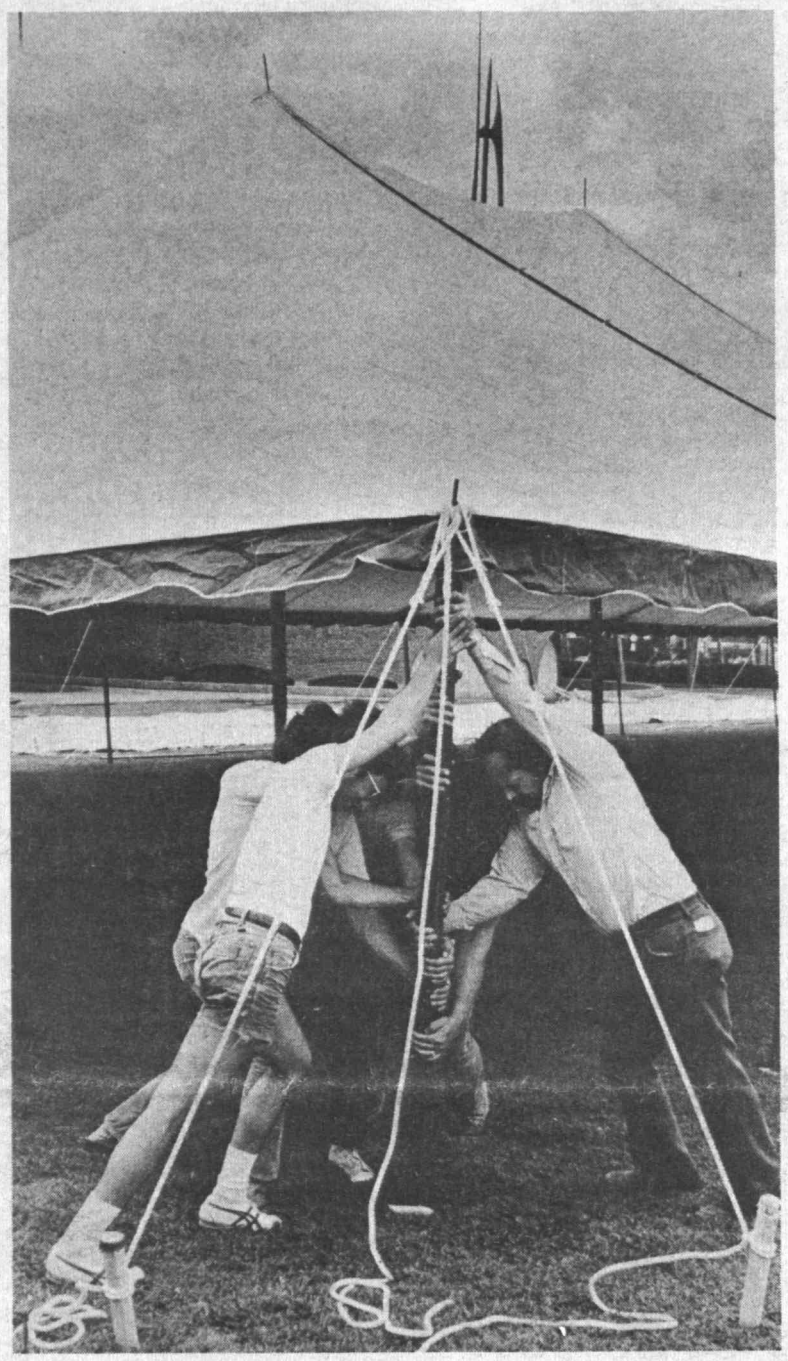
Massachusetts Institute of Technology

TECH TALK

May 29, 1974

Volume 18

Number 45



Commencement Big Top. Workmen with Jesse G. Willis Inc. of Watertown heave to, securing one of the three tents on Kresge Plaza where the President's reception will be held following Commencement. The company which rents and installs tents for many Boston-area college commencements has been putting up commencement tents at the Institute for almost 25 years. Photo by Edward McCabe

1,300 Degrees

Wiesner to Address Commencement

Approximately 1,300 seniors and graduate students—including a record number of women—will be awarded degrees at MIT's 108th commencement Friday morning, May 31.

Howard W. Johnson, Chairman of the Corporation, will preside at the exercises, which will be held in Rockwell Cage starting at 10:30am.

The faculty will meet this afternoon to recommend candidates for degrees. The meeting will take place in Room 10-250 at 4:30pm, instead of 3:15 as was indicated on the call to the meeting.

About 80 members of the 50-year Class of 1924 will be on hand, by tradition, and the majority will don academic robes and march as honored guests in the commencement procession.

President Jerome B. Wiesner will give the commencement address and award some 1,450 degrees (a number of graduates receive more than one degree), presenting the diplomas individually to the graduates as their names are called by the deans of their respective schools.

The degree recipients will include some 125 women. The largest number of women graduates previously—both undergraduates and graduate students—was 99 in 1973, the 100th anniversary of the first woman to graduate from MIT.

There will be an informal reception for graduates, their guests and faculty members immediately following commencement under tents on Kresge Plaza.

(Continued on page 2)

Commencement Parking Ban

Campus Patrol has announced that West Garage parking permit holders will have to use alternate parking lots—Westgate West, Westgate II, Monroe Parking Lot, etc.—on Commencement Day, Friday, May 31 when the West Garage will be reserved exclusively for participants in Commencement Exercises and their guests.

The campus patrolman at West Garage will provide information and some one-day passes for other locations where limited accomodations may be possible.

Experts in Transit Fields To Address Alumni Seminar

The president of the Insurance Institute for Highway Safety, executives from General Motors and Ford Motor Company and the Massachusetts State Secretary of Transportation will join MIT faculty members and other speakers June 3 at MIT for an in-depth look at the increasingly complex interrelationships among technology, science and society.

Entitled *Automobility*, the program—of MIT's Alumni Days—will focus on the automobile in examining the challenges technology poses for society.

More than 2,000 alumni, their spouses and families are expected to attend MIT Alumni Days, June 2 and 3, the Institute's traditional homecoming holiday following the May 31 commencement.

The June 3 program on *Automobility* will be held in Kresge Auditorium. The morning session, moderated by J. Herbert Hollomon, director of the MIT Center for Policy Alternatives and professor of engineering, will take an historical look at the impact of the automobile on America.

The afternoon session will be moderated by Alfred A.H. Keil, Dean of the School of Engineering and professor of ocean engineering at MIT. It will review future options and alternate routes the country may follow.

Morning session speakers will be:

Elting E. Morison, Elizabeth and James Killian Professor, MIT School of Humanities, who will review the development of technology over the last 50 years and suggest methods for directing its future growth.

Morris A. Adelman, MIT professor of economics, who has predicted gasoline prices will peak at about 65 cents a gallon. He will discuss the economics of extraction and distribution of automotive fuels and explain why he believes there is no question of running out of oil.

Henry D. Jacoby, Sloan School of Management professor, who will discuss ways to manage the environmental problems posed by the auto.

David Gordon Wilson, MIT professor of mechanical engineering, who maintains that current shortages of road space and vehicle fuels and future shortages of materials will not be handled well by the free market or by allocations. He will outline a proposal for a modified free

(Continued on page 6)

Toll Booth Vigil Yields Surprising Data on Oil

For two weeks during the chill of late winter four students from the MIT Sloan School of Management kept a vigil by a toll booth at the western end of the Massachusetts Turnpike.

They were counting trucks. Oil trucks.

The students—members of a class in management information systems (15.568)—were investigating a report that significant quantities of oil were entering Massachusetts from New York via the turnpike. They discovered the report was untrue.

The truck counting was one phase of a unique MIT effort to eliminate the information void that plagued early efforts to manage the energy crisis. The work is continuing in cooperation with MITRE Corporation under a grant from the New England Regional Commission and now involves students and professors in several disciplines.

"What we set out to answer," said John J. Donovan, associate professor of management at the Sloan School, "were questions such as:

"How much oil is there in the region? Who owns it? Who controls it? How much storage capacity is there?"

Beginning as a project of Professor Donovan's management information systems class, the MIT effort to build an energy information system for New England mushroomed to encompass disciplines such as computers, economics and natural resources.

Under the direction of Professor Donovan, Sloan School Professor Henry D. Jacoby and project coordinator Donald Garmer, students began interviewing fire chiefs, building inspectors, oil companies and pollution control agencies. Other students addressed the computer research issues of how to build flexible computer information systems, others how to do supply modeling and forecasting.

"The students concerned with data acquisition talked with anyone who might have information of any kind on the whole range of petrochemicals—from home heat-

(Continued on page 2)

Community Invited

2,000 Expected to Attend Alumni Days

More than 2,000 alumni, their spouses and families are expected to return to the MIT campus for Alumni Days, Sunday and Monday, June 2 and 3, the Institute's traditional homecoming holiday which follows the May 31 commencement.

The Alumni Association has invited all members of the MIT community to attend the Alumni Days events, including lectures, exhibits and open houses which are without charge.

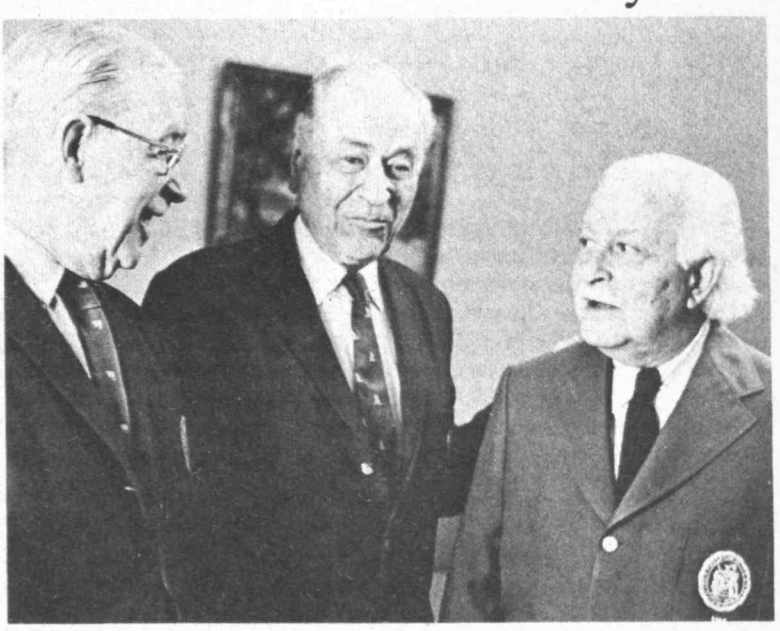
The events include:

—An exhibit of antique cars starting at 1pm Sunday at Briggs Field. Some of the cars will be available to take visitors for rides.

—Open house from 2 to 5pm Sunday at MIT Historical Collections 265 Massachusetts Ave. A fascinating collection of MIT memorabilia can be seen.

—A special art exhibition from 2 to 5pm Sunday at Hayden Gallery of 19th century art from the Museo De Art De Ponce, Puerto Rico, a

(Continued on page 2)



Arthur Fiedler once told a friend he nearly decided to attend MIT. If he had, the Boston Pops conductor would have been a member of the Class of 1917. That was reason enough for John A. Lunn, center, Class of 1917 president, and Stanley C. Dunning, class secretary, to present Mr. Fiedler, right, with an MIT blazer bearing the class year 1917. Mr. Fiedler plans to wear the blazer Sunday, June 2, when scores of MIT alumni, friends and members of the MIT community attend Tech Night at pops. Tickets are available at E19-437.

Present and Past Will Echo In Commencement Music

Music for MIT's 1974 Commencement exercises will have the sound of the present as well as of the past.

In keeping with a trend toward greater informality in academic celebrations, conductor John Corley has selected some contemporary works—including one to be performed in honor of a living composer.

Two preludes—*Soundings for Brass and Percussion* by Fisher Tull, and *Symphony for Brass and Percussion* by Alfred Reed—were chosen because they were both composed during the lifetime of the 1974 graduates.

In addition, the brass choir will play *Ceremonial Fanfare (1970)* by Walter Piston, as a salute to mark the 80th birthday of the composer, who resides in Belmont.

The professional brass ensemble that provides music for Commencement will play 11 processionals to accompany the entrance of participants in the academic festivities. The processional program will include *Fanfare* by William Walton, *Canzon Gallicam* and *Canzon Aechiopican* by Samuel Scheidt, *Canzon 26* by Pietro Lappi, *Canzon "La Battaglia"* and *Canzon "in Echo"* by Adriano Banchieri, *Lieto Godea* by Giovanni Gabrieli, *Canzon decimanona* by Gioseppi Guami, *Canzon vigesimaseconda* and *Canzon trigesimaprima* by Bastian Chilese, and *Intrada* by Samuel Scheidt.

For recessionals, the ensemble will play *Fanfare* by Dietrich Buxtehude, *Rondeau* by Joseph Mouret, *Canzon a 5*, and *Canzon a 6*, by Girolamo Frescobaldi, *Ricercar del duedecimo tuono* by Andrea Gabrieli and *Canzon septimi toni No. 2* by Giovanni Gabrieli.

Commencement

(Continued from page 1)

The degree candidates will lead the academic procession, followed by William S. Edgerly, Class of 1949, the retiring president of the MIT Alumni Association. Mr. Edgerly, financial vice president of the Cabot Corporation of Boston, will be chief marshal and carry the MIT mace.

Following Mr. Edgerly will be the members of the 50-year class, members of the Corporation, the faculty, guests of honor and the principals. The guests of honor will include the deans of the five academic schools, the Dean of the Graduate School, the Dean for Student Affairs, the Registrar and Dr. Paul M. Fye, President and Director of the Woods Hole Oceanographic Institution, with which MIT grants joint advanced degrees.

Also seated with the guests of honor will be permanent class officers of the Class of 1974 and the president of the Graduate Student Council. They include:

Derrick J. Vlad of McLean, Va., president; Dennis I. Dickstein of Deer Park, N.Y., secretary-treasurer, and John S. Hendricks of Hollywood, Calif., Graduate Student Council president.

The principals at the commencement, besides Mr. Johnson and Dr. Wiesner, include Chancellor Paul E. Gray, Dr. James R. Killian, Jr., Honorary Chairman of the Corporation, Cambridge Mayor Walter J. Sullivan and Rev. Constance F. Parvey, MIT Lutheran Chaplain who will be the first woman to give the invocation at an MIT commencement.

Professor Walter A. Rosenblith, Provost, will lead the guests of honor, and the Chairman of the Faculty, Professor Elias P. Gyftopoulos, will lead the principals.

Commencement activities will begin Thursday, May 30, at 11am in Kresge Auditorium, with commissioning exercises for MIT's Army, Navy and Air Force cadets.

Carew Returns

The well-remembered Topper Carew Band will give another rock and blues concert, noon, today (Wednesday), May 29, in the Great Court.

Alumni

(Continued from page 1)

museum created through the generosity of Luis A. Ferre, Class of 1924, the incoming Alumni Association president.

A lecture in Kresge Auditorium at 3:30pm by Seymour A. Papert, Cecil and Ida Green Professor of Education, who will discuss how MIT is using modern technology to design radically different learning environments for children.

—A film series from 2 to 3:20pm in Kresge on Sunday featuring three films from the ABC/MIT series "What About Tomorrow" and a film produced in 1939 about the General Motors' World's Fair exhibit which depicts a conception of the city of 1960.

Other events Sunday include class cocktail parties from 5 to 6pm in McCormick Hall, an International Buffet from 5:30 to 7:30pm at the Student Center, and Tech Night at the Pops from 8:30 to 10:30pm at Symphony Hall. Buses will leave from the front of the Student Center for Symphony Hall starting at 7pm.

Tickets for the Pops Concert remain available. There will also be a charge for the buffet and the cocktail parties, but the other events of Alumni Days are open without charge to the MIT community.

The MIT community also is invited to attend the special program on Monday, June 3, entitled *Automobility*, which will be a review of the opportunities and challenges created by the interrelationships among technology, science and society. The program will be held in Kresge.

'24 and '49 List Active Reunion Programs

The Class of 1924, which will observe its 50th reunion, and the Class of 1949, which will celebrate its 25th anniversary, will be well represented at Commencement and Alumni Days activities this year.

Close to 200 people, members of the class and their spouses, will begin the Class of 1924 celebration Thursday, May 30, when they arrive at the Governor Carver Motor Inn in Plymouth.

The next day they will travel to Cambridge by bus for commencement exercises. Later in the day they will attend a Council for the Arts Luncheon at Hayden Courtyard, then return to Plymouth by bus at about 3pm for an early evening clambake.

Activities in Plymouth Saturday include boating, golfing, a cocktail party and a banquet.

Class members will return to Cambridge Sunday and Monday for the scheduled Alumni Days program.

The Class of 1949 has given a "Forty-Niner" theme to its activities which will begin with a party Friday, May 31, at 6pm in the "Go West Saloon," normally known as McCormick Hall.

More than 200 classmates, spouses and children are expected to attend the reunion.

Saturday will be a Family day devoted to exploring the campus and to participation in sporting events, including the Class of 1949 Tennis Tournament.

After a "chuck wagon" lunch at Briggs Field Sunday the "Forty-Niners" will join in the regular Alumni Days program.

A special children's program for youngsters of 1949 classmates has been arranged under the direction of John G. Barry, assistant director of athletics. It will include sports, tours of historic sites, visits to the New England Aquarium, movies, dances and special entertainment.

Formal presentation of class gifts will be made at the Alumni Days luncheon on Monday, June 3, in Rockwell Cage.

Alumni Association president William S. Edgerly, Class of 1949, will preside at the luncheon and introduce the incoming president Luis A. Ferre, Class of 1924.

Presenting the Class of 1924 gift will be Edward Moll, class president, and Edward Hanley, reunion gift committee chairman.

Presenting the Class of 1949 gift will be Stanley V. Margolin, class president, and Leonard F. Newton, reunion gift chairman.

Students Participate in Oil Study

(Continued from page 1)

ing oil to gasoline," the professors said.

The results were, at times, startling.

"We found, for example, that New England has 28 percent more storage capacity than the federal census had reported," Professor Donovan said. "The students just discovered things the federal census missed. Like oil tanks in Lake Winnepesaukee."

To receive, evaluate and collate the field information the MIT team set up what Professor Donovan refers to as its "war room." It contains large wall maps of New England noting points of entry and routes to markets for petrochemicals. It also contains computer terminals that permit rapid access to the information.

Much of the groundwork for the information system was laid by the MIT team's early work and a parallel effort by MITRE. The grant from the New England Regional Commission will underwrite work to refine and to broaden the findings.

In their preliminary report on "Information Systems for Government Policies to Deal With Energy Shortages," Professors Donovan and Jacoby said:

"One advantage of the market system is that public officials can get by without knowing much about the details of the operation of most sectors of the economy. Many goods and services are produced, allocated over space and time, and delivered to consumers without government intervention and with no need for a public record of how things are done. When events occur that do call for government control of markets, however, this dearth of public information can be a crucial barrier to effective policy making.

"Recent federal and state intervention in energy markets is a case in point....From the beginning of this program of government activities, the lack of credible data on the structure and function of the energy supply system has proved a nagging problem.

"The boycott has now been lifted, but unfortunately that is not the end of the matter. The US faces a long period of dependence on potentially insecure sources of imported fuels....

"As a result, the federal allocation program is likely to remain on the books for some time to come, at least as a stand-by system to be called into play in an emergency.

"Clearly, high priority should be given to development of improved information to support this program and to indicate when intervention is called for (and when it is not), and to guide the actions that are taken."

Players Sought for Softball League

The 1974 season for the MIT Community (fast pitch) Softball League will begin Monday, June 10, and if league commissioner Sam Benichasa has his way, there will be a new look—more women involved.

"In the past only 1 percent of the participants have been women, even though there are many women at MIT who can play pretty decent softball," Benichasa said.

To overcome this sex barrier, Benichasa says he is going all out this year to encourage more female participation. In fact, he says he has even placed special posters in the women's locker rooms.

Some new teams are now being formed on which half the members will be women. There will be a special practice for such individuals Wednesday and Thursday (May 29 and 30) at 5pm on Briggs Softball No. 6.

