

'I'm stunned.'



Mr. Sherman with Rio trip brochure. —Photo by Margo Foote

MIT Custodian Wins Rio Trip

"I'm stunned," Henry J. Sherman of Charlestown said when he was informed Monday that he had won the trip to Rio.

Mr. Sherman is a machine operator who runs an automatic sweeper through the main complex corridors on the 11pm to 7am shift. His wife, Marie, is a custodian, also on the night shift.

They will visit Rio de Janeiro with \$200 spending money as beneficiaries of The Trip lottery sponsored by the Quarter Century Club-Community Service Fund.

Mr. Sherman—like most people—said winning the trip was the first time he had won anything in a lottery. He admitted, however, that he had once won a slogan writing contest for a copper cleaner.

Traveling will be a new experience for the Shermans. Mr. Sherman was posted to the Philippines and Australia on Navy duty during World War II, but apart from that, he and his wife have not traveled farther than Baltimore. "It's something you think about," he said, "but this will really give us a chance to get out of our rut." family tradition. His father was a physical plant employee for 15 years until his retirement in 1958. His brother, Bill, a 26-year veteran at the Institute, is head custodian in Buildings 33 and 35.

Ticket sales on The Trip amounted to \$1855. The Community Service Fund expects to realize approximately \$1600 after the lottery tax and expenses are paid.

2 Plans on Spring Term Up for Faculty Discussion

The Committee on Academic Performance this week put forth a second possible plan to end the second term three days earlier than scheduled next spring.

The new plan, together with an earlier one, will be a main topic of discussion at the regular monthly faculty meeting this afternoon (Wednesday).

The CAP is seeking to change the academic calendar and have classes end on May 14, instead of May 17, to give departments and faculty committees more time to review grade records and the

registrar's office more time to process grades and prepare for commencement.

The original plan suggested by the CAP would end the Independent Activities Period one day earlier, on Jan. 29 rather than Jan. 30, and eliminate two vacation days on Jan. 31 and Feb. 1. Under this proposal, which is now one of two possibilities, the second term would start and end three days earlier than scheduled.

The alternate method being offered would keep the calendar in-

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Weather Warmup Gives Respite But Fuel Prospects Remain Grim

Unseasonably warm weather—coupled with intensive energy conservation strategies—allowed MIT to make temporary savings in oil burned last week, but Department of Physical Plant officials said the Institute is still well short of cutting fuel consumption by 30 percent.

William R. Dickson, Physical Plant director, said the University's oil consumption was reduced by an amount in excess of 15 percent during the period Nov 5-15.

"We still have some way to go if we are to cope with the cut of 30 percent in the amount of oil we can obtain this winter over a year ago," he said. "The crisis is still with us, even if people have a hard time believing it because of the warm weather we've been having."

Dickson said warm temperatures last Wednesday, Thursday and Friday enabled his department to shut off virtually all heat to the main complex of buildings. At the same time, the Commonwealth Gas Co., because of reduced demands from its regular winter customers due to the warm weather, was able to give MIT an unexpected short term supply of natural gas.

And, finally, he said, internal demands for energy began dropping last week as a host of steps by Physical Plant—reduced hot water temperatures, night and weekend reductions in heating of ventilation air supplies—and by MIT people—closing venetian blinds, closing windows, etc.—began to take an effect.

"For those three days last week, we burned almost no oil at all," Dickson said. "But it was temporary. We still have a long way to go."

Dickson said the warm weather last week actually resulted in interior temperatures throughout the main complex of buildings reaching into the high 70s and even the low 80s.

"We had people calling us and writing to us to complain that we were wasting oil by overheating the buildings," Dickson said. "We weren't heating the buildings. We weren't burning oil. We were not operating the air conditioning systems that we have, either, because they take energy."

Bright sunshine streaming through MIT's large windows together with the movement of people inside the buildings brought about the high internal temperatures which, he said, probably would have been controlled in previous years with air conditioning or increased ventilation.

Dickson said the Institute has so far run into no cases in which research projects have had to be slowed down or halted because of the energy crisis. There was one case of a computer which began to

See related stories on Page 3

overheat last week, but it was controlled by the temporary diversion of chilled water into the cooling system for the room in which it is housed.

