as a health services center. Both will be located on Carleton St. between Main and Amherst Sts., on MIT's East Campus. The new facilities, combining two major buildings still in the design stage, will house a wide variety of medically-related teaching and research activities. These will include laboratories of physiology, human biology and experimental medicine, programs in health care planning and management, and important MIT components of the Harvard-MIT Program in Health Sciences and Technology. That Program is a major collabora-

tive effort begun seven years ago between MIT and Harvard to focus contemporary science and technology on human health needs. Director of the Program in Health Sciences and Technology is Dr. Irving M. London, a distinguished physician and life scientist, and professor of medicine at both MIT and Harvard.

Mr. Johnson said full development of the entire program will take several years.

"Funding has yet to be completed," he said. "But the magnificent grant which we have now received from the Pew Memorial Trust for health sciences and technology will serve as the base grant from which we will seek the balance of funding."

"The opportunities for service to mankind through the linking of modern science and technology to the improvement of human health and health care are so bright that we have every confidence the effort will attract the generous support it requires and deserves."

"Such major philanthropic support can bring into being at MIT a truly unique national resource for the more effective and powerful development of all these interrelated health fields."

MIT involvement in the health sciences reaches back nearly a century to the work of Dr. William T. Sedgwick, the pioneer microbiologist and public health scientist, on typhoid fever and other sewage-borne diseases. The early work on sterilization of canned food was carried out at MIT. MIT also initiated an early curriculum on biological engineering in 1937, and pioneered the medical use of radioisotopes before World War II.

Later, MIT faculty members played a role in the development of molecular biology, achieved the first chemical synthesis of penicillin, extended the uses of radiation in treating cancer, applied communications engineering and information theory to the study of biological processes, developed sensory aids for the deaf and blind and artificial prostheses for amputees, and have been among the world leaders in understanding the molecular structure of genes. Three of MIT's Nobel Laureates currently on the faculty were honored for work in medicine and physiology. They are Dr. Har Gobind Khorana who received the 1968 Nobel Prize, Dr. Salvador Luria who received the 1969 Prize, and Dr. David Baltimore who received the 1975 Prize.

Research and teaching activities related to health, medical and biological sciences at MIT, which are supported by both private and federal funds, are numerous and varied. Many have broken new ground. For example, MIT had the first Clinical Research Center and the first Center for Cancer Research to be established by the National Institutes of Health at a university without an associated medical school. MIT's Cell Culture Center provides biological materials for researchers throughout the northeast. MIT's High Voltage Research Laboratory, which pioneered high voltage x-ray and electron beam therapy for cancer, provides some 10,000 cancer

treatments a year in collaboration with the Lahey Clinic and, in addition, provides electron beam sterilization of bone and artery graft materials for medical centers throughout the U.S.

MIT engineers and scientists have devised new materials used in bone replacements by orthopedic surgeons and artificial skin that holds great promise for the treatment of burn victims. Others at MIT have developed non-invasive techniques of diagnosing cardiovascular disease. Still others have unraveled the intricate biochemical relationships between the body's hormonal system and brain activity. In the MIT Department of Psychology, years of painstaking research in the laboratory plus long-term observational research with brain-injured persons, including scores of brain-injured war veterans, have led scientists to a better understanding of how the nervous system functions, what activities various regions of the brain control, and how these phenomena are related to behavior.

There has also been in recent years a rapidly growing interest in MIT's Sloan School of Management in the organization of health care. Health-management research by the faculty of that school has covered a wide range of issues from family planning, to the interrelations of drugs and law enforcement, to the organization of the delivery of health care to communities. There has been a particular focus in the school's organizational studies, among others, on the improved management of basic health-care delivery systems. In addition to the teaching of regular undergraduate and graduate students in these new fields, there has been an increasing involvement in recent years of practicing health professionals in the executive programs of the Sloan School. These activities have included special management programs designed for medical school deans and other medical school administrators that have involved virtually all of the major medical schools of the country.

MIT established its first formal interdisciplinary biomedical engineering doctoral program in 1971. Presently, numerous faculty members and more than 200 graduate and undergraduate students in the School of Engineering are involved in biomedical engineering areas.

The Harvard-MIT Program in Health Sciences and Technology has been educating physicians and other

health professionals and has been pursuing better integration of the physical sciences and engineering with medical education, research and health care.

The educational programs of the Harvard-MIT Program include a curriculum to prepare students for careers as physicians with special grounding in the physical, engineering, and other quantitative sciences, and a new curriculum to prepare scientists and engineers for careers in medical engineering and medical physics. The Program has a present enrollment of more than 100 students who are candidates for the M.D. degree, and of these about one-fourth are also candidates for the PhD at MIT or Harvard. According to Dr. London, the aim of the new curriculum is the education of medical engineers and physicists who will apply their knowledge and skills to the study, prevention, and treatment of important human diseases. The educational programs are expected to reach maturity in five years when the number of students enrolled would be about 250.

Research under the Harvard-MIT Program has focused on major medical and health problems, with particular emphasis on biomaterials sciences, cancer radiation therapy, rehabilitation engineering, medical instrumentation, nuclear techniques in medicine, and the health effects of energy production.

Zebrowski to Give Recital

Pianist Marek Zebrowski will give a recital in the MIT Music Library (Rm. 14E-109) at 5:15pm on Wednesday, March 16.