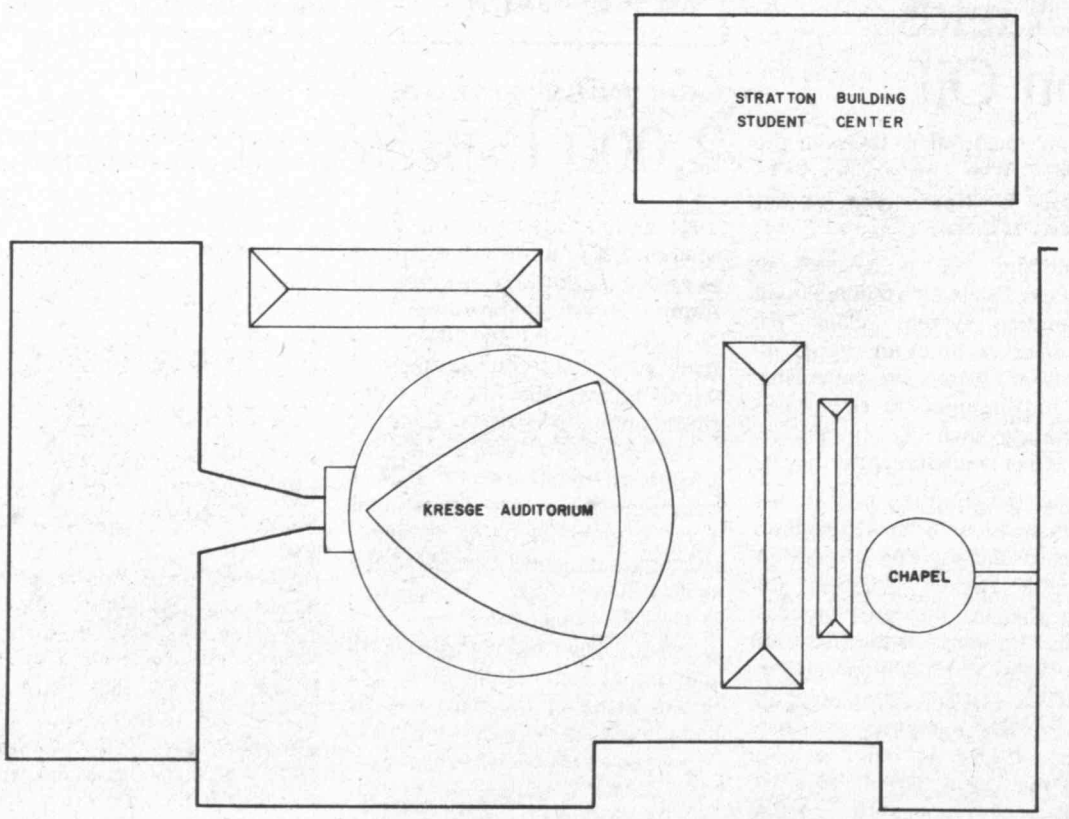
Team entries are now being accepted. Team representatives and individuals without team affiliation should contact Benichasa at Ext. 182-8-3686 or 3661 from 10am to noon or from 2 to 4pm. The deadline is Friday (May 31).

Women interested in playing should call Benichasa or Diane Cornwall at 3-2913 between 1-3pm before May 31.

There is a $40 fee per team. The fees pay for umpires—at $5 a game—and for softballs. Experienced umpires also are being sought.

Games will be scheduled Monday through Thursday at 5:30pm at Briggs Field. All players must be MIT community members. Each team will play usually once a week.

"The league has been growing in popularity each year," Benichasa said. "Last year there were 200 players and 17 teams. This year we expect even more."



Tents on Kresge will house the post-Commencement reception. The large tent between Kresge and the Chapel will house the School of Engineering, the School of Humanities and Social Science and the School of Management. The School of Architecture and Planning and the School of Science will occupy the large tent on the lower plaza. Signs within each tent will identify the specific location of each school. Faculty members are encouraged to attend the reception to meet informally with students and their families.

TECH TALK
Volume 18, Number 45
May 29, 1974

Tech Talk: is published 50 times a year by the News Office, Massachusetts Institute of Technology. Director: **Robert M. Byers**; Assistant Directors: **William T. Struble, Joanne Miller, Margo Foote** (Photojournalist), **Charles H. Ball, Dennis L. Meredith, Robert C. Dilorio**; Reporters: **Sally M. Hamilton, Pat M. Maroni, Damon P. Wright**; Calendar of Events/Want Ads: **Susan E. Walker.**

Address news and editorial comment to MIT News Office, Room 5-111, Massachusetts Institute of Technology, Cambridge, Ma. 02139. Telephone Ext. 3-2701.

Mail subscriptions are $6 per year. Checks should be made payable to MIT and mailed to the Business Manager, Room 5-111, MIT, Cambridge, Ma. 02139.

Debanne Wins First Prize For Management Paper

Professor Joseph G. Debanne, visiting professor at the MIT Energy Laboratory and the Department of Ocean Engineering, has won the first prize of $2500 of the Institute of Management Science College on the Practice of Management Science.

His paper, "Management Science in Energy Policy: A Case History and Success Story," was judged the best of eight papers selected for the competition from among 90 abstracts submitted, following authentication of the respective applications in the organizations where management science was applied.

The papers were presented at the recent joint national meeting in Boston of the Operations Research Society of America and the Institute of Management Science. They were judged on presentation as well as subject matter.

Professor Debanne, who is visiting MIT from the University of Ottawa, Canada, focused in his paper on the role of management science in the 1967 decision of Canada's National Energy Board to reject a natural gas export application by Westcoast Transmission Co., Ltd., as a means to force a change in the US Federal Power Commission's "in line gas pricing policy" as applied to Canadian gas exports to the United States.

A compelling argument in favor of approval of the export on FPC's terms was the expert studies and testimony before NEB and FPC that the ceiling price imposed by the FPC on this gas export was equal to the delivered cost of natural gas to the Pacific Northwest from US sources of gas supply, he added.

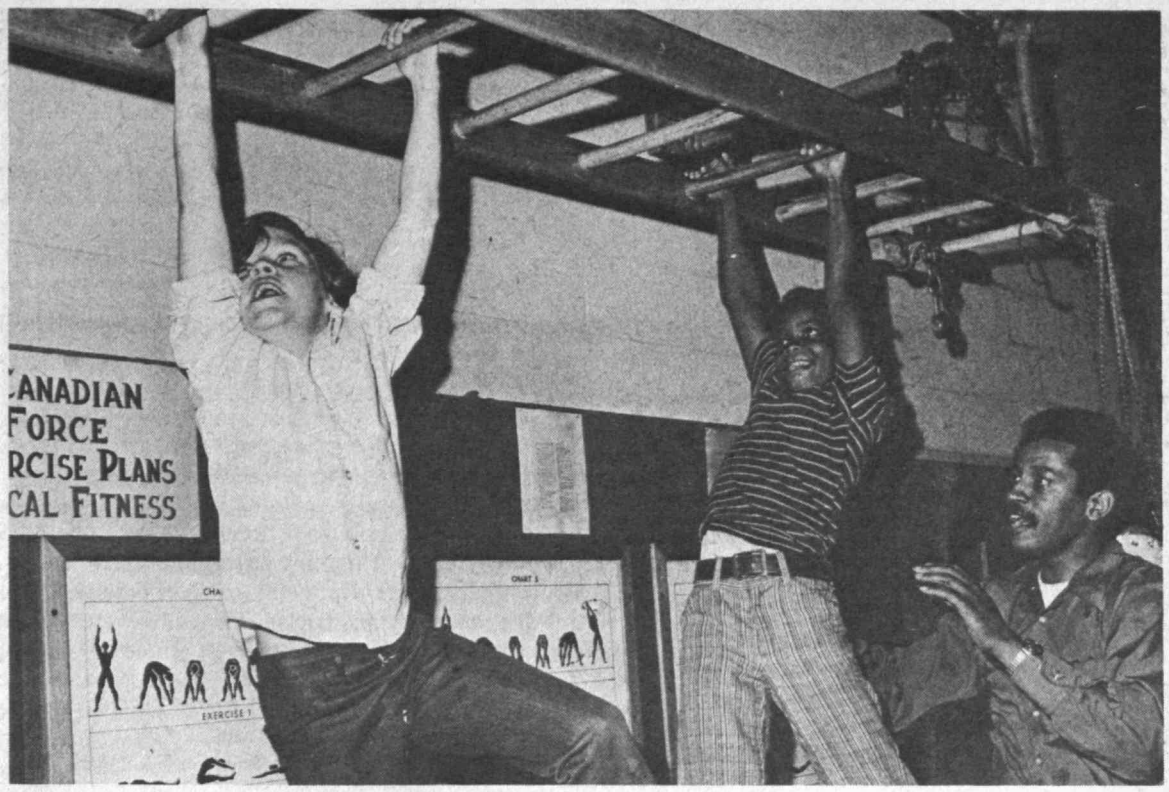
The key management science contribution was to disprove this expert testimony and to provide NEB with the analytical decision making framework that transformed the decision by NEB to reject the gas export application, into an acceptable risk with excellent chances of seeing the FPC back down, Professor Debanne said in his paper.

The 1967 decision, Professor Debanne said in his paper, is a watershed event in the history of the North American natural gas industry as it is the first time that the FPC backed down on a matter of gas price and on the terms of gas imports from Canada. In effect this was the first effective step toward deregulation of gas prices.

Kent Colton Named White House Fellow

Dr. Kent Colton, of Watertown, assistant professor of urban studies and planning at MIT, has been chosen as a White House Fellow for one year, beginning Sept. 1, 1974.

The announcement of the new group of Fellows was made recently by President Nixon. The Fellows will assist Cabinet members and White House staff officers.



Junior Beavers Michael Dupre (left) and David Knight test their strength in duPont Athletic Center for Patrolman Raymond Roberts.

—Photo by Margo Foote

Youngsters Enjoy New CP Program

Youthful next door neighbors of MIT's 130-acre campus are getting invited to ball games, fishing parties and the Edaville Railroad, thanks to four members of the MIT Campus Patrol.

The police officers are the founders of the MIT Junior Beaver Program, a new alternative for Cambridge youngsters accustomed to becoming "minor offenders" for confusing MIT with free playground space.

Saturday afternoon fun rather than detention dominates the theme of the project, which was developed through the voluntary efforts of Sergeant Marshall Cheverie, acting chairman of the group, Sergeant Robert Brown, Patrolman Edward Whitcomb and Patrolman Raymond Roberts.

Endorsed by MIT's Special Assistant for Urban Relations Walter L. Milne, as a program to divert area juveniles from entering the usual punitive justice system, Junior Beavers was made possible by an initial contribution from MIT's Community Service Fund.

Twelve trips, including outings to Massachusetts state parks, Provincetown beaches and New Hampshire campsites, are planned for the 15 Junior Beavers, who range in age from 9 to 15 years. They come mainly from the nearby neighborhoods of Newtowne Court and Washington Elms housing developments.

Patrolman Roberts, chairman of the Roberts Community School in Cambridge and a resident of the community bordered by Main and Columbia Streets, said, "Like MIT's Tutoring Plus and High School Studies Program, Junior Beavers will live in the hearts of many MIT neighbors. Because of their children's participation in these programs, neighborhood parents have come to view MIT as a more humane, less institutional place."

Community agencies that have acted as referral agents for the selection of Junior Beavers include the Youth Resources Bureau, the Margaret Fuller Neighborhood House and the Tenant Senate of Cambridge.

Coordinating off-hour shifts and alternate days off to be with the Junior Beavers, Officers Cheverie, Brown, Whitcomb and Roberts act as para-professional role models for the youths, MIT Campus Patrol Chief James Olivieri said. They conduct the program without financial compensation or staff assistance.

Further contributions, Campus Patrol estimates, could help expand membership in the program to as many as 50 youths.

One of the supervising officers said, "I believe we can not only reform recreation as a child in a housing project knows it, but we can also send one of these youngsters to MIT someday."

Boston Evening Globe
May 21, 1974

New era brings 5 women to MIT as Sloan Fellows

By Susan Trausch
Globe Staff

Only one woman, a nun, has participated. in the Sloan Fellows program at MIT's School of Management since it began in 1931.

This year five women are enrolled in a class of 50. Three are married and the husbands say they are looking forward to being billed as "Sloan wives."

Times change.

The women executives nominated by their employers and accepted into the 1974-75 master of science in management curriculum are: Carolyn S. P. Nanfeldt, financial analyst for General Motors Corp. in New York (the first woman nominated from US industry); Simone Stephens, assistant to the executive officer of Public Health Service, Department of Health, Education and Welfare, Washington, D.C.; Maureen A. C. Stefanini, student teachers supervisor, Worcester State College; Mary C. Zulalian, administrator, The Human Ecology Institute, Wellesley, Revathy M. Sriram of Colony, Madras, India, computer department manager at Binny, Ltd.

"When I attended the program in 1968-69, women were thinking differently about themselves than they are now," said Sister Anne O'Neil, treasurer of the New York Province of the Society of the Sacred Heart in Greenwich, Conn. "The school was most gracious and helpful and I felt they were making an effort then to recruit women applicants, but that women weren't applying."

Leslie Clift, assistant to Sloan School dean, William Pounds, said applications have increased for the Fellows program and for regular masters study. She said that this past year about 30,000 letters were mailed to MIT alumni asking for help in finding and attracting women executives, and Sloan Fellows director, Peter Gil also met with area company presidents.

"I've been writing personal letters to every woman who applies to the regular masters program," Ms. Clift said. "This year masters program applications increased 47 percent and there will be 25 women in a class of 100.

"What we're seeing is women's perspectives and roles changing," she continued. "It's not only affirmative action programs moving companies, it's women thinking of themselves differently, viewing their marriages differently."

Sloan Fellow Carolyn Nanfeldt and her husband Donald, a vice president in investment management at Lehman Brothers, will see each other on weekends during the coming year while she commutes between a Cambridge apartment and their New York home.

"We don't pretend it's going to be an easy year," Mrs. Nanfeldt said. "But this is an opportunity I couldn't pass up. I've been in employee benefits at GM and other companies for 11 years. This is a very specialized area and I want to broaden my business background and possibly move up into more of a managerial role."

"Our friends keep saying, 'how can you do it? It'll be terrible.' But I look at it as a logical step in Carolyn's career," Mr. Nanfeldt said. "I'd certainly go if I had the opportunity. Why shouldn't she?"

MARY ZULALIAN

CAROLYN NANFELDT

SIMONE STEPHENS

MAUREEN STEFANINI

Mary Zulalian and her husband, Harold, who owns an oriental rug business in Brookline, says they both expect to learn from the program.

"I'm a 'Sloan Wife' now," Mr. Zulalian said, "and I intend to study the reading material along with Mary. Also several lectures are open to me. I think it'll be great."

Simone Stephens said she felt it would be valuable studying management with men rather than in a women's school.

"Management happens to be a male dominated field and women have to learn to deal with that," Ms. Stephens said.

Maureen Stefanini said she was also looking forward to the classes, but not to paying for them. Cost of the year is $8200, and most companies pick up the tab.

"I'll be getting sabbatical pay for the year, but there are no grants available for this type of study and it's going to be tight for us," Mrs. Stefanini said. "This is an educational opportunity that I definitely want to take advantage of."

New Dictation Class to Begin

An introductory course in the techniques of machine dictation/transcription will be offered beginning Tuesday, June 4, by the Training Section of the Office of Personnel Development.

The course is offered both to typists who are currently using the equipment or would like to learn, and to supervisors, department heads and faculty who use the equipment for dictation. The course will be, at maximum, two hours long (one hour each day), with focus on proper transcription process, proper dictation process and an overall awareness of the two processes by both groups so that methods can be improved and a more even work flow achieved.

Classes are scheduled for Tuesday and Thursday starting June 4, at 10am in E19-730 and,depending on the number of enrollees, will continue in succession. Out of this short course an intensive course will be developed for those interested.

Registrations will be accepted by Mrs. Chandler in E19-734 or by phone at 3-1912.

Pershing Rifles Elects Hammes

Craig S. Hammes, a junior from Delta, Iowa, has been elected commander of MIT's Pershing Rifles unit.

The Pershing Rifles is a national Army Reserve Officer Training Corps society of ROTC cadets with headquarters at the University of Nebraska. MIT's unit—with members from all three services—contains the New England Champion ROTC rifle team and was named the outstanding cadet tactical unit in New England last year. The unit provided the Color Guard at New England Patriots home games last season.

Mr. Hammes, whose major is metallurgy and materials science, is the son of Mr. and Mrs. Robert Hammes of Delta, Iowa.

2 Students Win Transit Awards

Two MIT juniors in civil engineering were among eight recipients of $500 awards recently presented by the Massachusetts Highway Association.

The recipients of the prizes were all students who have special interests in transportation-oriented studies.

The two MIT students were Laurinda T. Bedingfield of Somerville, who is planning a career in high way construction management, and Michael G. Kozinetz, from West Springfield, Mass., who is interested in highway design.

Supercalifragilistic

Computer Learns to Read

By DENNIS L. MEREDITH
Staff Writer

"Supercalifragilistic" is the word typed into the computer sitting in the MIT electronics laboratory. During a 10-second pause, the computer digests the nonsense word, its display screen flickering as it shows how the word is broken apart and complex rules of pronunciation are applied.

Then, incredibly, out of a loudspeaker atop the computer comes an eery, flat voice proclaiming "SUPERCALI-FRAGILISTIC."

What is remarkable about this computer, developed by engineers in MIT's Research Laboratory of Electronics (RLE), is that it can pronounce any word in the English language, or any string of words.

Even more remarkable is that the computer need never have encountered a word before, but can pronounce it by figuring it out much the same way humans do, applying literally thousands of learned rules of pronunciation.

And also remarkably, the computer voice that utters the words is completely nonhuman in origin, having been constructed by a model of the human vocal tract programmed into the computer.

The text-to-speech system, developed by MIT engineers under the leadership of Jonathan Allen, associate professor of electrical engineering, began as part of an overall effort at RLE to build a machine to read to the blind.

According to Professor Allen major contributions to the work were made by RLE staff members Eric Jensen, Sharon Hunnicutt and Francis Carroll. Their contributions made much of the project possible, he said. Graduate students who have worked on the project include Thomas Barnwell, Yves Willems, and Douglas O'Shaugnessy. The research effort was first motivated by the late Samuel J. Mason, Cecil H. Green Professor of Electrical Engineering and Associate Director of MIT's Research Laboratory of Electronics, who died suddenly in March.

The reading machine project actually involved two enormous problems—first, building a machine to scan and recognize printed matter and transform it into computer language, and, second, building a computer to transform the scanned text into understandable speech.

Early work on computer-generated handwriting and pattern recognition was done at RLE by Professor Murray Eden. Extensive work on character recognition systems, particularly the recognition of type fonts, was done later at RLE by Professor Mason and Jon Clemens, then a doctoral student. Extensive work also was done on scanning devices by Professor William Schreiber and Donald E. Troxel at RLE.

A commercial outgrowth of the work at RLE has been the Autoreader, manufactured by ECRM, Inc., of Cambridge, Mass. The Autoreader transforms typewritten copy into computer representations of the copy and is used primarily in the newspaper industry for computer-controlled typesetting. ECRM has made a gift of an Autoreader to RLE and this device is connected to the text-to-speech computer.

Professor Allen's own work on the text-to-speech system is based on earlier work by Professor Francis F. Lee of RLE.

Although a reading machine for the blind is still one goal of Professor Allen's work in text-to-speech conversion, he also sees a wide range of other uses for a talking computer. A major use of the machine would be as a general computer output device, enabling a human to hear what information a computer has to offer. For instance, a library user of the future, desiring information over the phone, could have it automatically read to him from a computer.

The pronouncing computer could also be quite valuable in computer-aided instruction, such as teaching children to read, said Professor Allen.

And, in fact, reading instruction could also be aided by what the MIT researchers discovered they had to do to teach the computer to read. Their experience in programming the computer represents at least a partial statement of the capabilities used by humans in order to learn to read aloud. In addition, the text-to-speech computer can be used as a general model for a machine that can ingest and apply large numbers of rules to problems. Thus, the basic strategy of programming could be applied to other computer projects.

Earlier work on the reading machine for the blind received initial support from the Moses Foundation with supplementary funds from Miss Madeline Moses. Various aspects of the overall research was supported by the National Institute of General Medical Sciences and the National Institute for Neurological Diseases and Stroke, both parts of the National Institutes of Health, and by the Joint Services Electronics Program.