Meantime, Dickson said he still has received no assurance from suppliers that they will be able to meet all or part of MIT's oil deficit if environmental standards should be lowered to permit the burning of oil with 2.2 percent sulphur content.

The Environmental Health Di-

Physicists at MIT Studying Laser Ignition for Fusion

A promising, new approach to harnessing thermonuclear fusion—the energy-producing process of the sun—for practical use is now being actively studied by a team of MIT physicists.

Drs. Benjamin Lax, Daniel Cohn, Ward Halverson, and their colleagues are performing basic research at MIT's Francis Bitter National Magnet Laboratory in a new area of physics which may ultimately make it possible to use high-powered laser beams to ignite fusion and to contain it in magnetic fields.

Unlike nuclear fission, which involves splitting heavy atoms to release energy, fusion consists of

combining light atoms at temperatures of 80 million to 100 million degrees. This fusion results in the production of heavier atoms, but also in the release of enormous amounts of leftover energy which could be used to produce electricity.

Nuclear fission as an energy source is limited by the scarcity of fissionable materials such as uranium and plutonium, while fusion uses the almost limitless quantities of deuterium and other light elements on earth. Deuterium, or "heavy hydrogen" is very common—in fact, the world's oceans contain practically limit-

(Continued on page 2)

'Eyes' at MIT Will Focus On 'Comet of the Century'

As Kohoutek—dubbed the comet of the century—sweeps within earth's orbit at tens of thousands of miles per hour this December, a number of "eyes" will probe its secrets from MIT.

Scientists at Haystack Radio Observatory and MIT's George R. Wallace Astrophysical Observatory will scan the comet for various molecules suspected to be basic to its makeup, and will probe the structure of the heavenly visitor.

Three scientists from NASA's Goddard Space Flight Center, Greenbelt, Md., will use the 120-foot Haystack radio antenna to detect the comet's microwave emissions at the 1.35 centimeter wavelength of water vapor.

Like many of the research projects involving the comet, the scientists—Tom A. Clark, Bertram Donn, and William M. Jackson—are not sure what they will find, or whether they will find anything at all.

For example, in order for water vapor to be detected, say the scientists, temperatures in the comet must be high enough to put significant amounts of vapor into the proper energy state. If temperatures are too low, few microwave

emissions will be found, even if the comet's nucleus is composed entirely of ice.

Conditions are slightly more favorable for the detection of ammonia emissions at a wavelength of 1.30 centimeters, according to the researchers. This is because ammonia emits microwaves at temperatures lower than water, making ammonia vapors more detectable in the frigid environment of outer space. A team of scientists from Harvard University and the Smithsonian Astrophysical Observatory—including Drs. Harrison Radford, Marvin Litvak, Fred L. Whipple, and Edward Lilley—will carry out the search for ammonia.

Should ammonia and water vapors be found in the comet, support would be given the theory advanced by Dr. Whipple that the comet nucleus is essentially a "dirty snowball"—composed primarily of ices of simple molecules, including water, methane and ammonia, along with imbedded dust particles.

Such findings also would not be inconsistent with the theory that comets are formed from basic materials within the solar system,

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Physicists at MIT Studying Laser Ignition for Fusion

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less amounts. Another substance commonly used in fusion experiments, tritium, is the radioactive form of hydrogen. Furthermore, fusion reactors may likely present fewer safety problems and emit less radioactivity than fission reactors.

The MIT scientists contend that it may ultimately be possible to achieve the temperatures, densities, and containment times required for successful fusion by zapping deuterium-tritium gas with a powerful laser beam, and confining the atomic fragments,

called plasma, within a strong magnetic field. Their approach represents a combination of two other approaches currently being tried around the world.

One method, called the Tokamak approach, is to heat plasma rapidly in an "escape-proof" doughnut-shaped magnetic field and to contain it long enough for fusion of the plasma to take place and useful energy to be extracted.

The other approach is to blast a frozen pellet of deuterium and tritium with a laser beam, without any containment, and to extract energy from the ignited fusion

process before the pellet material has a chance to escape the reaction chamber.