Mr. Zebrowski will play Sonata in F Major, Op. 54, by Beethoven; Suite from Partita in E Major for Solo Violin (transcribed for piano) by Bach-Rachmaninoff; Two Preludes and Etude pour les octaves by Debussy; Two Preludes, Op. 1, and Two Mazurkas, Op. 50, by Szymanowski; and Impromptu in G Flat Major, Op. 51, and Ballade No. 4 in F Minor, Op. 52, by Chopin.

A native of Poland, Mr. Zebrowski graduated with distinction from Poznan's Music Lyceum and has studied at the Poznan Conservatory. In 1970 he studied piano with Robert and Jean Casadesus and theory, harmony, counterpoint and competition with Nadia Boulanger at l'Ecole d'art Americain in Fontainebleau. He has performed with the Poznan State Symphony

Dramashop To Present One-Act Plays

MIT Dramashop will produce two modern plays, *Embers* by Samuel Beckett and *A Slight Ache* by Harold Pinter, as its fourth and final set of one-act plays for the 1976-77 season.

The plays will be staged in Kresge Little Theatre at 8pm on Friday, March 11, and on Saturday, March 12. The performances are free and open to the public.

Embers is a very poetic play originally written for radio broadcast. It portrays a cantankerous old man, Henry, and Ada, his wife. Henry's personality is explored through his monologues and dialogues with imaginary people and Ada.

Alanna Connors, Dramashop president and a junior in physics from Greenwich, Conn., will direct *Embers*.

A Slight Ache is also about a middle-aged couple, Edward and Flora. Edward, realizing he is getting older, tries to resist advancing age and fails.

Susan Morgello, a junior in biology-nutrition from The Bronx, NY, will direct *A Slight Ache*.

Coffee and critique will follow the performances.

Orchestra and has recorded for Polish Radio and the works of Bach, Beethoven, Chopin, Debussy, Scriabine and Prokofiev. He has given recitals in Kotka, Finland, Newport, R.I., Cleveland, Ohio, Springfield, Mass., and U-Mass. and for WGBH-TV in Boston. Currently he is a graduate student at the New England Conservatory of Music.

Weiner in India

Dr. Myron Weiner, professor and head of the Department of Political Science at MIT, left earlier this week for India where he will spend two and a half weeks traveling and studying the national Indian elections, under the auspices of the MIT Center for International Studies. Professor Weiner is a student of the Indian political system and the author of several books and articles on Indian politics. He will lead a seminar on India's election upon his return.

Two Named Co-Chairmen Of Leadership Campaign

Two additional co-chairmen have been appointed for MIT's \$225 million Leadership Campaign.

They are Edward O. Vetter of Dallas, Tex., and William B. Murphy of Gladwyne, Pa. Both are members of the MIT Corporation, the Institute's governing body.

Announcement of the new appointments was by Howard W. Johnson, chairman of the Corporation and chairman of the Leadership Campaign, at the regular quarterly meeting of the Corporation in Cambridge, Friday.

Mr. Vetter and Mr. Murphy join Paul F. Hellmuth of Boston who has been co-chairman of the Campaign since it was announced in April, 1975.

Mr. Vetter, a 1942 graduate of MIT was formerly executive vice

president of Texas Instruments Co., Dallas, and until recently, was Undersecretary of Commerce under President Gerald Ford. He is serving this year as president of the MIT Alumni Association.

Mr. Murphy is former president and chief executive officer of the Campbell Soup Co., of which he is now director.

"Mr. Vetter and Mr. Murphy bring important added strength to our Leadership Campaign organization," Mr. Johnson said, "and we welcome their assistance and support."

The Leadership Campaign is aimed at marshalling \$225 million in new private resources for the Institute over a five-year period. With less than two years elapsed since the Campaign was announced, the Campaign total already has reached just under \$113 million.



DESIGNATION OF MIT as a Sea Grant College—the first private institution of higher learning to be so honored—was commemorated Friday, March 4, at the quarterly meeting of the Corporation of MIT, the university's governing body. Standing at a plaque noting the designation, which was announced officially in December, are, from the left: Dr. Ida Dyer, head of the MIT Department of Ocean Engineering; Dean

A. Horn, director of the MIT Sea Grant Program; Dr. Jerome B. Wiesner, MIT president; Robert M. White, administrator, National Oceanic and Atmospheric Administration; Howard W. Johnson, chairman of the MIT Corporation, and Dr. Alfred A. Keil, Dean of the School of Engineering at MIT. The plaque is in Building 5, the Pratt Building, near the Hart Nautical Museum.



WELL-ATTENDED COLLOQUIUM on "Opportunities for Ocean Utilization" March 4 heard remarks by, from left, Carl I. Wunsch, Cecil and Ida Green, Professor of Oceanography in the Department of Earth and Planetary Sciences; Robert M. White, administrator, National Oceanic and Atmospheric Administration; Dr. Jerome B. Wiesner, MIT

president; Thomas T. Barrow, senior vice president, Exxon Corp.; Professor Richard R. Baxter, Harvard Law School, and Dean Alfred A. H. Keil, Dean of the MIT School of Engineering. The colloquium was in connection with the quarterly meeting of the MIT Corporation at which designation of MIT as a Sea Grant College was commemorated.