In developing their "pronouncing computer," Professor Allen and his colleagues avoided what they term the "brute force" method of teaching a computer to read aloud.

"We could have attempted to feed all the words in the English language into the computer's memory, and instructed the computer to match each word in a text with a pronunciation," he said.

"This would have been unwise, however, because the number of English words is enormous—several-hundred-thousand—and because new words are constantly being invented.

"It would be extremely difficult and unwieldy to cram all the known words into a limited computer memory, and to attempt to keep up with the words that enter our language continually. It is much better to proceed from a basic understanding of the general linguistic rules of pronunciation. The basic properties of English would be applicable for a much longer period than mere word lists."

Fortunately for the engineers, almost all words, both old and new, are made up of a relatively few basic atomic units, which remain the same over long periods. For instance, "earthrise" and "cran-apple" are such new words invented out of old ones.

According to Professor Allen there are "only" about 11,000 of these units, called morphs, and using these, a computer can understand at least ten times that number of words.

"The morph lexicon within our computer includes, not only all the commonly known prefixes, suffixes and Latin roots, but many special cases of pronunciation which we found convenient to put intact into the computer," said Professor Allen. "For instance, the word 'of' is a frequently used exception to the rule that 'f' is pronounced as in 'fragment'."

Although feeding the 11,000 morphs into the computer was relatively simple, the engineers soon found themselves up to their linguistic necks in the problem of correctly breaking words down into their morphs.

For instance, morphs often change when they become part of a word—"choke" loses an "e" in the process of becoming "choking," and "pit" gains a "t" when it becomes "pitted." Professor Lee had developed a powerful set of rules to enable the computer to break up the word into the correct chunks.

Professor Allen added to these rules by developing a computer program to select the correct set of chunks for each word. For instance, the word "scarcity" is broken down by the computer as scar-city, scarce-ity, or scar-cite-y. The correct choice among these requires a special rule, and the computer has been taught to prefer the set of chunks containing a prefix or suffix over the set made of compounded words. Thus, it chooses scarce-ity as the correct set of morphs.

Even with these rules, the computer would still not be a successful pronouncer—just as with a human, a pronouncing computer must resort occasionally to sounding out words phonetically it cannot recognize as combinations of known morphs.

To achieve this, the research team developed and taught the computer more than 400 letter-to-sound rules for sounding out words not recognizable as understandable chunks. In using these rules, the computer first breaks off understandable prefixes and suffixes, then figures out the consonant sounds in the remaining chunk, and finally determines the vowel sounds.

Not only are the basic sounds of letters and combinations included in these 400 rules, but also rules governing allowable combinations of sounds. For example, in stripping the word "corpuscular" the computer knows it is not allowed to strip off the initial "co-" because one of its rules tells it—there is no such initial sequence as "rp" in the English language.

By combining the 11,000 morphs, and the 400 letter-to-sound rules, the engineers had a computer that could pronounce individual syllables strung together, but pronouncing entire words created still more problems.

When syllables are strung together into words, pronunciation changes show up because of the influence of the other syllables.

"Morphophonemic changes" occur in pronouncing letters, according to where they occur in a word. Thus, "s" is pronounced differently in "agress" and "agression."

"Lexical stress" changes are shifts in pronunciation according to what morphs are present. Thus, the noun "rebel" is pronounced much differently when it is part of "rebellion," and "reverent" changes when it becomes part of "reverential."

The MIT engineers drew on rules of linguistics developed by numerous researchers, prominent among them Noam Chomsky, the F.P. Ward Professor of Modern Languages and Linguistics; and Morris Halle, Professor of Foreign Languages. Using these rules the engineers taught the computer how to combine their hard-won syllables into correctly pronounced words.

Even with all this analysis, the text-to-speech computer would still have stood mute before its creators, for it would lack a vocal tract to convert pronunciation instructions to intelligible speech. Basically, said Professor Allen, this means transforming pronunciation marks into dynamic information telling a vocal tract how to alter itself from microsecond to microsecond as it proceeds through a word pronunciation.

The computer was given an electronic voice by Dennis Klatt, a research associate in electrical engineering. Dr. Klatt developed a computer model of the human vocal tract and a set of rules for transforming phonetic symbols into control instructions for that model. Thus, as information on the pronunciation of a word is available, the computer instructs the vocal tract model in how to build the speech wave within it. When these waves are fed through a loudspeaker, the computer "gives voice to its thoughts."

Basic work in speech analysis and synthesis which formed the basis for Dr. Klatt's work has been underway in RLE's Speech Communications Group under the direction of Professor Kenneth M. Stevens for nearly two decades.

Although the MIT computer system can correctly pronounce any word in the English language, its voice is still quite flat and featureless. This is because the MIT engineers are still very much immersed in the problem of teaching the computer how to pause and inflect at the proper place in a sentence, and even to change the pronunciation of words according to how they are used in the sentence.

Without this capability in the computer, people listening to the machine would be occasionally confused by unclear phrasing and by different possible pronunciations and meanings of such words as "refuse," "survey," ans "separate."

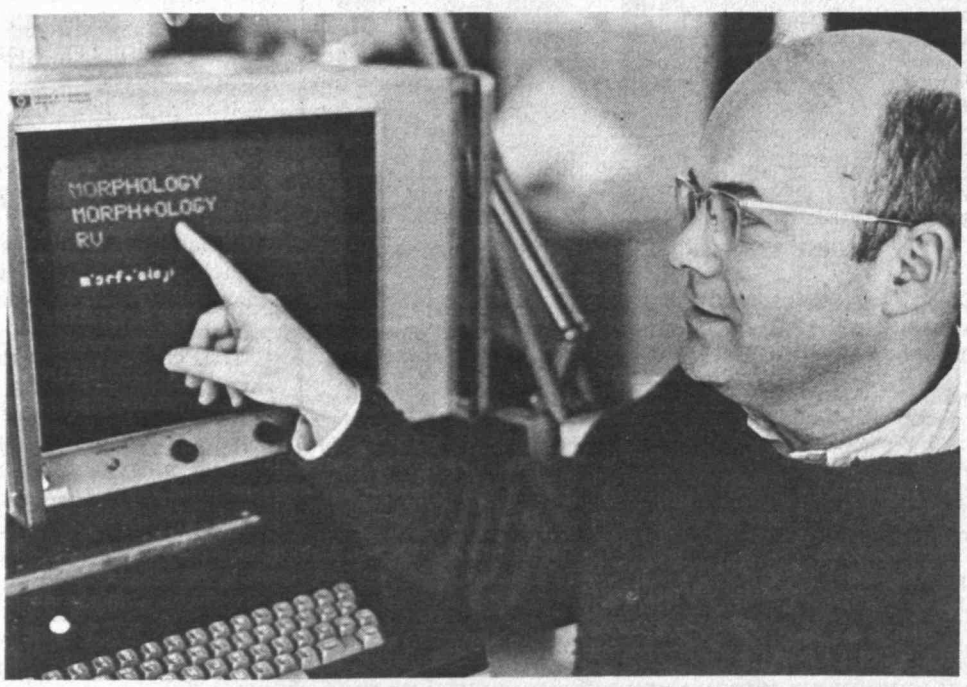
"Our task at the sentence level is nothing less than to determine from a given text the speaker's intent and to compute the corresponding acoustic information to supplement and modify what the computer has learned about pronouncing the individual words," said Professor Allen.

Although much remains to be done to program a computer to utter natural-sounding sentences, the engineers do have a handle on the problem.

For instance, in order to obtain natural sounding speech, the computer must be able to parse correctly each sentence—dividing the sentence into its component grammatical parts to understand its meaning. Most computer programs to parse sentences work from the beginning of a sentence to the end. If such a "parser" runs into difficulty at the beginning of a sentence, it gives up, even though it may have been able to analyze successfully later parts of the sentence. Professor Allen and his colleagues have found that a sentence analyzer can be developed which looks for useful phrasings throughout the sentence, and then searches for ways to connect them later.

"Using such local analysis, even if a parser fails to 'understand' a particular sentence, it fails gracefully, still obtaining as many recognizable phrases as possible," said Professor Allen.

The MIT scientists recognize that, even with this powerful approach, they will still have to make substantial progress in linguistics and parsing techniques before a computer can analyze sentences and speak them naturally. However, the techniques are advanced enough now to begin utilizing them in practical devices.



Professor Jonathan Allen shows how MIT's pronouncing computer analyzes the word "morphology." Using literally thousands of pronunciation rules, and a computer model of the human vocal tract, the computer can pronounce any word or string of words in the English language.

—Photo by Margo Foote

Student Honors

Writing Grants

Winners of MIT Summer Writing Grants were recently announced by the Department of Humanities.

The grants are awarded to help alleviate financial problems for students who wish to pursue serious writing projects during the summer.

The winners of prizes are **Anne McKinnon**, junior in life sciences from Wayland, $800 for a collection of poetry; **Marty S. Sasaki**, a sophomore from Hawthorne, Calif. and **Michael P. Thomas**, a senior in economics from Bowie, Md., $1,000 for a joint project of photography and poetry titled "Living Together"; **Anthony P. Cortizas**, a junior in humanities and science from Winchester, $800 for a novel, and **Alexander R. Jones**, a senior in humanities and science from Washington, D.C., $800 for a novel. The judges also awarded $200 to **Michael W. Gilbert**, a sophomore from Brussels, Belgium, for a short novel.

Honorable mentions went to **Michael D. Miller**, a junior in mathematics from Concord; **Patricia Beth O'Sullivan**, a junior in mathematics from Watertown who was recently awarded a Robert A. Boit writing prize; and **Lorin Kenneth Rosenthal**, a junior in physics from Beverley Hills, Calif.

Recipients of the prizes were chosen on the basis of writing samples and proposals for their summer projects. The judges were Floyd B. Barbour, assistant professor of literature; Ellen Bass, a poet and editor of the poetry anthology, *No More Masks*; Dean Mary Hope, assistant dean for student affairs and Mrs. Laya Wiesner, wife of the president of MIT.

DeFlorez Awards

The Department of Mechanical Engineering has announced six winners of the annual Luis De Florez Awards for undergraduate design projects.

The first prize award of $500 was won by **Gordon O. Salmela**, a senior from Braintree, who designed a rotary rolling conduit for the Ainslie Corp. of Braintree.

Second prize went to **Marc J. Rosenbaum**, a junior from Newtonville, for the design and construction of an ultralight track bicycle. He won $400 for the project.

Third prizes of $300 each were won by **James B. Cook**, junior from Cambridge, Mass. and **Roy F. Greenwald**, a junior from Barrington, R.I., for a wire-skiving gage; **Rene G. Gonzalez**, a freshman from Southfield, Mich., for steeping-assist drive system and **Anthony S. Pruszenski, Jr.**, junior from Cambridge, for a pivoted ghree wheel motocycle.

Guillemin Prizes

The Department of Electrical Engineering recently announced the winner of the first annual Ernest A. Guillemin Prize for the best undergraduate thesis in electrical engineering—**Robert M. Elkin** for "An Evaluation of a Computer-Assisted Newspaper Display-Ads Layout System."

The $500 prize was awarded for Elkin's research developing a computer-assisted system for laying out display advertising in a newspaper. The program was succesfully tested on issues of two area papers, the *Boston Globe* and the *Worcester Telegram*.

Elkin, of Brooklyn, N.Y., will receive SB degrees in management and electrical engineering at commencement. He has held several positions on *The Tech* and is former chairman. Elkin is planning a newspaper career.

Two honorable mentions were also awarded to **Philip W. Herman, Jr.**, of Edina, Minn., for PSYCBL and CALCBL—A Computer System for the Real-Time Control, Analysis and Simulation of Experiments" and **Sheldon Lowenthal**, of Cambridge, for "A Novel Design for a Fluid Electric Switch."

The Guillemin Prize was established in honor of the late Ernst A. Guillemin, an MIT faculty member from 1926 until his death in 1970. Throughout his career Professor Guillemin devoted his primary efforts to both graduate and undergraduate education.

Carnegie Interns

Two women students have received Carnegie Summer Internships under the "Women and Career Options" project of the Carnegie Corporation.

They are **Judy Ellenson**, a senior in mathematics from Newport, News, Va., and **Sharon Bernstein**, a freshman from Spring Valley, N.Y.

Ms. Ellenson will work at the Charles Stark Draper Laboratory, examining the role of women in a computer programming environment.

Ms. Bernstein will work at the Sloan School of Management with Leslie Clift, assistant to the dean, exploring management fields as professions for women.

The Carnegie grant was announced last year. The internships were provided to encourage undergraduate women to enter careers that are considered non-traditional for women.

Chem. Eng. Awards

At the annual Chemical Engineering Awards ceremony, Professor Raymond F. Baddour, head of the department, presented the following awards to graduating seniors:

—The Haslam Cup awarded annually "to a senior for outstanding professional promise" was won by Stephen A. Reber, a senior from York, Pa.

The Hunneman Prize, the oldest award in the department was awarded to **Mottlene Wang**, a graduate student from Convent Station, N.J. The prize includes a check for $100.

The American Institute of Chemists Award was won by **Howard J. Herzog**, a senior from Rochester, N.Y. The award is given to a student who "displays outstanding promise through demonstrated scholarship and leadership for advancing the professional aspect of the scientific community".

Tucker-Voss Awards

Janet A. Rossow and **Douglas R. Coonley** are this years winners of the Tucker-Voss Award given for "high scholastic standing, leadership and professional promise in the field of engineering and construction."

Mrs. Rossow, a resident of Cambridge, is a PhD candidate in the Department of Civil Engineering and is pursuing an interdepartmental program in civil engineering and management. She received her SB and SM in civil engineering at MIT. Both her SB and SM theses were related to the construction industry.

Mr. Coonley, whose family resides in Hopkins, Minn., will receive the Master of Architecture degree this spring. Mr. Coonley's speciality is energy flows in and around buildings. His master's thesis is titled *Design with Wind*. He has done several research projects in his field and has been a teaching assistant in technical subjects in the Department of Architecture and Planning.

Woodrow Whitlow holds a series of aerodynamic models, representing different shapes of the forebodies of supersonic airplaines, which he used in his prizewinning research. Mr. Whitlow studies how shock waves from the shapes were affected by changes in air pressure.

Whitlow Wins AIAA Award

A senior in the Department of Aeronautics and Astronautics at MIT has won a regional award for his research on shock waves and sonic booms.

Woodrow Whitlow Jr. of Inkster, Michigan won the 1973-74 student award of the American Institute of Aeronautics and Astronautics, New England Section for his research on "The Effects of Flow Gradients on the Near-Field Structure of Shock Waves and Sonic Booms." The award carries with it a prize of $500.

Whitlow, who will enter MIT as a graduate student next fall, conducted his research under the auspices of Dr. Wesley L. Harris, associate professor of aeronautics and astronautics and associate professor of ocean engineering. Whitlow's research was supported by the National Science Foundation and the Department of Aeronautics and Astronautics, and was initiated as part of MIT's Undergraduate Research Opportunities Program (UROP).

In his research Whitlow examined pressure waves created by various shaped objects placed in the supersonic flow in a wind tunnel. According to Whitlow, his findings could have application in studies of the upper atmosphere, the upward propagation of shock waves from thunderstorms, earth quakes and volcanic eruptions; and the propagation of shock waves from supersonic aircraft and re-entering space vehicles.

Work Study Funds Suffer Cutback

The federal government has cut back sharply its financial support of the College Work Study Program at MIT.

Lawrence E. Maguire, director of student employment and assistant director of financial aid at the Institute, said federal support for the CWSP in fiscal year 1975 will be about 44 percent lower than the year before.

As a result, he said, there will be no work study support this summer for graduate or undergraduate programs, except those few for which commitments were made early in fiscal year 1974 and whose project completion due dates occur in July and August.

"No new commitments will be made for summer CWSP support," Mr. Maguire said. "This applies to both on- and off-campus programs."

"The reduction in federal funds means that we will have to redouble our efforts to discover new job slots and that we will not be able to continue to offer prospective employers a return of 80 percent of the salary paid student workers," Mr. Maguire said. (Graduate student employers will be eligible for the 80 percent return beginning in the fall.)

"We hope that through past development programs we have introduced to employers the excellent employment resource that students represent, and that many will continue to employ students even without the 80-percent support."

The Tucker-Voss award was established in 1954 by the alumni of the then Department of Building Engineering and Construction to honor Ross F. Tucker, founder of the course, and Walter C. Voss, Tucker's successor as head of the department.

The award is not limited to any department and may be given to either a graduate or undergraduate student. Since 1954, the award has been given to 27 recipients.

Elderly Workshop Operations Expand

The Sage Workshop, a sheltered workshop for the elderly in North Cambridge started a year ago under MIT auspices, is expanding to accommodate approximately 40 half-day workers.

The workshop has been operating mornings only, carrying out mailing projects for the Millipore Corporation of Bedford. In a new afternoon program, elderly workers will package ear plugs for E.A.R., a division of the Cabot Corporation.

Phi Beta Kappa Elects 64 at MIT

Sixty four members of the Class of 1974 became members of the MIT chapter—Xi Chapter—of Phi Beta Kappa recently at an informal ceremony.

The Xi Chapter was established in 1971. Membership is the highest honor for academic achievement in the humanities, social sciences and science at MIT.

The Institute is the only institute of technology to be granted a Phi Beta Kappa chapter and the only school whose members receive only bachelor of science degrees. E. Neal Hartley, professor of history and Institute Archivist, is president of the Xi Chapter, Vincent A. Fulmer, Secretary of the Institute, is treasurer and John I. Mattill, editor of Technology Review is secretary.

The new members of Xi Chapter are:

Alex M. Aisen of Scarsdale, N.Y., Physics; **Maureen M. Alexander** of Laredo, Tex., life sciences; **Stephen R. Belejack** of Weston, mathematics; **Lawrence D. Bell** of Cincinnati, Ohio, mathematics; **Gilbert Berdine** of Skokie, Ill., chemistry; **Martin F. Brooks** of London, Ont., mathematics.

Ira M. Cohen of Seaford, N.Y., physics; **Mark E. Davison** of Carleston, W. Va., mathematics; **Frank J. DeLuccia** of Saddle Brook, N.J., physics and mathematics; **Marvin J. Essrig** of Tampa, Fla., mathematics; **Michael P. Filosa** of Denver, Col., chemistry; **David A. Fischoff** of Detroit, Mich., life sciences.

Alan S. Fisher of Toronto, Ont., electrical engineering and physics; **Douglas B. Fried** of New York, N.Y., mathematics; **Leland M. George** of Stonewood, W. Va., mathematics; **Janice I. Gepner** of Elmont, N.Y., chemistry; **Joan S. Gildin** of Great Neck, N.Y., architecture.

James R. Groff of Palmyra, Penn., mathematics; **Elizabeth Anne N. Hsu** of Cambridge, life sciences; **Glenn A. Iba** of Hershey, Penn., mathematics; **Frank A. Johnstone** of Berea, Ky., economics; **Stephen M. Kent** of West Orange N.J., life sciences; **Randy A. Kimble** of Allentown, Penn., physics.

Charles H. King of New City, N.Y., life sciences; **Jeffrey M. King** of Allston, life sciences; **Albert J. Lazzarini** of Santa Clara, Calif., physics; **Philip S. LeSourd** of Cambridge, humanities and science; **Howard L. Liber** of Stoughton, life sciences; **Virginia A. Lightner** of Santurce, Puerto Rico, life sciences; **Cecilia W. Lo** of Elmhurst, N.Y., life sciences.

Virginia A. Mann of Jacksonviile, Fla., interdisciplinary science program; **Daryl L. Merrett** of Regina, Sask., life sciences; **Frank E. Morgan, III**, of Allentown, Penn., mathematics; **Michael W. Moureau** of Davidson, Md., economics; **Roy S. Neff** of Philadelphia, Penn., mathematics.

Bahram Niamir of Addis Ababa, Ethiopia, mathematics; **Anthony D. Passera** of Bedford, mathematics; **Russell S. Phillips** of Newton, life sciences; **Clifford C. Podewell** of Evergreen Park, Ill., chemistry; **Seth H. Racusen** of Somerville, humanities and science; **Laurence H. Reece, III**, of Miami, Fla., political science; **Arthur D. Resnick** of Sharon, life sciences.