The MIT researchers foresee possible advantages in using both laser ignition and magnetic confinement. For example, the pellet fusion method requires enormous bursts of short-wavelength laser light in billionth-of-a-second pulses. So far, efficient lasers (in converting electrical energy to laser energy) have not been developed which could produce such powerful, short pulses.

However, laser-induced, magnetically-contained fusion would

not require nearly as short a pulse as the pellet fusion method—in fact about a thousand times longer say the scientists. Since a longer pulse is possible, laser energy can be delivered much more efficiently, because the laser doesn't have to dump its energy into the fusion chamber as rapidly.

The scientists say that the characteristic wavelength of the currently available carbon dioxide laser appears to be very favorably matched to the requirements for heating magnetically confined plasmas. This is advantageous because the carbon dioxide laser

happens to be the most efficient high-power laser in existence.

So far, the MIT researchers and their colleagues in the field at other laboratories have done only basic research indicating the promise of their approach. The MIT studies were initiated in 1970. Similar work is being done at the University of Washington and in Canada and another project was begun recently at Princeton University.

"We feel that the time is ripe for a scale-up of our investigations into larger, university-based experiments to determine further the method's feasibility, said Dr. Cohn. "While the pellet fusion approach will receive about \$30 million this year from the government, the magnetically-confined, pellet-fusion approach is currently funded at less than \$500,000 per year.

"We're not saying that this approach to thermonuclear fusion is necessarily the best, but preliminary studies indicate that it is certainly good enough to merit some serious consideration. Because of the problems involved in controlled fusion, we should be leery of depending totally on two or three approaches."

The MIT researchers were the first to produce and heat a plasma in a magnetic field, using a carbon dioxide laser. They plan to continue their basic studies and also hope to perform specific experiments to assess the feasibility of their approach.

Working with MIT undergraduate and graduate students, they plan to determine whether laser heating can produce plasmas with the proper densities for fusion; to measure the energy losses from their laser-induced plasmas; to determine whether high-power laser beams are reflected from plasmas to any large degree; and to determine whether magnetic fields can contain their plasmas sufficiently.

According to the physicists, a fusion reactor based on this approach might consist of a pencil-thin plasma about one-half mile long. This shape would make plasma escape difficult enough so that the fusion would have time to occur before significant leakage.

In addition to the laser fusion work at the Francis Bitter Laboratory, a Tokamak device—called Alcator—is also being developed.

Research on the interaction of high-power lasers with solid targets—as would occur in a pellet-fusion scheme—is being carried out at MIT by Dr. E. Victor George, assistant professor of physics, Dr. Hermann A. Haus, professor of electrical engineering, and Dr. Abraham Bers, professor of electrical engineering.

Lincoln Sculptor, Among Others

'Who Was Who' Project Finds Distinguished Alumni

It isn't news to anyone that MIT graduates have been involved in major engineering and scientific accomplishments over the years.

But it doesn't end there, of course.

For example, do you know that an MIT alumnus sculpted the famous statue of Lincoln for the Lincoln Memorial in Washington? And that another was the author of the Dr. Doolittle books for children?

These somewhat off-beat accomplishments by MIT alumni have been turned up by Fred R. Shapiro, 19, a senior from Roslyn, N.Y., in connection with a project he is doing on distinguished MIT alumni for a class, "Special Topics in History." Mr. Shapiro, a literature and mathematics major in the Department of Humanities and editor of the "Last Word" section in the student newspaper, *Thursday*, also plans to write an article on outstanding alumni for *Technology Review*.

The creator of the Lincoln statue was Daniel C. French, an 1871 graduate who gained renown as one of America's greatest sculptors. His statuary includes the Minuteman figure in Concord, but ironically his best-known campus work is the Alma Mater statue at Columbia University in New York.

The author of the Dr. Doolittle books, which are still being pub-



lished, was the late Hugh J. Lofting, who graduated with the MIT class of 1909.

Mr. Shapiro said he hopes to compile a list of at least 100 alumni who are "extremely distinguished in their fields," and he is looking for help.

For purposes of his project, Mr. Shapiro is including anyone who attended MIT, not just degree recipients. These alumni, for example, he said, would include Whitney Young, the late civil rights leader, who was at MIT under an armed services program.