Charles S. Rosenblatt of Huntington, N.Y., physics; **Robert L. Roth, Jr.**, of St. Petersbury, Fla., mathematics; **Paul E. Salomaa** of Wollaston, mathematics; **Laurence J. Segil** of Highland Park, Ill., chemistry; **Fred R. Shapiro** of Roslyn, N.Y., humanities and science; **Alan R. Sheff** of Great Neck, N.Y., life sciences;

Theodore Shifrin of Natick, mathematics; **Scott H. Shlecter** of Flushing, N.Y., management; **Kenneth G. Skier** of Northboro, humanities and science; **Eliot R. Spindel** of Los Angeles, Calif., life sciences; **Richard B. Steinberg** of Baltimore, Md., mathematics; **Janet D. Stoltz** of Brooklyn, N.Y., electrical engineering and physics.

David E. Sullivan of Cambridge, political science; **Benjamin Svetitsky** of Bronx, N.Y., physics; **Jonathan Tepper** of Chevy Chase, Md., management; **Richard W. Trepeta** of New Hyde Park, N.Y., life sciences; **Ira M. Wasserman** of Brooklyn, N.Y., physics; **David S. Weigle** of West Hartford, Conn., life sciences.

Jeffrey C. Weinreb of East Meadow, N.Y., life sciences; **Elizabeth F. Wise** of Evanston, Ill., life sciences; **Henry K. Yee** of Renton, Wash., chemistry; and **Dirk A. Zwemer** of Kensington, Md., chemistry.

THE INSTITUTE CALENDAR

May 29 through June 12

Events of Special Interest

Topper Carew* – Special rock & blues concert, sponsored by Lobby 7 Committee. Wed, May 29, 12n, Great Court.

Military Commissioning Exercises – Thurs, May 30, 11am, Kresge Auditorium.

Commencement Exercises – Fri, May 31, 10:30am, Rockwell Cage.

President's Reception – For graduates and their guests. Fri, May 31, 1pm, West Campus.

1974 Alumni Days – This is not a complete schedule. For further details consult the Alumni Days brochure, which also contains registration forms for those events which require tickets for admission.

Sunday, June 2

Automobiles of the Past – See and ride in vintage cars. 1-7pm, Briggs Field.

Film Series – ABC Series – What About Tomorrow – Searching the Unknown; City of the Future; Facing the Consequences. 2-3:20pm, Kresge Little Theatre.

A New Concept in Education – Seymour A. Papert, education & applied mathematics; co-director, Artificial Intelligence Lab. 3:30-4:45pm, Kresge Auditorium.

Class Cocktail Parties – Cocktails at new fraternity houses, 5-6pm, 405-407 Memorial Drive. Tickets required.

International Buffet – Sumptuous dinner from around the world, with an unlimited supply of draft beer. 5:30-7:30pm, Stu Ctr. Tickets required.

Tech Night at the Pops – Arthur Fiedler at his best. 8:30-10:30pm, Symphony Hall. Buses leaving from front of Stu Ctr, 7pm, Tickets required, available Rm E19-437, x3-4876.

Monday, June 3

Perspective: A historical look at the impact of the automobile on America.

The Dangerous Future – Elting E. Morison, Elizabeth and James R. Killian Professor, School of Humanities. 9-9:20am, Kresge Auditorium.

Changing Constraints: 9:30-11:30am, Kresge Auditorium. Participants: **Automotive Fuels – Morris A. Adelman,** economics. **Environment – Henry D. Jacoby,** management. **Congestion, Shortages and Equity – David Gordon Wilson,** mechanical engineering. **Safety – William Haddon, Jr, M.D.,** '49 president; Insurance Institute for Highway Safety, Washington, DC. Question and answer period.

Future Options: A review of some of the alternate routes we're likely to take. 2:30-5pm, Kresge Auditorium. **Alfred A.H. Keil,** Dean of the School of Engineering; ocean engineering; moderator. Participants: **Technology and Design in the Future – John B. Heywood,** mechanical engineering. **Fred Bowditch,** executive environmental activities staff, General Motors. **Public and Mass Transportation – Daniel Roos,** civil engineering. **Government and Public Policy – Alan Altshuler,** secretary of transportation & construction, Commonwealth of Massachusetts. **Legislative and Legal – Lloyd Norton Cutler,** Wilmer, Cutler and Pickering, Washington, DC. **Industrial Strategies – James W. Ford,** assistant controller, Ford Motor Finance Staff. Question and answer period.

Social Hour – 5:15-6:15pm, duPont Athletic Center. Tickets required.

Seminars and Lectures

Wednesday, May 29

A Three Component Laser Interferometer for Measurement of Turbulent Flow – Joseph E. Rizzo, aero/astro, Southampton University. Mechanical Engineering Seminar. 4pm, Rm 3-343.

IC's and Op Amps in Audio* – **Barry A. Blesser,** electrical engineering; **Rene Jaeger,** dbx Inc. WTBS, Audio Engineering Society Boston Section Monthly Meeting. 8pm, Rm 6-120. Info, Frank Cunningham, 521-1150.

Thursday, May 30

Post Critical Heat Transfer to Flowing Liquid in Vertical Tubes – David M. Plummer, G. Mechanical Engineering Doctoral Thesis Presentation. 10am, Rm 5-217.

Monday, June 3

Perspective: A historical look at the impact of the automobile on America.

The Dangerous Future – Elting E. Morison, Elizabeth and James R. Killian Professor, School of Humanities. 9-9:20am, Kresge Auditorium.

Changing Constraints: 9:30-11:30am, Kresge Auditorium. Participants; **Automotive Fuels – Morris A. Adelman, economics. Environment – Henry D. Jacoby,** management. **Congestion, Shortages and Equity – David Gordon Wilson,** mechanical engineering. **Safety – William Haddon, Jr. M.D.,** '49 president; Insurance Institute for Highway Safety, Washington, DC. Question and answer period.

Social Hour – 5:15-6:15pm, duPont Athletic Center. Tickets required.

Tuesday, June 4

CAIN* – Free on-line demonstration of NASIC's new data base of agricultural and nutrition literature. 3pm, Dewey Library. Info, arrange demonstration of any NASIC data base, call Coordinating Office, Rm 10-400, x3-7746.

Friday, June 7

Generation of Intense Ion Beams* – Dr. S. Humphries, Cornell University Informal RLE, Plasma Dynamics Seminar. 3pm, Rm 36-261.

Community Meetings

Women's Forum* – Meet with the Steering Committee to make plans for the fall. Mon, 12n, Great Court; bad weather, Rm 10-280.

Introduction to PL/1** – Information Processing Center course, June 3, 5, 7, 10, 12 & 14, 10am-12n, Rm 39-530. Enrollment limited, pre-registration required. Fee: $10. Register, Lynne Penney, Rm 39-427, x3-6320. No previous knowledge of programming will be assumed.

MIT Club Notes and Meetings

Classical Guitar Society – Classes, group or private. Thurs, 5-9pm; Sat, 9am-12n; Rm 1-132, 134, 136. New group class for beginners every month. Vo Ta Chuoc, x9633 Dorm.

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

Student Homophile League* – Meetings 1st and 3rd Sun of each month, 4pm, Rm 1-132; next meeting Sun, June2. Info, talk, help in coming out, call Hotline, 494-8227. Come out, come out, wherever you are!

Strategic Games Society* – Offers opponents and discounts on merchandise to members plus gaming and periodical library. Sat, 1pm-1am, Walker Rm 318. Info, Kevin Slimak, x0389 Dorm.

Wellesley Events

Agnes Abbot: A Retropsective Exhibition* – Includes 60 water color landscapes and several in oil. Thru Wed, June 5, Wellesley College Museum, Jewett Arts Center, Wellesley campus. Hours: Mon-Fri, 8:30am-5pm; Sat, 8:30am-12n, 1-5pm; Sun, 2-5pm. Free.

The Claude Lorrain Album* – Sixty drawings from the collection owned by Norton Simon, Inc. Museum of Art. Through Sat, June 8, Wellesley College Museum, Jewett Arts Center. Hours: Mon-Fri, 8:30am-5pm; Sat, 8:30am-12n, 1-5pm; Sun, 2-5pm.

Movies

2001 Space Odyssey* – Sponsored by senior class. Wed, May 29, Sala. Times will be announced during finals week.

Bullit – LSC. Fri, May 31, 7pm, 9:30pm, Rm 10-250. If its a hot night, Rm 26-100. Admission 50 cents.

Voyage to Italy – Film Society Fri, May 31, 7:30pm, 9:30pm, Rm 6-120. Admission $1.

Monkey Business – LSC. Sat, June 1, 7:30pm, 9:30pm, Rm 10-250. If its a hot night, Rm 26-100. Admission 50 cents.

Gai Aur Gauri* – SANGAM. Indian movie with English subtitles. Sun, June 2, 3:30pm, Rm 26-100. Admission 50 cents with ID. Indian Refreshments available.

Fantastic Voyage – LSC. Fri, June 7, 7pm, 9:30pm, Rm 10-250. Hot weather, 26-100. Admission 50 cents.

Rocco and his Brothers – Film Society. Fri, June 7, 7:30pm, 9:30pm, Rm 6-120. Admission $1.

The Great Race – LSC. Sat, June 8, 6:30pm, 10pm, Rm 10-250. Hot weather, Rm 26-100. Admission 50 cents.

Seetha Aur Geetha* – SANGAM. Indian movie with English subtitles. Sun, June 9, 3:30pm, Rm 26-100. Admission 50 cents with ID. Indian refreshments available.

Dance

Folk Dance Club* – International, Sun, 7:30-11pm, Sala. **Balkan,** Tues, 7:30-11pm, Stu Ctr Rm 491. **Israeli,** Thurs, 7:30-11pm, Sala. **Afternoon Dance Break,** Fri, 12:30-1:30pm, Kresge Oval.

Exhibitions

Photographs by MIT Students* – Exhibition of black and white prints. Thru Sat, June 1, Creative Photography Gallery. Hours: 12n-7pm weekdays, 12n-6pm Sat, Sun. Free.

Paintings from the Museo de Art, Ponce, Puerto Rico* – Organized by MIT Committee on the Visual Arts. Fri, May 17-Sat, June8, Hayden Gallery. Hours: Mon-Sat, 10am-4pm; closed Sun, holidays. Free.

Music Library Exhibit – Chinese musical instruments.

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.

Athletics

Maggie's Spring Exercise Marathon** – Beginning Mon, June 3, daily for 2 weeks, 5 hours of exercise per day: 7-9am, 12n-2pm, 5-6pm, duPont Athletic Ctr. Only those who have been exercising regularly, including running, for 1½ hours/day, should expect to participate.

MIT Community Softball League** – Team and individual entries being accepted (deadline June 3). Season June 10-Aug 15, games at 5:30pm about once a week. Charge: $40/team to pay for umpires & balls. Experienced umpires needed, $5/game. Sam Benichasa, league commissioner, x8-3686 Drpaer, 10-12 or 2-4.

Religious Services and Activities

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

Campus Crusade for Christ/College Life* – Family time, singing, prayer, teaching from God's word. Fri, 7:30pm, Rm 37-252.

Announcements

Attention: UROP – UROP summer funding review is closed. We're broke!

Official Notice – Second term grade reports will be mailed to home address on Mon, June 3. Students should report address corrections to Registrar's Office, Rm E19-335, no later than Wed, May 29. Telephone requests will not be granted.

Official Notice – Transcripts with June grades included will be available the week of June 24, if orders are placed now. Transcripts without June grades may be ordered up to June 14.

Dining Service

Dining Specials – Thursday, May 30 – Lunch; fish 'n chips. Dinner: beef burgundy over rice. **Friday, May 31** – Lunch: baked fish with lemon butter. Dinner: chicken chow mein over toasted noodles. **Monday, June 3** – Lunch: chili chop steak on bun. Dinner: escalloped ham & potato. **Tuesday, June 4** – Lunch: macaroni, beef & tomato. Dinner: beef stew over rice. **Wednesday, June 5** – Lunch: baked cod cutlets. Dinner: creamed chicken & mushrooms over toast.

***Open to the public**
****Open to the MIT community only**
*****Open to members only**

Send notices for June 5 through June 16 to the Calendar Editor, Room 5-111, Ext. 3-3279, before noon Friday, May 31.

Transit Experts Speak

(Continued from page 1)

market that would simultaneously permit the auto to be a "good neighbor" and free industry, suppliers and users from "unwarranted government interference in day-to-day and year-to-year operational decisions of corporations and of individual motorists."

William Haddon Jr., M.D., president, Insurance Institute for Highway Safety. Dr. Haddon believes the primary quality of life issue associated with transportation is the degree to which damage to people, both direct and indirect, is minimized. "Thus, the humane criterion for system choice and design, including hardware characteristics, is the extent to which human wastage is eliminated. "So judged," he says "the motor vehicle system has been and is a failure of monumentally tragic proportions."

Richard M. Soberman, professor of civil engineering at the University of Toronto and director of Metropolitan Toronto's Transportation Plan Review Board. Professor Soberman will explain why engineers and planners can no longer consider only cost-benefit questions in transportation planning.

Afternoon speakers will be:

John B. Heywood, associate professor of mechanical Engineering at MIT. He will discuss how automobile design is changing in response to emissions and safety regulations and the demands for improved fuel economy.

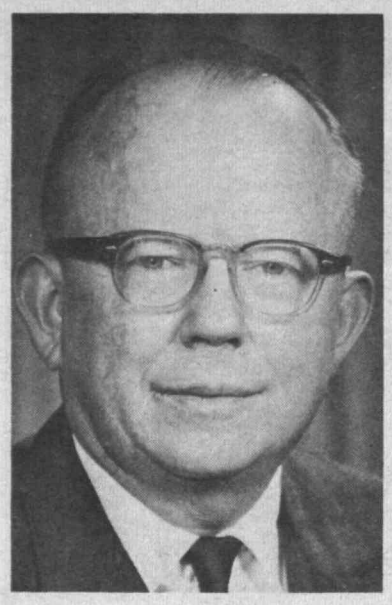
Fred Bowditch, executive assistant to the vice president, environmental activities staff, General Motors, who will offer the manufacturers' perspective to regulatory contraints.

Daniel Roos, MIT associate professor of civil engineering, who believes that the decline in mass transit cannot be attributed solely to a shift to automobile travel. Professor Roos says transit systems designed to service travel needs prevalent several decades ago have not been modified to reflect changes in urban development and trip making.

Alan Altshuler, state secretary of transportation and construction, who will discuss government and public policy.

Lloyd Norton Cutler, partner in the law firm of Wilmer, Cutler and Pickering, will offer his views on the limits of regulation as a solution for the social problems presented by the automobile. He will also discuss the importance of building incentives into the market system designed to achieve the kind of conduct society wants.

James W. Ford, assistant controller, Ford Motor Co. finance staff, will discus business response to market and government demands. He contends that, with the exception of emissions controls, most of the attributes society desires in its autos can best be obtained through the marketplace.



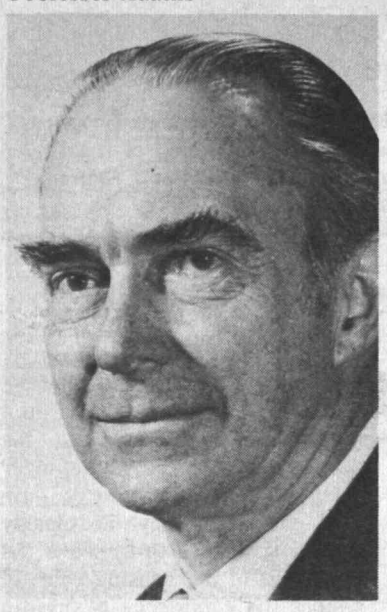
Professor Adams

Professor Bryant

Professor Freeman

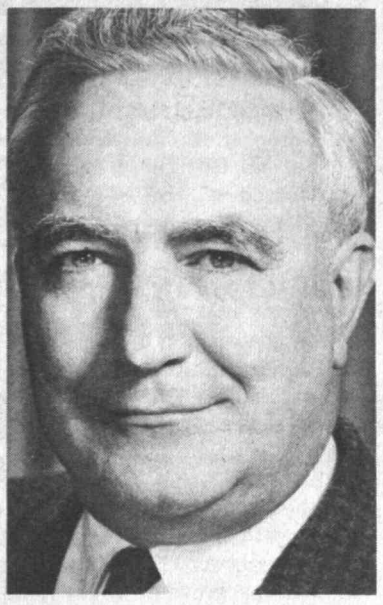
Professor Holley

Professor Locke



Professor Murray

Professor Starr



Professor Valley

Professor Wadsworth

Professor Weisskopf

Eleven Faculty Members Plan Retirement

Institute Professor Dr. Victor F. Weisskopf, universally respected contributor to modern physics, is one of 11 members of the MIT faculty who will formally retire at the end of this academic year.

Former Director-General of the European Center for Nuclear Research (CERN) in Geneva, Switzerland, and head of the Department of Physics, Dr. Weisskopf is retiring after 28 years at MIT. He was named James R. Killian Award lecturer at the beginning of the current academic year and has been active as leader of MIT's theory group in physics. A native of Vienna, Austria, Dr. Weisskopf received the PhD degree from the University of Gottingen, Germany, in 1931. The many papers he has authored on nuclear physics, quantum theory and radiation theory have distinguished him as a major force in the development of the physics curriculum at MIT.

Associate Professor of Russian Margaret Z. Freeman, who will retire after 42 years, designed and established MIT's language laboratory, which later became a model for many school systems. Formerly Director of the language laboratory and lecturer in the Department of Modern Languages, she initiated the first Russian course at MIT, with offerings in Advanced Russian and Russian Civilization. An emigre from prerevolutionary Russia, she lived much of her young life in Harbin, Manchuria, where she graduated from the Polytechnic Institute in engineering. In 1931 she received the SM degree from MIT, to which she has long devoted special interest in the areas of women undergraduates, freshmen advisors and research for the Provost.

Professor Victor P. Starr of the Department of Meteorology is a recognized authority on the circulation of planetary atmospheres and the author of the theory of negative viscosity. After receiving the AB degree from New York State College, the SM from MIT and the PhD from the University of Chicago, he joined the MIT faculty in 1947. The theories expressed in his book *Physics of Negative Viscosity Phenomena* have proven useful in understanding equatorial acceleration in the rotation of the sun and the maintenance of prevailing easterly and westerly winds around the earth.

Dr. George E. Valley, Jr., professor of physics, who was instrumental in developing the concept of linking radar with computers, has served as associate director of the Lincoln Laboratory while at MIT and Chief Scientist for the Air Force. He joined the staff of the MIT Radiation Laboratory in 1941 and was appointed assistant professor of physics in 1946. During the early fifties he directed the research that produced the SAGE Air Defense System developed at Lincoln Laboratory. A founder of the experimental studies group, he has also devoted much time to the modernization of the junior laboratory for physics.

In photography, the name of Minor White, head of MIT's Creative Photography Laboratory, has become synonymous with creativity and craftsmanship. The innumerable exhibits and "happenings" he has produced since he joined the faculty in 1965 have displayed many of the basic photography practices outlined in his book, *Zone System Manual*. Before coming to MIT, Professor White was a member of the faculty at Rochester Institute of Technology as well as curator of exhibitions and editor of "Image" at George Eastman House in Rochester. His photographs are represented in permanent collections of many museums.

Professor Lynwood Bryant of the Department of History played a prominent role in the development of the MIT Press and has been instrumental in guiding its growth to its present place of distinction among university presses. A recipient of the BA and MA degrees from Harvard, Professor Bryant has been a member of the MIT teaching staff since 1937. From 1963 to 1967 he and his wife shared the duties of Master of McCormick Hall, where they contributed much to MIT's first residence hall for women.

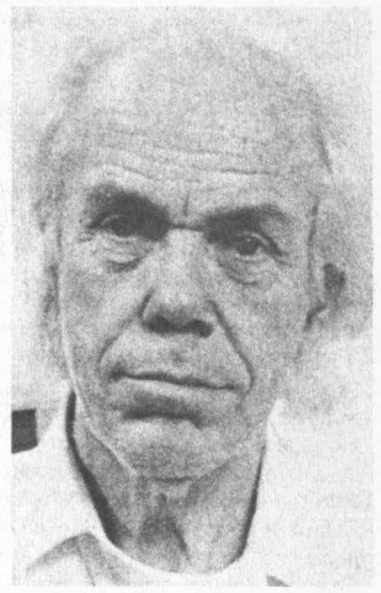
Professor William N. Locke came to MIT in 1945 as head of the Department of Modern Languages and became Director of the Libraries in 1956. He held both positions until 1964. A pioneer in library management and computerized library services, he is a graduate of Bowdoin College and Harvard College, where he received the MA and PhD degrees. His projects in speech analysis and machine translation of languages have given rise to much of the modern linguistic work accomplished at MIT. For the past two years he has served as Foreign Study Advisor.

George P. Wadsworth, who is retiring after 40 years on the MIT teaching staff, is a "pure product" of the Institute, having received his bachelor's, master's and doctorate degrees here. His work in applied mathematics and operations research contributed significantly to Norbert Weiner's classic theory on generalized harmonic analysis and provided the basis for understanding complex phenomena within the areas of meteorology and seismic exploration. For many years Professor Wadsworth was responsible for the entire advisory function for undergraduates in the Department of Mathematics.

Professor Douglas P. Adams, a member of the Department of Mechanical Engineering since 1938, attended Harvard Law School and is a member of the Massachusetts bar. Active for many years in the graphics activities of the mechanical engineering department, he has recently been engaged in harnessing the digital computer for use in the mechanical engineering profession. Members of the MIT community will long associate him with his lectures and seminars on historical Boston.

Professor Emeritus William M. Murray, of the Department of Mechanical Engineering, combined the management of MIT's Experimental Stress Analysis Laboratory and Cooperative Course II-B from the mid-1940's until his early retirement in June of last year. He has served as Executive Officer of the Department of Mechanical Engineering and placement officer for graduate students. He received the SB degree in 1932 from McGill University in Montreal, where he is a native, and the SM and ScD degrees from MIT in 1933 and 1936 respectively. One of the original founders of the national Society for Experimental Stress Analysis, Professor Murray continues to serve as a consultant to the Department of Mechanical Engineering.

The retirement of Myle J. Holley, Jr., Professor of Civil Engineering, has been announced within the past two weeks. A former assistant chief engineer for the S. Morgan Smith Company of York, Pa., before his appointment to assistant professor in 1947, he received the SB and SM degrees from MIT in 1939 and 1947 respectively. Over the years, the design of reinforced concrete structures has been of particular interest to Professor Holley. In 1959 he and four other MIT professors authored the textbook, *Structural Design for Dynamic Loads.*



Professor White

Leonard Named Food Services General Manager

Edward Leonard, food service manager at Illinois State University at Normal, Ill., has been named general manager of Food Services at MIT.

He will be responsible for overseeing all MIT food services, which up to now have been maintained on a contract basis with Stouffer's Food Services.

The Faculty Club, which is managed as a separate corporation, will continue to be serviced by Stouffer's.

The announcement of the new position was made by H.E. Brammer, Director of Housing and Food Services at MIT.

Leonard, who has managed all university union food services at Illinois State since 1968, was food services manager at Washington State University in Pullman, Wash., from 1965 to 1968.

Between 1957 and 1965 he worked for several commercial and industrial food suppliers in various capacities.

Leonard holds the SB and AB degrees in hotel and restaurant management from the University of Denver. He also attended the University of Illinois at Champaign prior to a five-year tour of duty in the Navy.

Married and the father of five, Leonard will be on campus later this week to observe dining preparations for MIT's commencement alumni activities.

He is expected to assume his duties as General Manager of Food Services some time in June.

Tennis Lessons

The Department of Athletics is offering both group and individual tennis instruction this summer.

Manny Weiss, the freshman tennis coach, and Robert McKinley, former MIT tennis team member, will give group lessons. Mr. Weiss will be available for private and semi-private instruction for adults and children.

For information, contact Mr. Weiss at the duPont Tennis courts or call x3-4918.

NSF Grant Will Support Sewage Treatment Study

MIT has received a one-year, $113,700 grant from the National Science Foundation to study the feasibility of bombarding sewage sludge and wastewater with high energy electrons to destroy bacteria and viruses and to break down organic materials.

The work will be carried out under the direction of Professor John G. Trump at MIT's High Voltage Research Laboratory. The staff of this laboratory has long been active in developing methods of generating high voltage electron beams for cancer treatment and for the sterilization of materials for surgical use.

Scientists at MIT and elsewhere have already found that high energy electrons can destroy a wide range of microorganisms, including bacteria, viruses, spores, molds; and larger organisms such as algae, protozoa, and parasites. Applied to liquid wastes, such energetic electrons also produce useful chemical reactions which break down complex organic molecules and promote their oxidation. Untreated, such organic molecules deplete natural waters of their dissolved oxygen and jeopardize marine life.

Electrons are negatively charged particles, the most numerous and useful of all basic particles. Ordinary electric power is transferred by the movement of billions of electrons along an electrified conductor such as a wire. In a vacuum, electrons can be accelerated to almost the speed of light by applying a high voltage.

The resultant energetic electrons can be directed into air and penetrate solid or liquid matter. As they pass through matter their energy is distributed among the atoms and molecules along the way.

Electron irradiation has been used in the sterilization of surgical materials such as sutures and bone and for the production of industrial materials such as cross-linked polyethylene. At MIT physicians of the Lahey Clinic have pioneered in the treatment of superficial cancers in humans by the direct injection of such high energy electrons.

The National Science Foundation grant to MIT comes from the Foundation's program on Research Applied to National Needs (RANN), and is the first phase of a larger study. If feasibility studies at MIT prove the concept, the next phase would shift to the Metropolitan District Commission's Deer Island Wastewater Treatment Plant. Here an industrial electron accelerator of the High Voltage Engineering Corporation would be installed in a pilot facility capable of irradiating 100,000 gallons per day of liquid waste residuals under more realistic conditions.

Determination of the dosage and the optimum treatment conditions will be the chief outcome of the physical and biochemical studies planned for the first year at MIT.

According to Professor Trump, the expected electron treatment to convert municipal sludge into a disposable and useful material would raise its temperature only about 2 degrees Fahrenheit. This shows the efficient energy use of the proposed treatment method, he said.

In the sewage treatment scheme the electron beam would irradiate from both sides a wide, thin stream of the material delivering a uniform dose throughout its volume.

Electron treatment of municipal wastewater may show advantages over the conventional disinfection of wastewater by chlorination, Professor Trump said. Chlorine, which has recently become costly and in short supply, presents hazards in its transport and use. He also pointed out that chlorine is a chemical additive while electrons are a natural ingredient of all matter. While electrons have been shown to inactivate viruses, Professor Trump said, the effectiveness of chlorine on viruses is questionable, particularly when they are imbedded in solid particles. Finally, there is a growing recognition that the effects of chlorine compounds on local waters are unattractive and possibly undesirable from health consideratons.

Electron beam equipment would utilize local electric power as the energy source, and conversion to high energy electron power is possible with efficiencies extending up to 90%. In discussing the power requirements of the process, Professor Trump noted that electric power is also used in the production of chlorine from sodiun chloride. "Some of the increased electric power demands for the operation of the electron accelerator would be offset by the reduction of chlorine consumption," he said.

Some research centers have proposed gamma rays from radioactive isotopes or from atomic fuel rods as possible radiation sources for treating municipal sewage. Professor Trump believes that directed streams of high energy electrons are more appropriate for treating sewage waste because of their relative safety and adaptability to small and large treatment systems, and the sufficiency of electric power for this widespread application. Electrons are neither radioactive nor would they produce radioactive products in the water at the voltages needed for sludge and sewage treatment.

MIT Victorious In NE Rugby

The MIT Rugby Team defeated the Beacon Hill team in double over time to win the New England Rugby Tournament recently (May 11 and 12) at the University of Massachusetts, Amherst.

The MIT team played four games during the tournament in which 24 teams vied for the championship. The Tech team drew a bye the first round and beat the Springfield Rugby Club in the second 13-0.

The Tech squad played the Charles River team—which it had recently lost to—in the third round game and won in double over time 16-12. In the Sunday semi-finals the MIT team met the Providence club which they beat 6-3.

In the finals the Tech men played last year's champion, the Beacon Hill Rugby Club, which defeated Brown University to move into the finals. MIT beat the Beacon Hill team 7-3.

Grant Will Support South Asia Studies

Professor Myron Weiner of the MIT Department of Political Science has been awarded a grant from the American Council of Learned Societies for research on South Asia.

Dr. Weiner, a senior staff member at MIT's Center for International Studies, has written extensively on political organization and political participation, particularly in South Asia. The grant will assist his research project on early 20th century migrations in India and their effects on ethnicity.

Howard W. Johnson, left, chairman of the MIT Corporation has been named chairman of a Special Gift Drive on behalf of the Cambridge Council of the Boy Scouts of America. Mr. Johnson is shown with Paul F. Langley, center, president of the Cambridge Council of the Boy Scouts, and Cambridge Mayor Walter J. Sullivan, vice president of the Council.

Housing Policy Changes Needed, Book Says

The Associate Director of the MIT-Harvard Joint Center for Urban Studies has called for a major redirection of United States housing policy.

His approach de-emphasizes new construction and stresses the preservation of existing housing and neighborhoods through a national program of direct rental and homeownership subsidies, government-insured mortgage pools and neighborhood environmental development efforts.

Dr. Arthur P. Solomon, an associate professor of economics and urban studies at MIT, recommends the changes in a new book, *Housing the Urban Poor: A Critical Evaluation of Federal Housing Policy*, published this month (May) by the MIT press.

He said the nation has relied "for too long" on a single approach—the stimulation of new construction—to achieve *both* its economic and its social objectives.

While a high annual volume of residential construction is essential to keep pace with population increases, household formation and net immigration—the economic objectives—it is not the appropriate strategy to meet the needs of declining neighborhoods, excessive housing costs, economic and racial segregation, and housing abandonment—the social objectives, he said.

A departure point for improving national housing policy, then, is to disentangle the two objectives, he said.

The social objective is "better served," Professor Solomon said, "by direct subsidy of housing consumption, particularly in a manner that encourages the more efficient use of the existing stock."

He contends in the book that "direct consumer subsidies"—through rent and homeownership assistance, housing allowances or subsidized private leasing arrangements—are essential to any housing and community development policy that is to avoid the disappointments of urban renewal, Model Cities and other community reforms of the 1950's and 1960's.

But the housing subsidies must be coordinated, he said, with overall community development activities as well as efforts to eliminate exclusionary zoning, restrictive real estate practices and other activities that distort housing and financial markets.

In short, he said, "housing assistance must be provided as part of a well-orchestrated environmental management plan."

It is only through such coordination "that any long-term improvement in the living conditions of the nation's low- and moderate-income families is possible," he said.

After comparing alternative housing strategies in terms of their economic, social and environmental impacts—Professor Solomon concludes:

"One theme predominates over all others: the need to end our official obsession with housing production subsidies and to rely, instead, on a set of strategies for utilizing the existing housing stock."

According to Professor Solomon, it is evident that in deteriorating but still viable ethnic areas, elderly enclaves, racial ghettos and many older suburban communities as well, the additional purchasing power provided by direct consumer subsidies could do much to counteract the existing physical and psychological decline. They would do so, he said, by helping to enhance and stabilize demand, thereby creating an investment climate in which owners and lending institutions would be more disposed to conserve, and even upgrade, the supply of decent housing at moderate prices.

The author maintains that a few neighborhoods "may indeed be terminal cases, already neglected beyond our best intentioned efforts to restore them to a viable life."

"However," he added, "the vast majority of the poorly housed live in communities whose condition is far from hopeless. Decline may be incipient, or even well advanced, but given a major shift in national housing and community development policies, residents can be spared the fate of the Brownsvilles (New York), North Lawndales (Chicago), Montgomergys (St. Louis) and other crisis ghettos."

National policy has historically attempted to solve the social housing problem, he said, "by subsidizing the construction of new units."

Yet, he said, "it is the loss of housing demand associated with an absolute decline in population, as well as more concentrated poverty, which is at the heart of the urban housing problem."

He continued: "It is this loss of an effective and stable demand, rather than an inadequate supply of dwelling units or the exploitive practices of a few pernicious slum landlords, which underlies the decline of central cities and older suburban communities.

"A new strategy is clearly needed if we are to improve the conditions of the housing poor, to restore the confidence of private investors and lenders in aging neighborhoods and to dispel, or at least reduce, the serious dichotomy between the suburbs that are lily-white and affluent and central cities that increasingly house the elderly, the poor and the blacks."

"Any policy attempting to offer the housing deprived genuine relief," Dr. Solomon said, "must both increase their ability to pay for better housing and give them options beside enforced ghettoization."

The most direct and least costly means to this end, he said, is the replacement of the present system of housing subsidies with efforts to better utilize and maintain the housing stock already in existence.

"Direct rental and homeownership assistance," he concluded, "will enable low- and moderate-income consumers to search the housing market for a wider range of structural types, locations and neighborhoods."

"Obviously, some families will choose to move into higher quality neighborhoods in suburban communities as units become available through the natural turnover of the existing housing stock. But experience indicates that the vast majority of recipients will try to improve their housing conditions within the boundaries of the central city itself."

MIT Student Picked

Ilene S. Gordon, an MIT junior in mathematics from Newton, Mass., will be the first MIT student to serve as a teaching assistant in computers at the 1974 Andover Summer Session at Phillips Academy. More than 500 college students applied for the 25 teaching positions in the sciences and humanities at the enrichment camp for high school students.

Baseball Team Bows in NCAAs

MIT's baseball team, playing in its first post-season tournament last week, lost to New Haven College and Ithaca College and was eliminated from the National Collegiate Athletic Association's Division II competition.

Four unearned runs in the first inning gave New Haven a head start in the opening game Thursday, May 23, which was called after six innings when a steady drizzle became a downpour. The final score was 6-1.

The second game of the double-elimination tournament was closer, but Ithaca managed a 5-4 win over MIT on Friday, May 24.

New Haven defeated Montclair State College of New Jersey for the title.

CLASSIFIED ADS

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, and presenting Institute identification. Ads may be telephoned to Ext. 3-3270 or mailed to room 5-105. **Please submit all ads before noon, Friday, May 31.**

For Sale, Etc.

Polaroid 210 Land camera, hrdly used, $25. Mary, x3-5656.

Old fashioned 2 person curved sofa, nwly uphol, bge, $40 delivered, $30 u move. Robert Zamenhof, x3-5725.

Koss ESP-6 electrostatic hdphones. self-energizing, $60; Scotch Hi Energy cassettes, still wrapped lots of 3, C-60, $5; C-40, $6; Triplett 850 vtvm, $20. Frank, 521-1150.

TWA Getaway Guide to Honolulu w/48 discount coupons, b nw, $0.50. Diana, x3-2891.

Elec washer & dryer; wndw 8000 BTU ac; 4 drwr metal file cab; Singer port sew mach; best. Larry, 734-4400 x2105.

Old Southern yel pine lumber, about 16 4x4's in 11, 12, 16' lengths. $0.33/1in ft. Tony, x3-5717.

Sofas, $10 & $15; desks, $10 & $15; bkcse, $5; chrs, $3-$5; fl lamp, $4; shlvs, $2.50. Mitch, x3-6417.

Great wtrfront lot, Eidelweiss, Madison, NH, 4 seas area, 3 lakes, pool, tennis, $16,000, owner wl mortgage. Susanne, 227-6478.

Trlr, 2 whl w/metal fr, trlr hitch, no bed or box on it, $40. x3-5584.

TV, 23" b&w w/UHF, $30. Anatoly, x3-3178.

Sm wndw fan, $5. Call, 661-9465.

Kenmore 24" wndw fan, 1/5 hp, auto thermostat, exh, multi-spd, $24. Linda, x3-6824.

Panasonic amfm stereo & cassette, $75. Saed, x9258 Dorm.

Gdyr 4 ply nylon tire, 855x14, gd for spare, $3. Dave, x7689 Linc.

Heathkit 60 W guitar amp, TA16 solid state, perf cond, great PA sys, $100. x7500 Linc.

Hvy mtrcycl chain & lock, all case hardened, $15. Mike, x3-7203.

Ping pong tbl, $10; card tbl, $2; rcrd changer, $5; rcrd player, $1; free firewd; cold frame for grdn, $2; baby carriage, $15. x3-1580.

Port elec heaters, 3: 2 port ac; refrig; washer & dryer; carpet & linoleum; vac; 3 elec cook units; pressure cooker; 3 dressers & ft stools; K cab; mason jars, other K items. x3-2750.

Blk naugahyde couch, trim w/wlnt, comfy, mod, $125. Kathy, 646-0283.

Motorola 23" b&w TV, $23. Ginny, x3-2380.

K set, 7 pc w/leaf, $100; 2 pr m Martelli ski boots, $15/ea; valet chr, $12.50; mpl end tbl, $10; homemade cab $10; port TV std, $10; mpl lamp, $6; 3 doz preserv jars, $5; trlr, $20. David, x 465 Linc.

Jacobsen rotary lawn mover, w/bag & gas can. Vivian, x3-4650.

Sailboat, Alcort sunfish, $375. Kenneth, x3-4428.

Royce Union 5 spd bike, hrdly used, $75. x3-6607.

Fireside chrs, 2, nd re-uphol, $25 or best. Call, 876-7199, 9-11am, 3-7pm.

Old Town mld 18' Royalex canoe, yr old, lk nw, many access. India, 296-6465, aft 5.

Stl belt Sears radial & tube, 175x14, driven less 100 mi, $38. Stan, x412 Linc.

Wht enamel 39" gas range, $25. x7523 Linc.

Sunbeam Mixmaster w/attach: juicer, power unit, meat mincer, gd cond, $35; sm mpl desk, exc shape, $25. x3-2576.

F bike, sm, old, $5. Kathy x3-7047.

Old Playboys, Dec '59-present, $175. Mike Foley, x461 Linc.

Dbl bed w/matt, box spr, $20; sgl bed w/box spr, matt, $7; tbl, $7; armchr, $3. Call, 893-6800, x63.

Snows, 1 seas, exc cond; 2 nw gas cans, 5 gal; playpen; baby walker; 42" baby gate; all exc cond, must sell, best. Call, 494-8836.

Zoom lens, Lentar 80-200mm, f3.5 w/Minolta bayonet mount, less yr old, $95. Marty, 923-1511.

Sears couch, $150; bkcse $20; Sears matt, $40; coffee tbl, $10; gold 9x12 rug, $30; DR tbl w/r chrs, $30; Eureka vac, $40; file box $30; nw Simmons baby crib, $30, & matt, $15; etc. Call, 494-8743, evgs.

Refrig; K tbl w/2 chrs; GE stereo; formica top cab; frpl screen and iron; end tbl; desk; 9x12 rug; toaster; RCA clock-TV; nego. Sharon, x196-342 EDC.

Bose 901's, $320. Mark Davis, x3-7779.

Antique Underwood typwrtr, circa 1924, gd work cond, best. Renee, x3-2889.

Butcher blk tbl; 4 ladderback chrs; stu couch w/cover; K tbl; dresser; rcrd cab; nego. Carol, x3-7053.

Refrig, sm full-sz Frigidaire w/frzr, exc cond, $65. x3-6913.

Hvy mtrcycl chain, 5', w/Amer lock, 2½" links, best. Bob, x3-7305.

GE washer, 2 cycles, 4 temps, 4 yrs old, $50. Call, 484-7744.

Tape rcrdr, Sony 666, 4 heads, auto reverse, wl give demo, $200. Call, 494-8414.

Cool air humid, 10 gal, w/auto humidistat, gd for 2 BR apt, $30; 1000 W 110-220 volt step-up trans, w/plugs & sockets, ideal for adapting foreign elec equip to US current, $40. David, 494-8174.

Desk, $10; bureaus, $9, $30; bed, $35; dining chrs; f 3 spd bike; 5'2" schefflera plant; port typwrtr; A-clarinet; hsehld items. Jan, 492-6778.

Floor lamp, $9; tbl lamp, $5; shop cart, $2. Earle, x3-2429, Rm 41-116.

Pr JBL 88 spkrs, 2 yrs, perf cond, $250 or best. Phil Mandel, x3-3161, lve msg.

Wicker loveseat, $45. Jim, x3-4388.

DR tbl, 62"x42", 5 chr, $30; dresser w/r drwr, $25; end tbl; dbl bed w/matt, box spr, metal fr, $50. Heddy Richter, x3-5673.