Mr. Shapiro asks that anyone wishing to suggest a name—the person may have had either an unusual career or a conventional career in science, engineering or business—send it to him, with a short description of the person's accomplishments, at East Campus.

Among alumni he already has found with unusual accomplishments, he said, are Gen. James H. Doolittle, who received a master's degree in 1924 and ScD in aeronautical engineering in 1925; John W. Campbell Jr., class of 1933, and Charles Edison, class of 1913.

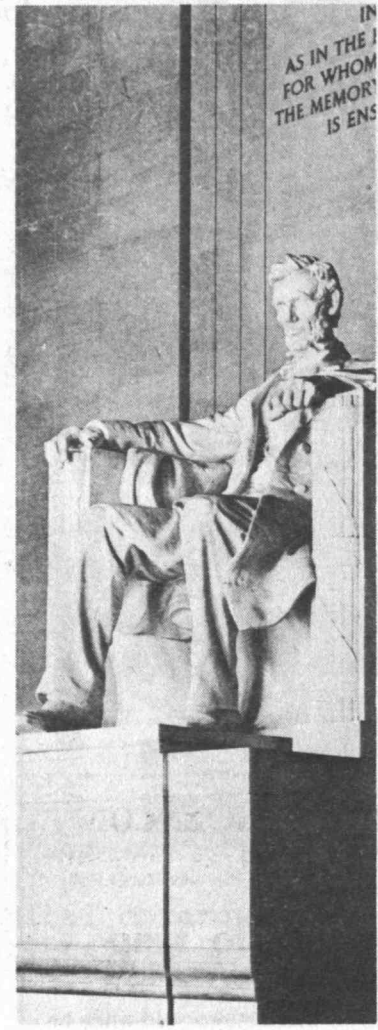
Gen. Doolittle, who gained fame as an aviator and has had an outstanding business career, is an MIT Corporation member, emeritus.

Mr. Campbell, an editor, was a key figure in the development of science fiction through his insistence that the stories have scientific plausibility.

Mr. Edison, the son of inventor Thomas Alva Edison, was Secretary of the Navy, at the time it was a cabinet post, and governor of New Jersey.

Mr. Campbell and Mr. Edison died in recent years.

Altogether, Mr. Shapiro said, MIT has among its alumni at least four governors, a senator, five US representatives and two cabinet



members, including George P. Shultz (PhD, 1949, in industrial economics), the present secretary of the treasury.

United Way Tops Its Goal But MIT Drive Far Short

Last week the United Way of Massachusetts Bay topped its 1973 campaign goal of \$14.5 million—but with small thanks to the lagging MIT drive.

MIT's United Way/United Black Appeal campaign has netted only \$33,099—a little over 20 percent—of its \$150,000 goal.

"After three weeks of work, this figure is a disappointment," said John A. Carley, the MIT United Way organizer.

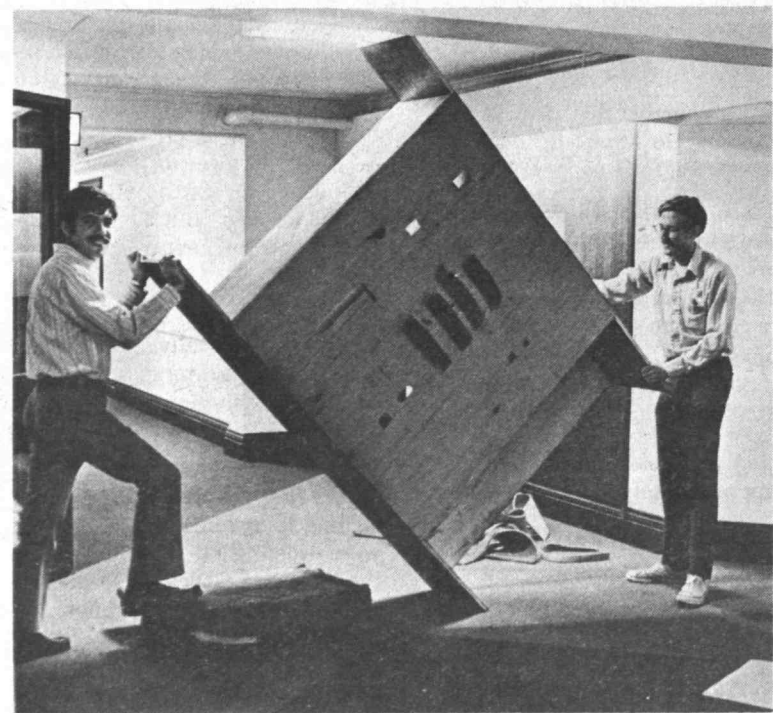
"The gifts so far come from only 1,113 members of the MIT community—that means that a lot of Institute people are simply sitting and thinking about their pledges," he said.

"Just because the larger goal of \$14.5 million has been reached, this amount will not provide all the services necessary," Mr. Carley said. "MIT pledges are still needed."

"United Way picked the \$14.5 as a nominal goal—a compromise figure which just meets minimum funding needs for UW recipient organizations," Mr. Carley said. "Furthermore, this year's goal does not include the United Way's recent gift of \$100,000 in emergency relief to victims of the Chelsea fire," he explained.

Donors wishing to specify United Way agency or services to receive their gifts may do so on pledge cards.

UW and UBA pledges will be accepted after the Thanksgiving deadline.



Moving day at Ashdown—Joseph D'Aversa, left, a graduate student in management, and Gregory Rewoldt, a graduate student in physics, transfer a bookcase from their old quarters in the east wing of the graduate student residence to the newly renovated west wing of Ashdown House. The renovation of the east wing will commence shortly after all of its former residents are settled in their new rooms. Completion of the east wing is set for May, 1974.

—Photo by Margo Foote

Young Worker to Give Talk on Arabs

Naws Massalha, head of the Young Arab Workers Division for the Israeli Federation of Labor, will speak on the condition of

Arabs in Israel, Monday, Nov. 26, at 3pm in Room E53-482. The talk is sponsored by the Center for International Studies.

Press Book Sale

The annual MIT Press Book Sale will open Wednesday, Nov. 28, at 10am in the Sala de Puerto Rico, offering 50 to 95 percent off on all titles.

More than 1,200 titles and 30,000 volumes will be included in the three-day sale. The range of subjects includes art, archeology, linguistics, sociology, economics, ecology, urban planning, architecture, engineering, education, management, history and many others.

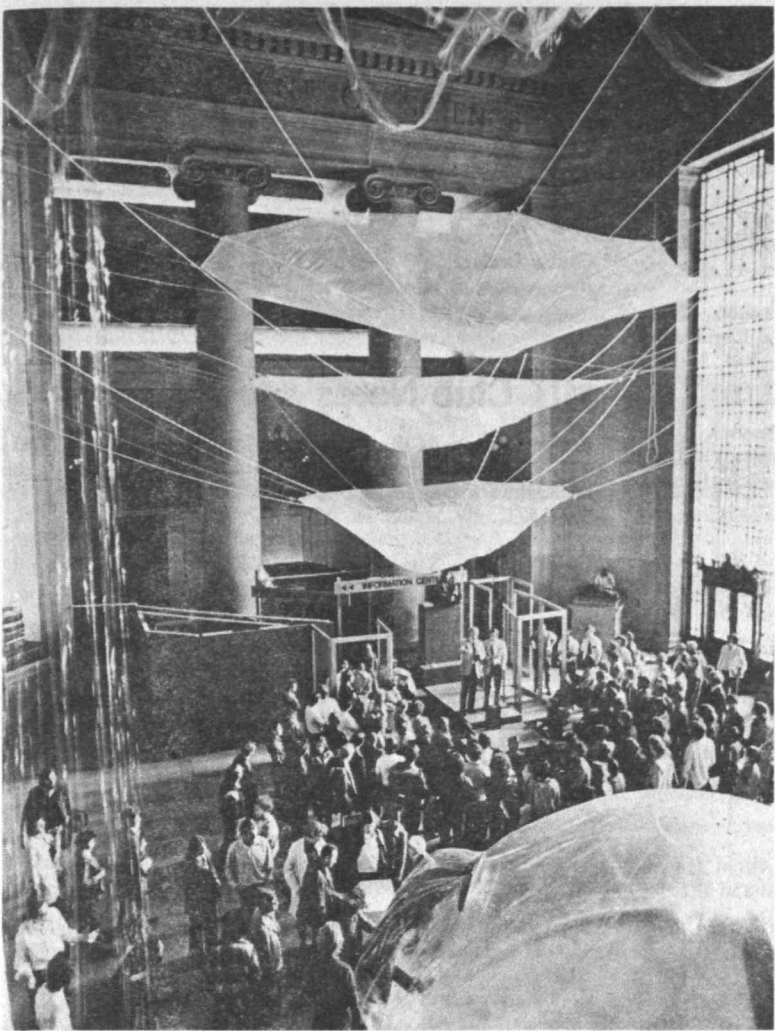
Sale hours are: Wednesday, Nov. 28, 10am-10pm; Thursday, Nov. 29, 10am-10pm; Friday, Nov. 30, 10am-4pm.