Nw Volvo tire, 185x15, mtd '68 wlh, ww, $25. W.E. Kelly, x3-4493.

Kodak M28 super 8 movie camera w/auto elec eye, 3-1 zoom lens, batt, SV spec movie light, yr old, $50. Marilyn, x3-4112.

Lawson style sofa w/mtch drapes, $45 or best; port rcrd player, $10; tires: 6.85x15, fit Volvo, VW, etc, t-less ww, 2 snows, 5 reg (1 b nw), best. Bob, x3-2991.

Regina 2 spd elec broom w/rake, $15. Larnie, x8-3367 Draper.

Elec range, 40"; combo sink, garbage disp, dw; both perf working order. x8-4415 Draper.

Moving: Child sch desk w/attach seat; 2 Mercedes rims; 6 hp Jacobsen 2 stage snowblow; GE oven; skis & boots; sled; want rider to Miami, 6/14. Harold, x7216 Linc.

Sgl bed, v gd cond, 1st owner, nego. Kathy, x3-1592.

Collier stroller, $22; Realistic fm rcrvr, $60; b&w TV, $50; desk (door held by bkcse, file cab), all $25; bassinet w/nw pad, bmpr, $12; Phillips bikes 3 spd m, $30, f sgl spd, $15. Saba, x3-2686.

Maytag Washer, $25; Hoover upright vac w/attach, $25; Waring blender w/ice crusher, $15. Bob P, x3-5505.

Cal 21 fbrglas sloop, 4 suits sails, slps 4, retractable keel, trlr, nw 7.5 Merc, many xtras, $3,500. Ned, x8-1257 Draper.

Collier bl vinyl baby carriage/carbed w/thick matt, lk nw, $25. Arnie, x8-3852 Draper.

Bkcse, $35; wool rug, $7; 2 stud snows, G-78x14, $25. Call, 494-9336.

Soligor 200mm f3.5, $100; Revue 35mm f3.5 w/skylight filter, $50; Pentax flash, $5 or best. Bruni, x3-6726.

Reg twin bed, $15. Tom, x3-3619.

Refrig, $35; RCA Whirlpool washer, $50; twn beds w/padded K sz hdbrd, compl $100. Donna, x3-4271.

Dbl bed, $25; K tbl, $15; b&w TV, $15; 2 rugs, 9x12; B sink; more, x8-1589 Draper.

Norge rfrig/frzr, $50. Nick, 646-6092.

Welbilt AC, 6000 BUT, exc cond, thermostat, var fan spd, wrnty, $100; Kelvinator refrig, med sz, fr cond, $40; GE elec fan, lk nw, $20. Chor, x3-2139.

Vehicles

'53 Chevy, 2 dr sedan, $200. Bob x8-2861 Draper.

'65 Mercedes 220 SEB, 4 dr sed, 60 K, bd body, exc eng, 27 mpg, $1,200 or best. Lun, x8739 Dorm.

'65 Tbird, auto, gd transp, $150 or best. Marie, x3-2809.

'66 Ford Frlne wgn, p st, gd mileage, exc eng, gd trans, cln body, lving cntry end June, ask $350. x3-3457.

'67 Ply, ac, p st & br, 4 gd tires, 2 snows, 60 K, 14.5 mpg, exc cond, must sell, lving cntry, $550 or best. Call, 494-8446.

'68 Buick sport wgn, 4 dr, sm 8 cyl, p st & br, auto, 56 K, $700. x3-2772.

'68 Pontiac Bonne, gd cond, red, r, nw br, $250; also dbl bed, tbls, chrs, K misc. Call, 494-0271, evgs.

'69 Ford Gal, 4 dr hdtp, gd eng, best. Joe, x8-2895 Draper.

'69 Fiat 850 sport coupe, 42 K, stick shift, stereo r, nw tires & batt, gd cond, $500. Boon, x3-7170.

'69 VW sqbk. x3-4177.

'70 Ford Frlne, 4 dr, sm V8, gd cond, 49 K, 2 snows, ac, auto, lving cntry, $1,100 or best. Torben, 484-6234.

'71 Super beetle, 42 K, exc cond, add'l snows, amfm, must sell; also typwrtr, Smith-Corona elec, exc cond. Call, 494-9065.

'71 VW super bettle, ex cond, best. Gary, x5861 Linc.

'72 Toyota Corona Deluxe, gd cond, 2 xtra snows, 21 K. x3-3106.

'73 Toyota Corona, 2 dr hdtp, auto, console, r, ww, 6.7 K, $2,700 or best. Call, 364-2569, aft 6pm.

'67 Honda CL 305, exc cond, $300. Aldo, x8-1224 Draper.

'71 Tagalong 18' travel trlr, compl self-contained, w/xtras, slps 6, exc cond, $1,750. Judy, x7423 Linc.

Housing

Bos, Comm Ave nr Mass Ave, 2 BR w/lg LR, mod K & B, dining area, avail 6/1, exc loc 1st fl, $250. Call, 237-2309, lve msg.

Bri, sub duplex July & Aug, 6 rm $ bsmnt, bk yrd, washer, furn, nr Harv Stadium & T, $165, nego. Jeff, 783-5561.

Bkln, nr Coolidge Crnr, 2 BR, compl furn, ac, TV, all appl, qt nbrhd, off st pkg, avail 7/1, $200 incl util. Steve, x3-1691.

Bkln, 2 BR condo, St. Paul St, $30,000. Linda, x3-6771.

Camb, sum sub hse, off Brattle St nr Harv Sq, compl renovated older home, furn. Call, 491-4258, evgs.

Camb, lg 2 BR btwn Cent & Harv Sq, ww, balc, ac, furn, avail mid July-Aug, $200+ nego. Morris, x3-3138.

Camb, 4½ rm mod apt, unfurn, skylight, sub until 9/1, $165. Call, 492-8182.

N Camb, sum sub w/opt, BR w/porch, nice qt st, on st or gar pkg avail, $170. x3-5640.

Camb, Eastgate crnr BR, sub 6/15-9/1, furn, $200. Write Edwin Diamond, E53-411.

Jam pl, furn rm in priv hse, quiet area, nr T, $15/wk. Nancy, x3-4433.

Newton Ctr, 3 BR hse compl furn, grdn, nr T, stores, swim, tennis, avail about 6/20-8/31, fam only, $800 total, incl util, pkg. x3-6397.

Saugus, 2 rm w/Kette, & B, $135 incl util. Dean, x8-1632 Draper.

Weston, S Vt, 3 BR mod log chalet, secluded cntry rd, tennis, golf, fish, riding, $300. x477 Linc.

Animals

F 2 yr old cat, b&w, nds home, v frndly, purrs, Al, x9646 Dorm.

Free kittens, yel & wht, dbl pawed. Lorraine, x8-4201 Draper.

Free to gd home, m org & wht kitten, 8 wks. x3-6694.

Earn $20 easy: nd gd home for 2 cats, 6/2-6/15, plus trip to airport, wl pay for everything. Sharon Zito, x3-3261, lve msg.

Lost and Found

Lost: brn notebook, quadrille ruled, pix of Grateful Dead on front, contains circuit diagrams, if find pls return to Rm E10-033, or call David Pettijohn, x3-5766.

Wanted

Ride from MIT to Rt 2a, Acton, 5pm daily. Leida, x3-2375.

Rmmate, m or f, Cent Sq 3 blks MIT, share inexp semifurn rm, qt, frndly apt, w/MIT grad stu, alum, Harv librarian, lg K, pkg, $55 + util. Call, 864-9795, evgs.

F rmmates, 24+, share 14 rm hse w/2 m, f, share cooking, chores, yd, patio, grdn, pkg, nr T, no smokers or pets, own rm, $105-$125 & util. Call, 646-5854, evgs.

Rider to SF, share driving & exp, lve June 24-30; for sale: qn sz bed; 2 wd bureaus; wd chrs; sgl bed; file cab; etc. Call, 489-2772.

F rmmate, cute 2 BR, 5 min walk MIT, avail immed w/opt, $87.50. Bonney, x8-1811 Draper.

F rmmate, 2 BR apt w/ac, d&d, pkg, nr Harv Sq, avail 9/1, Nancy, x3-6069.

M or f rmmate, share Inman Sq apt w/2m, own BR, 10 min bus MIT, avail immed, part furn, $83. Richard, x3-1368.

Rmmate, pleasant furn BR in cln, qt 5 BR apt nr Cent Sq, lg K, dw, sunny porch, $86 + util. Call, 868-8895, evgs.

AC; vac clnr; highchr; stroller; baby back-pack carrier; garden furn. Call, 861-9027.

Responsible person, licensed driver, to chaparone 13 yr old girl 5 days/wk, 6/26-7/19. x3-6084.

Rmmate, share 2 BR furn apt, Camb-Som line, avail 6/1. Ann, x3-5670.

Prentice-Hall Framework Molecular mdls, wl pay $2/set, bring to E18-666. Info, x3-6220.

Intermed tennis prtnrs to play once/wk during day. Marie, x3-3745.

Teams or indiv for MIT Cmnty Softball League, games 6/10-8/15, 5:30pm, f encouraged; also exp umps, wl earn $5/game; deadline 6/3. Sam Benichasa, x8-3686, 10-12 or 2-4.

M or f rmmate, 7/1-8/31, share 2 BR furn apt, ww, ac, piano, pkg, Camb nr Mass Ave, btwn Cent & Harv Sq. Fred, x3-3406.

Sailboat, 30'-40', sound cond for cruising, pref wood, max $12,000. Jean, x3-6630.

Rmmate, rm avail 6/1 in 8 BR apt, 2 K, 4 B, frndly people, $75 + sec dept. Call, 547-3256.

F rmmate, 25-30, Arl Hts, 2 BR, $112.50 incl heat. Caroline T, x3-2054.

Rmmate, 5 BR apt crnr Mass Ave & Marlboro St, own furn rm, cln, safe bldg, nr T, eat in K, LR, $106 incl util. Call, 267-7416.

Nikon F camera in gd cond; Nikon lenses. Antonio, x3-5934.

Rmmate for apt w/stu, Camb-Som line, nr Harvard, MIT, own BR, furn, non-smokers, $80. Call, 776-5718, evgs.

Rmmate, Tang Hall 14B, avail 6/1. John, x3-1836.

House to rent, west of Bos, 3-4 BR, 9/1/74-9/1/75. Vicki, x3-5049.

Used calculator, cheap. Linda, x3-4669.

F rmmate, share bright, cln Som 2 BR apt w/f, 23, grad stu, nr stores, T, qt res area, want reasonable qt, independent person, sum sub w/opt, $75 + util. Jacqueline, x3-6726.

Rmmate, own rm in 4 BR hse, avail 6/1-9/1, nr BU Bridge, Stop & Shop, $67.50. Howie, x3-2280.

M or f rmmates, 2, 4 BR Coolidge Crnr, Bkln apt, 15 min by T MIT, sum sub avail 5/18, $80. Maureen, 868-8050, x271.

M or f for lg, 5 person 5 BR coed duplex Camb, 10 min walk MIT, sum sub w/opt, come meet us, $65 + util. Call, 876-2920.

Subj for behavioral exp, 1 time only, ½ hr, gd pay. Dr. Hall, x3-3720.

Rmmate, 25+ & working f, share Bri apt w/2 f, own rm, $80. Sandy, x3-1952.

Rmmate, f, share 3 BR apt w/2 f MIT grads, nr MIT, nice apt, avail 6/1 w/opt, $90 incl util. Joyce or Sherry, 492-4772, evgs.

Ride, Denver or vicinity, 6/10 or 6/11, wl share driving & exp. Joe, x3-2677.

Furn home for visiting scientist, 8/1/74-7/31/75, suburb, 3 BR or more. x3-3806.

Sum lab work, senior bio major, exp in bacteriology, ecology, radial chem. x3-3982.

Rmmate, share lg Beac Hill apt w/f musician, grdn, piano, 10 min MIT, 6/16-9/1, $25/wk. Call, 227-8510

Sum rmmate, Tang 9A2, share K, B, DR, avail 6/1-9/1, nice view Charles, price nego. Call, 494-9220.

Research assoc & wife nd BR apt, MIT-Harvard area, 8/1-12/1. Call, 628-0927.

Miscellaneous

Expert piano tuning & repairs. Lynne, 321-7448.

TV stamps in exch for grn shield stamps. Call, 547-8397, evgs.

Learn to sail: b nw Pearson 30, Marblehead Harbor, wkday, wkend, evgs. Call, 522-1506.

Dan's van will help you move, rates $7-$12/hr, up to 2 helpers. Dan, 536-6328.

Grad travelling cross-cntry wl perform market or location research on way, alternate suggestions considered, resume. James, 494-9285.

Wellesley stu, exp typist (60 wpm), Fr & Russian, wants sum job, MIT or spec project work, pref full-time, avail 6/3. Mrs. Wolf, x3-2026.

Moving to Fla? I am, lving 6/3, lk for others moving objects (to share costs). Bob Nance, x3-1461, lve msg.

Stu earning $ for karate tournament wl do odd jobs & hvy work, Sat, June 1, indiv or grps of 3 or more: yardwork, cleaning wndws, lifting & moving, baby or hsesitting, etc, u name it, we'll do it – fix your dinner, too! Charles. Ron, Mike, x3-7700.

Positions Available

This list includes all non-academic jobs currently available on the MIT campus. Duplicate lists are posted each Tuesday preceding Tech Talk *publication date on the Women's kiosk in Building 7, outside the Office of Minority Affairs, 10-211, and in the Personnel office E19-239, on the day of* Tech Talk *publication. Personnel interviewers will refer any qualified applicants on all biweekly jobs Grades I-IV as soon as possible after their receipt in Personnel. Employees at the Institute should continue to contact their Personnel Officers to apply for positions for which they feel they qualify.*

Virginia Bishop	*3-1591*
Mike Parr	*3-4266*
Philip Knight	*3-4267*
(secretary – Joy Dukowitz	
Sally Hansen	*3-4275*
Jack Newcomb	*3-4269*
Evelyn Perez	*3-2928*
(secretary – Mary Ann Foti)	
Dick Higham	*3-4278*
Pat Williams	*3-1594*
Claudia Liebesny	*3-1595*
(secretary – Dixie Chin)	

New applicants should call the Personnel Office on extension 3-4251.

Managing Editor – Administrative Staff for the *Technology Review* (Alumni publication) will commission articles; review submitted articles; edit articles for publication; write reports of papers, seminars, meetings; assist with the management of the magazine and participate in all editorial activities. Familiarity with current science and engineering, events essential. 4-5 years editorial experience required, preferably on material relating to science and/or engineering, with background in one or more fields of science, engineering, related social science, as well as in writing and science journalism. 74-591-R (5/29).

DSR Staff with the Energy Laboratory will work with an international project to assess global alternative energy strategies; participate in formulation and evaluation of regional energy assessments. MS in Management, Economics or Engineering with em-

(Continued on page 10)

Positions Available

(Continued from page 9)

phasis in energy, technology assessment and long-term implications of growth necessary. International program management or equivalent experience desired. Demonstrated writing and speaking skills essential. Extensive international travel required. 74-601-A (5/29).

DSR Staff in the Energy Lab will assist in the construction of a mathematical energy model for US supply and demand. Gather data, participate in econometric model building and analysis of energy sectors. BS degree in Economics with econometrics and mathematics background desired. Experience in FORTRAN programming and use of Econometric Software Package necessary. Communication skills important. 74-602-A (5/29).

DSR Staff in the Energy Laboratory will prepare and coordinate various proposals for the Waste Heat Management Group. Assist in fund raising activities for facilities and research; prepare plans for construction of new facilities. Develop predictive models based on analytical and experimental techniques and of operational simulation models for economic assessment. PhD required; experience in fluid mechanics (analytical and experimental), water resources management; ability to conduct independent research important. 74-604-A (5/29).

DSR Staff for the Energy Lab will develop a metal-air fuel cell pre-prototype and conduct research into powdered metal electrodes. MS in electrochemistry or chemical engineering; knowledge of electro-chemistry, semi-conductors; experience in fluid mechanics, academic or industrial exposure to metal-metal oxide systems required. 74-605-A (5/29).

DSR Staff at the National Magnet Laboratory will design, supervise construction of electrical cryogenic and vacuum systems for operation of Alcator Experiment. Design and fabricate electronic circuity, mechanical structures and vacuum systems for high temperature plasma diagnostic experiments; supervise technical personnel. MS in Physics or EE. Minimum one year experience in operation of high temperature plasma physics experiments and diagnostic equipment; and solid state electronic design required. Work schedule will require evening and weekend work. 74-448-A (5/22).

DSR Staff – Director of Vehicular Testing for the Energy Lab will design, supervise, administer program for testing 200-500 private vehicles operating on varying methanol-gasoline mixtures to evaluate driver reaction, gas mileage, and maintenance difficulties. PhD in ME with minimum 5 years' industrial experience required. Extensive experience in assembly and disassembly of internal combustion engines and administrative experience required. 74-606-A (5/29).

Project Leader/Systems Analyst – Administrative Staff will investigate the information needs of the Medical Department, coordinate needs and develop the system. Responsible for data acquisition and clerical processing of source documents to the finished reports. Minimum 5 years experience in System Analysis, System Design, PL/1 and 370 BAL Programming for management information system. Familiarity with medical data systems preferred. 74-419-A (5/22).

DSR Staff in Electrical Engineering will develop and construct specialized electronic circuits to interface with electrical/electronic equipment such as an electric power system physical scale model, a transmission system simulator, measurement systems for underground power transmission, and automated electric power meter readers. MS in EE required; experience in the design, construction and testing of electronic circuits and computer interface equipment and in the operation of switching surge simulators necessary. 74-333-A (5/22).

Area Systems Coordinator – Administrative Staff in the Office of Administrative Information Systems will analyze and develop solutions to business problems; provide systems support; direct and coordinate the work of systems analysts and/or programmers as needed. Applicants should have business and administrative experience, analytical ability, and knowledge of programming. 74-563-R (5/22).

DSR Staff Engineer in Earth and Planetary Science will supervise the design and implementation of electro-optical data acquisition systems for astronomical application; develop a solid state imager as a photometric data system; maintain, modify, and update slow-scan silicon vidicon photometer system; act as technical consultant to student projects. Degree or strong background in EE; extensive experience in analog and digital circuit design and mechanical hardwork design. 74-429-A (5/15).

DSR Staff Engineer in the Energy Laboratory will work in the Sloan Automotive Laboratory. Participate in basic and applied research programs on combustion problems related to performance and emission characteristics of automotive engines. Research will be experimental and theoretical. PhD in Mech. Engineering or equivalent academic training, with good background in combustion, thermodynamics and fluid mechanics required. Experience in design and operation of optical, electronic and spectroscopic instrumentation used in basic aerodynamic, combustion and engine related experiments important. Ability to work closely with faculty and students essential. 74-415-A (5/15).

Administrative Staff – Assistant to the Director of the Alumni Fund will be responsible for all internal administration of Alumni Fund activities; coordinate programs and field activities of three Associate Directors and one Assistant Director; establish and administer systems for all phases of the volunteer Alumni Fund organization. An alumnus/alumna of MIT is preferred, but not essential. 74-348-A (4/24).

DSR Staff at the Laboratory for Nuclear Science will design, develop, and maintain the operating system of the IBM 360/65 in the laboratory's computer facility. Assist users with special projects. Degree in computer science, physics, or mathematics; programming experience, particularly 360 Assembly Language required. 74-361-R (5/1).

DSR Staff in the Energy Lab must have minimum 5 yrs experience in defining, securing support, organizing and supervising research in heat transfer related to energy production and utilization. Familiarity with MIT; experience in supervising student theses research and staff; Ph.D. in Mechanical Engineering required. 74-359-A (5/1).

Administrative Staff – Special Events Director for the MIT Alumni Association will organize, coordinate, and promote alumni convocations in major cities throughout the US. Individual with imagination, organizational abilities, leadership and interpersonal skills required. MIT degree or knowledge of the Institute is desirable. 74-349-A (4/24).

Administrative Staff – Project Manager, Resource/Alumni Data Systems. Will report to the Director of Resource Planning to take full responsibility for development, production coordination and operation of computer systems in support of the Resource Development and Alumni Offices. A minimum of five years professional EDP experience required, including at least three years of systems analysis, Familiarity with MIT systems will be helpful. Will evaluate overall assignment, define group staffing needs and, when approved, be expected to recruit, train, and supervise staff. 74-412-A (5/8).

Administrative Staff – Associate Director of the Alumni Fund will be responsible for Staff support to alumni boards and committees engaged in the annual solicitation programs. Duties require extensive interaction with senior alumni and corporation executives throughout the country, at MIT. Individual must be an alumnus/alumna of MIT. Position entails a moderate amount of travel. 74-347-R (4/24).

Marketing Director – Administrative Staff at the MIT Press must have experience and skills in some or all of the following areas: direct mail, scientific/technical, international, research and planning, trade and library relations. Innovation, creativity, adaptability for goals; ability to work as part of a publishing team in a university environment. Please submit resume with educational background; accompanying letter must describe in detail marketing methods in achievements. 74-313-R (4/17).

DSR Staff in Nutrition and Food Sciences will coordinate the specialized analytical services of the department; advise and assist in the development and application of analytical methods and manage the mass spectrometry laboratory. BS or MS in chemistry or related field and experience in operating a mass spectrometer required. 74-302-R (4/10).

DSR Staff in the Laboratory for Nuclear Science will participate in fundamental particle research at major accelerators and in data analysis. Candidate must have Ph.D. in high energy physics or a related field with experience in scintillation counter and spark chamber techniques and familiarity with large computer data analysis. 74-220-A (3/13); 74-221-A (3/13).

DSR Staff – Curriculum Developer at the Artificial Intelligence Lab will develop and write new mathematical curriculum material in the Logo language for elementary school use. The job will often require working outside normal office hours. Academic qualifications in developmental psychology and mathematics, demonstrated experience in teaching computer programming to children required. Position available 5/74. 74-153-R (2/20).

Assistant Director – Administrative Staff in the Development Office will direct developmental support of MIT's senior officers and Resource Development Staff. Participate in developing funding goals; write background briefs, memoranda, proposals, ad hoc statements; direct funding projects. Minimum 3 years formal experience in development required, preferably in a university environment. Professional individual, tactful, imaginative, skilled in writing is needed. 74-327-A (4/17).

DSR Staff in the Laboratory for Nuclear Science will participate in fundamental particle research at major accelerators and in data analysis. Candidate must have a Ph.D. with a minimum of two years experience in high energy phyisics. Detailed knowledge of bubble chamber techniques is essential. 74-222-A (3/13); 74-223-A (3/13).

DSR Staff Physicist in the National Magnet Laboratory will conduct original research in experimental solid state and low temperature physics with emphasis on the magnetic fields. Ph.D. in physics or related area and 3 years postdoctoral laboratory experience in magnetism and low temperature physics required. Familiarity with cryogenic and electronic instrumentation desired. Position available after 10/1/74. 74-130-A (2/13).

Assistant Auditor – Administrative Staff in the Audit Division will perform EDP internal auditing, reviews of the systems development effort, evaluate internal controls, and post audits of computer systems. Will develop audit programs, questionnaires, write and present reports. Must have four years of working experience in EDP, a degree in Accounting, knowledge of COBOL or PL/1, and public accounting experience. 74-150-A (2/20).

Assistant Director (Photo Journalist) Administrative Staff for the News Office will make news photographs for press releases and various newspapers and magazines. Maintain darkroom and photography equipment; perform own darkroom work for primarily black and white photography. Previous experience on daily newspaper, extensive work as darkroom technician required. 74-409-R (5/8).

Applications Analyst – Administrative Staff at the Information Processing Center will work in the Application Services group to advise users on procedures and techniques in setting up a statistical problem for computer solution. The equivalent of a master's degree in statistics or social science with statistical training is required; experience in programming and solving problems is essential. 74-403-R (5/8).

DSR Staff Systems Programmer at Project MAC will perform system analysis and system programming on a research version of Multics operating system. SM or EE degree required; 2-3 years programming experience in the supervision of some advanced operating system required. Ability to contribute to research and work with students important. 73-1234-R (11/14).

Applications Programmer – Administrative Staff in the Office of Administrative Information Services will translate detail program specifications into computer code; test codes and document program for operational use; review specifications; develop program flow charts; test and debug programs; perform other duties as assigned. Minimum 2 years experience in Business applications programming required. 74-278-R, 74-279-R (4/3). 74-573-R (5/29); 74-574-R (5/29).

Systems Analyst – Administrative Staff in the Office of Administrative Information Systems will develop under direct supervision, solutions to business problems; prepare, design, and program specifications for new programs and for modifications to existing systems. Applicants should have business and administrative experience, analytical ability and familiarity with computers. 74-391-(5/8).

Programming Analyst – Administrative Staff for the MIT Information Processing Center must have experience and knowledge of large-scale time-sharing computer systems. PL/1 and FORTRAN language. Documentation and communication skills are necessary qualifications. The User Services Group requires an individual who understands and is responsive to the needs of the Center's users.

User Assistance – Assisting users by providing programming information and debugging help and tracking down special problems.

User Information – Instruction documentation and conducting seminars, workshops, and short courses. 74-178 (2/27).

Keypunch Operator III in the Comptroller's Accounting Office will keypunch accounts payable invoices and all input for the Journal Voucher System, on an Infarex Key-to-Disk entry system. Responsible for verifying and balancing all data entered. Minimum 1 year experience required; previous key tape experience desirable. 74-418-A (5/15).

Senior Keypunch Operator III in the Office of Administrative Information Systems will operate the IBM 029 keypunch machine. Punch into computer input cards formated and unformated documents, Minimum 2years experience operating IBM 029 or comparable equipment. 74-384-R (5/8); 74-428-R (5/15).

Assistant Food Production Supervisor – Exempt in Food Service will assist in all areas of daily production, inventory and quality control, purchasing and a sanitation program. Will assume full responsibility in the absence of the Food Production Supervisor. Degree or experience in food production, knowledge of menu planning, food production, quality control, food purchasing required. Must be able to work irregular hours and weekends, 3 days 7am-4pm; 2 days 10:30am-7:30pm. 74-454-A (5/22).

Assistant Unit Manager – Exempt will assist with the administration and operation of a Food Service Facility. Assist in the supervision of personnel, planning and monitoring daily operations, maintaining standards within the system. Will handle administrative duties in personnel, payroll, budget and purchasing areas. A degree or experience in administration of a food service unit required. Ability to communicate and work with all levels of the MIT community important. 74-453-A (5/22).

Registered Nurse Practitioner Exempt in the Medical Department's Emergency Clinic will be responsible for physical assessment, treatment, and counseling of ambulatory patients. Candidate must have completed an Adult Practitioner course or Physician Assistant course and have prior Emergency Clinic or ICU experience. Permanent 4pm-12am. 74-582-R (5/29).

Technician – Exempt or DSR Staff in the Center for Cancer Research will supervise the animal room: insure proper feeding, watering, housing of small animals; maintain records; immunize animals, bleed and collect sera, transplant tumors, perform immunochemical techniques involved in purification of antigens and antibodies, prepare hapten protein conjugates. BS required, MS in Immunology preferred. A conscientious individual with good manual dexterity required. Ability to work with details important. 37½ hour work week. 74-598-R (5/29).

Assistant Editor – Exempt will report and write about activities and events at MIT for *Technology Review*'s alumni audience. Describe educational developments, student and alumni activities, etc. Training and/or experience in newspaper and magazine writing about people and events typical of those in the MIT community required. Ability to conduct interviews, write news and feature stories, plan photo essay important. 74-590-A (5/29).

Dental Hygienist – Exempt Staff in the Medical Department will perform initial examination and charting, prophylaxis, periodontal treatment, plaque control. Take and process X-rays, screen dental emergencies. Candidate must be a Registered Dental Hygienist with an AB or BS degree in Dental Hygiene and high academic standing in college. Previous experience in periodontal care is preferred. 8:30-5pm 74-593-R (5/29).

Pantry Supervisor – Exempt in MIT's Food Service will be responsible for the unit serving areas, flow of food and utensils, portion controls and sanitation program for area. Will supervise the pantry employees. Technical knowledge of food production, ability to work with deadlines under pressure, ability to train personnel required. Must be able to work irregular hours and weekends. 4 days 10:30am-7:30pm; 1 day 7am-4pm. 74-455-A (5/22).

Secretary IV in Civil Engineering will handle a variety of general secretarial duties. Type technical manuscripts and statistical tables and charts, set up format and proofread; independently answer some correspondence; maintain records and student files. Technical typing skill, previous experience, familiarity with shorthand required. Ability to work on many projects simultaneously important. 74-406-R (5/8).

Secretary IV for the editor-in-chief and two acquisitions editors at the MIT Press. Type letters from tapes and rough drafts; independently acknowledge receipt of manuscripts and proposals; prepare expense accounts. Good typing, attentive to details, maturity and tact essential. 74-386-R (5/8).

Senior Secretary V for the International Nutrition Planning Program Director, Center for International Studies will coordinate project accounts; manage correspondence; handle office management responsibilities. Excellent typing essential; dictaphone, secretarial and office management experience required. 74-589-A (5/29).

Senior Secretary V to the Metallurgy and materials Science Department Head will coordinate busy schedule of meetings, appointments; type various reports, technical manuscripts; type correspondence from tapes or dictation, independently answer some correspondence; maintain confidential departmental files; provide secretarial assistance to Administrative Officer as necessary. Excellent typing, shorthand or speedwriting required; technical typing experience or working experience in an academic department preferred. Ability to handle a complex job, establish priorities essential. Discretion and tact important. 35 or 40 hour work week. 74-447-R (5/22)

Senior Secretary V (Part-time) will handle a variety of secretarial and administrative details at the President's home at Watertown. Schedule appointments for Mrs. Wiesner and for the President's House at 111 Memorial Drive; arrange travel, transcribe correspondence, maintain extensive files. Work closely with Dr. Wiesner's secretary; act as liaison for Dr. Wiesner with other MIT offices, community agencies and businesses. Keep payroll and other records; attend meetings when required; write and address invitations for Institute events. Excellent typing and shorthand skills required. Knowledge of the Institute desirable. Discretion, honesty and tact essential to deal with confidential matters and to work in a private home. 25 hour work week; mid-day schedule preferred. Available after 8/15/74. 74-315-R (5/8).

Secretary IV or Senior Secretary V to the Director of a new Special Laboratory will assist in all aspects of developing the new lab; organize the Director's schedule and set up the office systems. Some College and 3-5 years secretarial experience; excellent typing and shorthand required. Ability to organize, establish priorities important. 40 hour work week. 74-368-R (5/1).

Secretary IV or Senior Secretary V for Vice President in the office of the President and Chancellor will handle a variety of duties in a very busy office. Arrange and coordinate complicated appointment and meeting schedules; maintain communications among many people and offices of the Institute. Excellent typing, shorthand, organizational skills and command of language are essential; ability to anticipate, recognize and organize priorities and work as part of a team, resourcefulness for handling complex situations, discretion, tact, and good judgment important. 37½ hour work week. 74-343-R (4/24).

Secretary IV will perform general secretarial duties for the Director of the Neuroscience Research Program. Transcribe from tapes, schedule appointments and conferences; compile and type special reports. May also do some library and bibliographic research on technical topics. A good educational background, strong secretarial skills required; shorthand and willingness to learn scientific terminology desired. Ability to interact effectively with staff and foreign and domestic visitors important. 74-565-R (5/22).

Secretary IV to the Administrative Officer of Chemical Engineering will handle general secretarial duties; maintain contract, grant, personnel records; assist with a variety of headquarter's functions. Good typing, shorthand, dictaphone and organizational skills required. Maturity, tact, ability to anticipate problems desirable. May occasionally work overtime. 74-306-R (4/10).

Secretary IV in the Center for International Studies will be responsible for scheduling and organizing seminar series and special seminars, including publicity. Will also handle all standard secretarial duties. Accurate typing, maturity, good judgment, ability to work in a busy office required. 74-583-R (5/29).

Secretary IV to two Biology professors will handle all general office duties; type technical material from dictaphone; independently perform other office functions. Strong typing and dictaphone skills required; some accounting and organizational ability preferred. Previous experience essential. 74-584-R (5/29).

Secretary IV in Biology will handle general secretarial duties for two labs. Type technical manuscripts for publication; maintain student files; monitor office accounts and supplies. Accurate typing required; ability to work independently, establish priorities, organize work important. 74-585-R (5/29).

Secretary IV to an Economics professor will type manuscripts, correspondence; transcribe dictaphone tapes; schedule travel and appointments; act as liaison with other MIT research centers. Excellent typing, dictaphone skills required. Ability to organize and establish priorities important. 74-569-R (5/29).

Secretary IV will be responsible for secretarial support for full-time physicians in the Medical Department. Schedule appointments; transcribe patient case histories, correspondence and reports. Excellent typing skills required; shorthand and knowledge of medical terminology preferred. Previous secretarial experience important. 74-581-R (5/29).

Secretary IV in Project MAC will type technical manuscripts, class notes and correspondence for two professors. Maintain documents on the PDP/10 computer, answer some correspondence independently. Good typing, knowledge of office procedures, ability to organize and establish priorities required. 74-596-R (5/29).

Secretary III in the Information Processing Center will handle general secretarial duties; assist with the preparation of payroll records and statistical reports pertaining to computer work load. Excellent typing required; shorthand desired; minimum one year office experience necessary. 74-600-R (5/29).

Secretary IV in the Music Office, Humanities Department will handle a variety of secretarial duties; coordinate class schedules and class materials; handle concert arrangements, monitor accounts; take and transcribe notes for the section. Typing and shorthand skills; ability to work with musicians, staff and students required; initiative and ability to work independently important. 74-456-R (5/22).

Secretary IV in Chemical Engineering Headquarters will handle secretarial duties for the Department Head and Administrative Assistant. Ability to establish priorities and to work with a minimum of supervision essential. Excellent typing, shorthand and organizational skills required. Familiarity with MIT procedures helpful. 74-444-R (5/22).

Secretary IV in the Center for International Studies will handle standard secretarial duties for a new program on nutrition planning and training. Will also make travel arrangements and maintain communication with field staff in Pakistan. Organizational skills and good typing required. Shorthand preferred. 74-443-A (5/22).

Secretary IV in Mathematics will handle all general secretarial duties; type correspondence, class notes, quizzes; technical reports and manuscripts; maintain mailing lists; will also do some filing and dictaphone work. Excellent typing and/or previous experience in technical typing required. Ability to work under pressure with careful attention to detail important. 74-564-R (5/22).

Secretary IV to the Executive Officer of Chemical Engineering will handle general secretarial duties; maintain petty cash account; make travel arrangements; receive visitors. Good typing, shorthand, and dictaphone skills required; previous experience (MIT preferred) or secretarial schooling; ability to work independently, maturity, tact essential. 74-398-R (5/8).

Secretary IV in Meteorology will assist with administrative duties and perform secretarial functions for the Executive Officer of a large research program in physical oceanography. Handle routine office duties, type correspondence, arrange meetings for program participants from all over the world. Ability to organize office and to communicate with 60 scientists on a regular basis. Good office skills important; interest in physical oceanography desirable. 74-379-R (5/1).

Secretary IV to the purchasing staff of the Laboratory for Nuclear Science. Type purchase orders, correspondence; maintain records. Will also be responsible for processing articles for publication which involves communication with publishing firms. Reconcile invoices of publishing orders; distribute reprints; maintain files and records of theses and article publications. Excellent typing, organizational ability, independent judgment, initiative required. Library and/or cataloguing experience highly desirable. 74-362-R (5/1).

Secretary IV to the Institute Secretary for Foundations will be responsible for budget accounting, file maintenance; research in reference materials, maintain communications and smooth relations with top level offices of the Institute. Excellent secretarial skills, ability to organize and to use discretion required. Knowledge of MIT desirable. 74-332-R(4/24).

Secretary IV or Senior Secretary V for the Council for the Arts Staff and the Special Assistant to the President for the Arts will coordinate office activities; do considerable typing. Excellent typing and organizational skills required; ability to work against deadlines essential; shorthand and knowledge of MIT are desirable. 37½ hour work week. 9-5:30. 74-300-R (4/10).

Secretary IV in the office of the Institute Secretary for Charitable Trusts will monitor the office budget; arrange appointment schedules and travel; type correspondence and proposals from dictaphone and handwritten copy; set up and maintain files; act as liaison between the office and other sources inside and outside MIT. May occasionally conduct research on charitable trusts and foundations. Excellent skills, organizational ability, professionalsim essential. Previous experience required. 74-293-R (4/10).

Secretary IV to the Administrative Officer of Chemical Engineering will handle general secretarial duties; maintain contract, grant, personnel records; assist with a variety of headquarter's functions. Good typing, shorthand, dictaphone and organizational skills required. Maturity, tact, ability to anticipate problems desirable. May occasionally work overtime. 74-306-R (4/10).

Secretary IV for a professor in Earth and Planetary Sciences will handle all secretarial functions; perform some administrative chores, some library research and editing. Excellent typing (some technical); shorthand preferred. Editorial and organizational skills important.74-8-R (1/9).

Secretary III-IV in Resource Development will handle all secretarial duties for the Institute Secretary. Plan travel schedules make arrangements; assist in gathering and collating information on corporations. Previous experience; excellent typing required; shorthand preferred but not essential. Ability to organize and work independently important. 74-579-R (5/29).

Secretary III-IV to Associate Director of the Alumni Fund will handle a variety of general secretarial duties; compose and type correspondence; handle details for luncheons, dinners, meetings; develop and maintain special files. Good typing, shorthand or speedwriting skills required. A flair for writing; genuine interest in fund raising activities important. Some financial public relations background helpful. 74-580-R (5/29).

Secretary III-IV will handle secretarial duties in the Child Care Office; help to interview applicants seeking child care; maintain accounts, tuition payment records; compose and type correspondence, promotional literature; edit material for grammar and format; keep statistics. Good typing, ability to establish priorities and work independently essential. Knowledge of accounting procedures, particularly MIT's, very helpful. 74-594-R (5/29).

Secretary III will handle general secretarial duties for several Energy Lab staff members. Type proposals, reports, correspondence (some technical); handle some classwork-related activities, good typing, dictaphone skills required; ability to work for several people and to determine priorities important. 74-603-R (5/29).

Secretary III-IV Part-time in the Center for Space Research will type correspondence, minutes of meetings, progress reports and occasional papers in the Director's office. Good typing, shorthand and dictaphone skills required. Approx 20 hrs. flexible. 74-595-A (5/29).

Secretary III-IV will handle a variety of secretarial and reception duties for the Graduate School Office. Type correspondence, financial aid awards, reports. schedule meeting and appointments for Deans; answer inquiries regarding procedures and fellowships. College background or business schooling required; good typing, shorthand, dictaphone skills needed; knowledge of MIT helpful. 74-420-R (5/15).

Secretary III in the Information Processing Center will handle general secretarial duties; assist with the preparation of payroll records and statistical reports pertaining to computer work load. Excellent typing required; shorthand desired; minimum one year office experience necessary. 74-600-R (5/29).

Secretary III will work with an Industrial Liaison Officer in providing services to approximately 15 companies; distribute Institute publications, arrange travel and meetings; compose and type correspondence; maintain mailing lists. Assist with special projects. Secretarial schooling or previous experience preferred. Good typing required; shorthand or speedwriting preferred. 74-451-R (5/22).

Secretary III in Physical Plant will handle applications for use of the Student Center, Kresge and the Chapel; maintain files of records; type Student Center Committee correspondence; handle billing of LSC movies, events, weddings, good business skills required. Ability to deal effectively with students, visitors and others who use the facilities. 74-608-R (5/29).

Secretary III in Earth and Planetary Science headquarters will process graduate admissions applications; handle editing and production of department publicity; frequently handle secretarial duties for the Department Head. Excellent typing; ability to edit, and work with students and other personnel in a busy office. 74-609-R (5/29).

Secretary III will provide secretarial support for three faculty members in Chemical Engineering. Perform office reception duties; maintain records; type class material, reports, technical manuscripts, research proposals. Good typing essential (technical typing experience preferred); organizational skills, ability to use the dictaphone and to work independently required. 74-445-R (5/22).