TECH TALK

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Hanging sculptures of plastic sheeting by environmental artist Otto Piene dominate the scene as crowd gathers around TV weathermen Norman J. MacDonald of WBZ (a member of the MIT meteorology staff) and Dr. Fred Ward of WNAC (an MIT alumnus) for opening of "Weather" exhibition in the Building 7 lobby. Mr. Piene, visiting professor in the Department of Architecture, organized the show, which closes today (Wednesday). The exhibition has more than 30 displays prepared by MIT faculty members, students and staff—all related to the dynamics of weather and climate.

—Photo by Margo Foote

Paper Recycling Program Lags as Prices Increase

MIT's paper recycling program, which began so auspiciously last spring, needs a shot in the arm.

Recyclable paper is now averaging seven to 10 tons every two weeks, down from 12 to 14 tons collected weekly when the program began. The ratio of paper to rubbish was approximately 50-50 last spring and is now about 33-66.

Fred Gross, a graduate student in civil engineering who originated the program, cites two reasons for the fall-off. "Some of the recycle baskets have disappeared since April," he said, "and also, people just aren't as conscious of the program as they were in the beginning."

Getting paper recycling back to a higher level would be an economic—as well as ecologic—boon right now, Gross said, because there is a worldwide shortage of wastepaper. As a result, prices paid for recyclable paper are rising—up to \$50 a ton at paper mills for old newspapers, for example.

MIT could save \$5,000 a year or more on rubbish removal if a level of 10 tons a week could be maintained. At the present level, the savings will be closer to \$2,000 a year, Gross estimated.

The recycling program operates in Buildings 1-12, except Building 9. As yet there are no facilities to permit recycling in other areas of the campus. In the main complex, wastebaskets are emptied Monday, Wednesday and Friday nights and the recycle boxes are emptied Tuesday and Thursday nights.

Persons who need new recycle boxes may call Ext. 3-4757 and leave a message to have a box delivered.

The MIT program was the first such university effort in this area, Gross said. It was based on a feasibility study carried out in the summer of 1972 by Gross and other members of MIT Ecology Action.

Dial 'ENCON' For Conservation

ENCON—the special telephone extension the Department of Physical Plant has established to receive suggestions and comments from MIT people on energy conservation—was kept busy last week with dozens of calls from interested MIT people.

The extension number is 3-6266 which spells ENCON—for energy conservation—on the telephone dial. William R. Dickson, Physical Plant director, said numerous calls dealt with long-term changes to save oil in future years "and these are welcome."

"We are equally interested in what we can do now," he said.

Anyone with suggestions, questions, or comments are urged to use the line.

How to Help Save MIT Oil

Will you help save oil at MIT? Is so, here's what you can do where you live and/or work:

1. Close venetian blinds and drapes at nights and on week-ends.
2. Keep your windows closed.
3. Keep doors opening onto corridors closed.
4. Don't stack books, papers, coats, etc., on registers or forced hot air registers.
5. Turn thermostats down to at least 65 at night and on weekends and by at least four degrees during the day.
6. Don't use electric space heaters.

Topical IAP '74 Offerings Include Watergate, Energy, Environment

Major news stories of 1973 will be reflected in IAP '74, which has half a dozen offerings related to President Nixon and/or Watergate and dozens devoted to energy, ecology or the environment.