Secretary III in the Humanities Library will handle general secretarial duties for the library; maintain payroll records; participate in interlibrary borrowing operation; assist with some bibliographic searching. Speed and accuracy in typing required; ability to work with detail important. Library experience helpful. 74-441-R (5/22).

Secretary III in Aeronautics and Astronautics will assist the Undergraduate Officer with student registration and various other office duties; type correspondence and technical reports for two professors. Good command of English, ability to organize and work with details required. 74-433-R (5/22).

Secretary III in Urban Studies and Planning will type manuscripts, correspondence, reports, class notes; maintain files; schedule appointments and travel. Excellent typing and previous secretarial experience required. 74-446-R (5/22).

Secretary III in Physics Undergraduate Office will handle all general secretarial duties for several courses; responsible for the Greater Boston Physics Calendar. Good typing (some technical); ability to occasionally work under pressure important. 74-401-R (5/8).

Secretary III in Nuclear Engineering will provide reception and secretarial services for department headquarters; maintain department statistical information; type admissions correspondence and research manuscripts. Good typing and dictaphone skills required; ability to establish priorities important. 74-399-A (5/8).

Secretary III in Earth and Planetary Sciences will assist with general secretarial duties for a professor and research group and handle all office duties for another staff member. Excellent typing needed for heavy typing load (technical typing helpful), will compose some correspondence, arrange committee meetings. Ability to handle details essential. 74-321-R (4/17).

Secretary III to an Industrial Liaison Officer will assist with the Institute publication distribution, symposia and faculty travel, research for briefings, handle all other general secretarial duties. Good shorthand preferred; typing skills necessary. 74-100-R (2/6).

Secretary III in Chemical Engineering will type quizzes, reports, technical manuscripts, proposals for three associate professors. Will arrange appointments, file, act as receptionist for the office. Dictation from tapes; technical typing experience preferred. Prompt, dependable, able to accept supervision and follow through on details. 74-162-R (2/20).

Administrative Assistant V in the Harvard-MIT Program in Health Science and Technology will work with the Executive and Business Officers in a wide range of administrative and secretarial duties. Excellent administrative and secretarial skills required. Ability to work independently, organizational skills and editorial experience essential. Familiarity with an academic environment, accounting procedures and technical typing desirable. Maturity and discretion required. 37 or 40 hour work week. 74-274-A (5/22).

Administrative Assistant V in Earth and Planetary Sciences will perform administrative tasks for a group of oceanography professors; coordinate with the Woods Hole Oceanographic Institution and several MIT departments on the administration of the joint degree programs; act as liaison between department; prepare and monitor accounts and budgets. Institute experience desirable; ability to anticipate problems, work independently and make administrative decisions required. 74-561-R (5/22).

Technical Assistant V in the Development Office will be involved in fund raising activities. Analyze and process various types of information relating to philanthropic foundations; maintain central records; identify and write evaluations of prospects; coordinate the work of an assistant. Accurate typing, excellent organizational skills, ability to establish priorities and work with deadlines essential. 74-328-A (4/17).

Library General Assistant III Part-time in the Music Library will be responsible for circulation desk routines: maintain files, statistics, answer general information questions, perform other clerical projects as assigned. Accurate typing, ability to work with the public required. Subject background in music preferred; familiarity with foreign languages helpful. Some morning hours essential 9-1, flexibility possible. 20 hours. 74-578-A (5/29).

Library General Assistant III Part-time in the Rotch Library will be responsible for periodical materials: process serials and journals, maintain display and circulation areas. Will also assist with circulation duties 2-3 evenings per week. Previous library experience desired; knowledge of foreign languages helpful; accurate typing required. 30 hour work week. 74-599-R (5/29).

Library General Assistant III or Sr. Library Assistant IV will be responsible for circulation desk operations at the Rotch Library: inventory, shelving, overdue notice procedures, searches, records and statistics. Supervise and schedule assistants in desk and library procedures. Responsible individual with good judgment, organizational skills required; previous experience helpful. 74-451-R (5/22).

Senior Clerk III-IV in the Comptroller's Accounting Office will be responsible for complete control of the Journal Voucher System; maintain batch controls and edit input; create magnetic tapes for computer processing. Individual must be good with figures; previous experience with computer printout, familiarity with keypunch machine helpful. 74-417-R (5/15).

Technical Typist III-IV Part-time in Mechanical Engineering will handle variety of typing: reports, class notes, proposals, some correspondence. Excellent typing required; ability to do technical typing preferred. Good command of English important for answering phones. 25 hour work week, flexible. 74-389-A (5/8).

Senior Clerk III in the Comptroller's Accounting Office will post, prove and mail the Accounts Receivable monthly cycle billing. Answer questions regarding overdue balances. Accurate typing and the ability to work with figures and details important. 74-567-R (5/29).

Senior Clerk III in the Planning Office will be responsible for operating the IBM Mag Card typewriter or similar equipment in this busy administrative office. Above average typing skills required. Previous experience preferred, but will train willing candidate. 74-570-R(5/29).

Senior Clerk III in the Personnel Benefits Office will answer general questions about employee benefits; maintain various files; type correspondence and benefit forms. Ability to handle a heavy volume and variety of clerical duties under pressure essential. Skill and experience in dealing effectively with people, and to establish priorities required. Interest in medical plans, insurance, pension plans, helpful. 74-587-R (5/29).

Senior Clerk III in the Comptroller's Accounting Office will type correspondence and bills for Institute benefits; maintain data logs for the computer system. Good typing, knowledge of 10 key adding machine required. 74-588-R (5/29).

Senior Clerk III in Medical will handle reception duties at the first floor reception desk. Answer phones, schedule appointments, handle a variety of clerical duties. Mature, responsible individual with previous work experience and success in dealing with the public needed. Light typing required. 37½ hour work week 8:30-5:00. 74-430-R (5/8).

Clerk-Typist II or Senior Clerk III will assist with a variety of clerical duties at the Haystack Observatory, Westford, MA: maintain records, prepare various forms, handle administrative details of shipping and receiving, occasionally cover for other secretary. High school business courses, typing, bookkeeping; two years applicable experience required. 40 hour work week, must have own transportation. 74-592-R (5/29).

Clerk-Typist II in the Information Processing Center will distribute publications; maintain and update collections of reference manuals, mailing lists. Good typing needed for training in the use of the MTST and technical/statistical typing. Ability to deal with people important; (lot of public contact in this job). 74-572-A (5/29).

Accounts Payable Clerk II or III in the Comptroller's Accounting Office will process invoices and batch processed invoices; audit vendor invoices; perform various other procedures; ability to work with figures important. Proficiency on the adding machine required. 74-381-R (5/1).

Jr. Diet Aide II in Nutrition and Food Science will prepare special diets for consumption by human experimental subjects under the direction of the Dietician or Senior Diet Aide. High school graduate with some experience in handling foods preferred. 74-358-R (5/11).

2nd Class Engineer must have a Mass second class Engineer's license or higher. Individual must be willing to work on any shift. 73-182-R (11/24).

3rd Class Engineer at the Power Plant may work any and all shifts and do all kinds of work, consistent with self sufficiency of the Plant. Mass. Third Class Stationary Engineer's license or a license of a higher grade required. Experience on high pressure boilers, oil and gas fired with automatic combustion controls, turbine driven auxiliaries: AC and DC generation, switchboard and feed water control required. Some experience on turbine-driven refrigeration equipment is desirable. 74-422-A (5/29).

Reactor Operator Trainee IV in Nuclear Engineering will serve as shift operator on the MIT Reactor after passing A.E.C. Operators' Examination. Two years of technical college education or its equivalent background will be necessary for preparing for operators' licensing. Knowledge of electronic circuits would be helpful. Ability to work under pressure of emergencies important. 40 hour work week. 74-560-R (5/22).

Dormitory Maintenance Mechanic will perform a wide variety of duties related to the servicing, maintenance, repair and renovation of dormitory buildings and associated equipment. Duties fall within the lower skilled-range of duties performed by tradespersons. Accept orders, assign priorities, direct work. Familiarity with all common hand tools and small power tools, minimum 3 years experience in maintenance and repair of building fixtures and accessories required. 8am-4:30pm. 74-252-R, 74-253-R (5/29).

Senior Stock Clerk in Graphic Arts will perform all stock room functions; initiate orders for stock; keep reserve stock room records; check requisitions for descriptions. Must have full knowledge of commercial printing paper including: types, finishes, grains, properties, etc. Must be able to use power cutter and work from material cards. Graduation from high school or its equivalent and two years applicable experience required. 40 hour work week. 74-350-R (5/22).

Lab Assistant – Part-time in Nutrition and Food Science will wash, sterilize and prepare glassware for research laboratories. High School background, experience washing scientific glassware in research laboratory desirable. 16 hour work week. 74-566-A (5/22).

Messenger I Part-time for the Physics Department will deliver vials to the Mass. Eye and Ear Infirmary at 7:30am and 3:00pm, approximately 2-3 days a week. 74-609-R (5/29).

Messenger I for the Arteriosclerosis Center will xerox and file reprints, transport blood samples to and from MGH and MIT, maintain office supplies, run errands for the center. Responsible individual willing to be helpful is desired. Typing ability could be helpful. 74-388-R (5/8).

Campus Patrolwoman/Patrolman Minimum 10 years experience required in all phases of law enforcement to include knowledge of court procedures and case preparation, investigation of criminal and other complaints and reporting on same. Rotating shift/40 hour work week. 74-94-A (2/6).

Group Secretary IV at Lincoln Lab in Lexington. Responsible for Group Office, including directing other office personnel. Takes and transcribes dictation. Specialized report typing includes technical manuscripts and statistical tables/charts. Answers telephones, screens visitors, and makes travel arrangements. Supervises and maintains a Group filing system of classified and nonclassified material. Makes appointments for Group personnel and interfaces persons wishing to contact the Group Leaders. Must have a strong sense of responsibility. Must have the ability to establish own (and other office personnel) work priorities and to work cooperatively with other members of the Group. High school training or equivalent, plus three years' secretarial experience or secretarial school with one year of secretarial experience. Call Doroty Petrovich, x7306 Linc.

Technical Typist II at Lincoln Lab in Lexington. Will type technical reports, tables, simple drawings, and viewgraphs. Excellent typing and a conscientious approach to work required. Minimum of two years' typing experience required. Technical typing experience preferred. High school training or equivalent. Call Dorothy Petrovich, x7306 Linc.

The following positions have been filled since the last issue of *Tech Talk* and are no longer available:

74-397-R	Sr Clerk III
73-1184-A	DSR Staff
74-292-R	Secretary III-cancel
74-407-R	Sr Clerk III
74-307-R	Tech C
74-129-R	DSR Staff
74-457-R	Sr. Lib. Asst. IV
74-442-R	Secretary III
74-204-R	Clerk III
74-360-A	Systems Anal. Admin. Staff
74-414-R	DSR Staff Lab Tech P.T.
74-410-R	Exempt Acct.
74-432-R	Sr. Clerk III
74-365-R	Sr. Library Asst. IV
74-458-R	Lib. Gen. Asst. III or Sr. Lib. Asst. IV
74-120-R	DSR Staff
74-364-R	DSR Staff
74-392-R	Clerk-Messenger I
74-369-R	Edit. Sec. IV
74-416-R	Sr. Clerk III
74-450-R	Lib. Gen. Asst. III
74-397-R	Sr. Clerk III

Rank of Adjunct Professor Discussed at Faculty Meeting

Discussion at the May 22 continuation of the annual faculty meeting centered on a proposal to establish the rank of adjunct professor within the faculty.

Dean William L. Porter of the School of Architecture and Planning outlined the main recommendations of the proposal, which would attract outside professionals to a part-time commitment of teaching, conducting and supervising research at MIT:

Under the proposal, appointments to the rank of adjunct professor, which President Jerome B. Wiesner said was "somewhat akin to the rank of Lecturer," would be made for a maximum term of three years. The time commitment of an adjunct professor is not expected to exceed an average of 50 percent.

The formal appointment designations, as named in Dean Porter's proposal, are Adjunct Professor, Adjunct Associate Professor and Adjunct Assistant Professor. These appointments would not be tenured.

Discussion concerning the selection and review of adjunct professors was focused in part on possible conflicts of interest between research conducted at MIT and outside industrial commitments.

Professor Elias P. Gyftopoulos, Chairman of the Faculty, said he hoped rigorous screening of adjunct professor appointments would allow MIT "to capitalize on the expertise of outside professionals without compromising the experience of colleagues involved in in-house activities."

In contrast to the functions implied by the titles lecturer, research associate and visiting professor, the proposal would permit adjunct professors to become principal investigators on research projects.

In calling for increased certification of students' off-campus work in programs such as UROP, Dr. Alfred Keil, dean of the School of Engineering, said the need to maintain enduring relationships with the rapidly changing power industry was critical. He also supported the recommendation that adjunct professorships represent fewer than 10 percent of a department's regular faculty appointments.

The rank of adjunct professor was strongly supported by Dr. William F. Pounds, dean of the Sloan School of Management as "a more lasting and appropriate relation to the Institute."

Speaking in support of the built-in experimental period of two years for the proposal of Adjunct Professors, Walter A. Rosenblith, Provost, said, "All knowledge cannot by transplanted within these walls. We owe it to ourselves to study new ways of creating academic appointments."

Dr. Wiesner said the rank would "regularize in a major way" appointments in departments in which community professionals could have important influences on curriculum development.

Discussion of the proposal will be resumed in the fall, when a sense of the faculty will be taken to determine the advisability of administrative acceptance.

In other business last Wednesday, discussion was temporarily concluded on proposed revisions to the MIT judicial process. Professor Gyftopoulos concurred with Professor Thomas Sheridan of the Department of Mechanical Engineering that discussion be continued next fall on the recommendation concerning grievances against non-students.

The faculty will hold a closed meeting today, May 29, for the purpose of recommending candidates for degrees.

Energy Tips

Carl Hagge, the Institute's environmental engineer, said individuals can help save energy and maintain lower temperatures in the summer in several ways:

"Perhaps the most important of these," he said, "is to operate lights and other heat generating equipment only when necessary.

"Also, when windows are exposed to direct sunlight, the use of existing blinds or shades can be surprisingly effective in reflecting the sun's energy back outside."

When the flowers bloom in the spring there are also bloomin' exams to take and four of them were in progress in this quiet scene last Monday in duPont gymnasium. Depending on subject, assembled students were bending their heads around questions in chemistry (5.41, Introduction to Structure), electrical engineering (6.014, Electrodynamics, and 6.031, Structure and Interpretation of Computer Languages), or mathematics (10.100, Analysis).

Air Conditioning Economy Plans Announced

As a part of MIT's energy conservation program, the Physical Plant Department has announced plans for more economical operation of air-conditioning systems.

The plan is part of a year-round program in which the department intends to maintain temperatures in occupied buildings in a range from 68 degrees to 80 degrees, using a minimum amount of energy.

Generally, heat will not be provided to raise temperatures above 68 degrees, nor will mechanical cooling be used to reduce temperatures below 80 degrees in the warmest part of a building, according to Carl Hagge, the Institute's new environmental engineer.

Temperatures in other parts of a building might fall into the 70's on the same day, he noted, depending on the particular conditions affecting individual areas.

Outside air cooling will be used to the extent practicable, he added.

Hagge said the policy is based on comfort studies carried out by the National Bureau of Standards and is consistent with the policy of the federal and state governments and many other institutions.

Hagge, describing other aspects of the summer conservation plan, said:

"Some buildings have air-conditioning systems designed to provide a high degree of flexibility and control of temperatures in individual areas. These systems normally use energy to both cool and heat the air supplied to a given area in order to adjust humidity and temperature.

"Conditions are controlled by varying the proportions of hot and cold air or by reheating the cold. It is proposed to eliminate or at least minimize the use of simultaneous heating and cooling with some sacrifice in individual control."

Hagge said that persons with individual room air-conditioners are being asked to set them to maintain the upper temperature level of 80 degrees when the areas are in use, and to be sure they are off when the areas are not in use.

During hours when buildings are considered "unoccupied," Hagge said, a normal temperature range of 60 degrees to 80 degrees has been adopted.

This recognizes, he said, that an "unoccupied" building may well have occupants and equipment which would be affected by further extremes in temperature. "During the cooling season," he added, "the 80 degree limit applies irrespective of occupancy although an 'unoccupied' building will not be ventilated on the same schedule."

Hagge said that as the concepts are applied to specific buildings, "the particular requirements of each will be taken into account and the activities will be coordinated through the appropriate departmental administrative officer or other designated individual."

Anyone who has suggestions about the program is invited to call Hagge at x3-4755.

Gunfighters Need Practice—Pilots Do Too

By CHARLES H. BALL
Staff Writer

The Hollywood stereotype of the gunfighter who comes out of retirement to rid a frontier town of a hired killer may have its dramatic appeal—but it's probably a lot of hogwash.

Without some recent and regular practice, the hero most likely would be blown out of his shoes in any real-life shoot-out.

Dr. Walter M. Hollister, associate professor of aeronautics and astronautics at MIT, has cited the example of the gunfighter in summarizing the results of a study of what happens to piloting skills when they are not used.

The MIT researchers found, he said, that rusty pilots are likely to be as bad off as rusty gunfighters.

The study, conducted for the Federal Aviation Administration to help the agency make decisions on regulatory action, showed that pilots should not be complacent about having logged a lot of flying time.

It found that skills deteriorate very quickly among pilots who fly not at all, or only occasionally, over an extended period, such as a month or more. And it indicated, Dr. Hollister said, that flying regularly and often is "far more important" than the amount of experience a pilot has.

But there was good news, too. The researchers also found that the skills come back quickly with a little practice.

"The average private pilot flies about one hour a week," Dr. Hollister said. "It would take only about four hours of practice to get an average private pilot back to normal after an extended layoff."

Professor Hollister, who is a pilot, said his "best advice" to pilots is to fly regularly and often, not to extend themselves when their skills are at a low ebb and to practice—regularly and often—those skills that can save their lives in emergencies.

The researchers, from MIT's Department of Aeronautics and Astronautics, flew a series of flights in a late-model Cessna 150 single-engine plane with 60 non-instrument rated private and commercial pilots selected at random from the New England states.

A typical program consisted of three flights spaced over several weeks. The first flight was basic piloting, air work and landings. The second was a cross-country, or point-to-point, flight. And the third was a repeat of the first flight after an idle period.

The flight history of each pilot was recorded, along with the observed piloting skills on each flight as evaluated by an experienced instructor pilot.

The data was analyzed by computer to find statistical correlations between piloting skill and several measures of flight experience—with results, Professor Hollister said, that gave "valuable insight into how piloting skills change with and without practice."

The most significant result was that, of all the factors considered, recent flight experience was most strongly correlated with observed piloting skill.

In fact, the skills which scored the highest were typically those which are practiced most often—including flight planning, pre-flight inspection, taxiing and take-off.

The skills which scored the lowest were those which were seldom or never practiced—such as stalls and instrument flight.

"Many of the subjects had not done stalls since their initial flight training," Dr. Hollister said. "Some subjects had no simulated instrument experience at all. It is unfortunate that inadvertent stalls and flight into instrument weather contribute to a major percentage of the accidents to pilots in this category."

Dr. Hollister said the study indicated that any change in FAA regulations that could lead to diminished flying activity—such as a reduction in the requirement for landings in a specified period—"would be a step in the wrong direction."

He also suggested that required flight proficiency checks every two years or so should have a beneficial effect on flying skill.

"Nobody likes to take check rides," he said, "but they are apparently effective because on a statistical basis skill was found to decrease with the number of years since the last check. Anticipation of the review should cause pilots to increase flight frequency prior to the check ride, if nothing else."

Dr. Hollister also listed some "miscellaneous results of interest" from the study:

"For those who detest written exams, it was found that there was no correlation between written test scores and observed piloting skill.

"Pilots who flew regularly from controlled fields had better radio skills.

"Pilots on the average make about two landings for each hour of flight.

"There was no significant relationship found between skill and geographic location where the pilot trained or whether he attended a certificated flight school or not.

"It was obvious that the pilot's individual instructor had an important influence on the skill which the pilot developed, but no statistical data was collected about the instructors of the test subjects."

Those who worked with Dr. Hollister on the study included Dr. Charles M. Oman, assistant professor of aeronautics and astronautics; John R. Tole of Natick, Mass., a graduate student, and Arthur LaPointe, business manager for the Measurement Systems Laboratory.