The Department of Political Science, for example, is offering "Kicking it Around: How the Press Covers the White House," "The Nixon Game," and "Watergate and National Security."

Activities in energy, ecology or environment pop up in 24 of 39

Spring Term Proposals On Faculty Agenda

(Continued from page 1)

tact at the beginning of the term, but eliminate two Tuesday holidays on Feb. 19 and April 16, making them regular class days. (On one of these Tuesdays, classes that normally meet on Monday would be held.) This plan would result in shortening the term by one class day.

The CAP said it originally had rejected this latter means of ending the term early "because of a strong representation by the student members of the committee that these vacations were of great value in relieving the academic pressure during the term."

But it said it decided to offer the plan to the faculty as a possible alternate method after learning that the original proposal—ending IAP a day early and eliminating the two vacation days following it—could increase air travel costs for some students.

"While we were aware that our proposal to start the spring term earlier would involve some personal inconveniences for both students and faculty," it said, "we presumed that these would be resolvable in most cases."

However, it said, a difficulty had been brought to its attention "which seems to be both widespread and substantial."

"Airlines have offered low group fares to customers willing to make firm reservations at least 90 days in advance," it said, adding that some students under this plan had made reservations to return to Boston during the Jan. 30-Feb. 4 period.

"To change their plans now would involve a significant financial loss, on the order of \$100 for students traveling a long distance," the CAP said. "We have heard directly from only a few students but expect that a substantial number might face this problem."

The CAP's original proposal also noted some potential adverse effects under that plan.

While it was not generally felt that there was any "great need" for the vacation days at the end of IAP, it said, "some people will have made plans in advance which will be difficult to shift. However, such conflicts occur under any calendar and can usually be resolved by the individual."

Also on the agenda at the faculty meeting—it starts at 3:15pm and is held in Room 10-250—is a report by Philip A. Stoddard, vice president for operations, on the effects of fuel and energy curtailments at the Institute.

Other business includes a report on the Council for the Arts by Dr. Roy Lamson, professor of literature, emeritus, and special assistant to the president for the arts.

departments, centers and organizations sponsoring IAP offerings. Individual examples include "City Game: The Bicentennial and Environmental Design," "Energy Shortage," "Solar Energy Workshop Competition," and "The Boston Navy Yard Project."

Altogether, there are 350 activities listed in the First Guide to IAP, which was issued Nov. 14. Activities range from mini-versions of regular subjects, such as calculus, to off-beat one-time-only classes, such as "Introduction to Wine Making."

In addition, several favorites from previous IAPs will be back in this year. Classes in beginning and

intermediate automotive mechanics will be available, although no shop for actual repair work has yet been found. Four sections of elementary glassblowing, one in laboratory glassblowing and a glassblowing project lab are planned by various departments.

A Second Guide to IAP, including additional listings that came in too late for the first guide, will be issued Dec. 12. Deadline for submitting material for the second guide is Thursday, Nov. 29. Listings should be sent to Joan Friebely, Room 5-133. Listings that miss the Nov. 29 deadline will be posted on an IAP bulletin board in Building 7.

Students Develop a Valve To Cut Anesthetic Leakage

By JOANNE MILLER
Staff Writer

Improved working conditions in operating rooms may result from a summer project carried out by Eve Higgenbotham, a junior in chemical engineering from New Orleans, and her research partner, Marc Jacobs, from Lehigh University.

They developed an environmental control system which greatly reduced leakage of the anesthetic halothane into the atmosphere of surgical suites.

Halothane is widely used in surgery because it is quick, safe, and easily manufactured. However, its leakage into the air of surgical suites has become a problem. The presence of halothane has been shown to be harmful to operating room personnel exposed to it over long periods of time.

The students solved the leakage problem by devising a valve which shunts exhaust halothane through a charcoal filter where it is absorbed. The device is efficient enough to reduce halothane leakage up to 99 percent.

An anesthesia machine using the new system has been tested successfully on animals and is being tested further in the surgical suite at Howard University's Freedman's Hospital.

The project was carried out at the NASA Summer Institute in Biomedical Engineering at Goddard Space Center in Greenbelt, Md., held in cooperation with the Howard University Medical School. Ms. Higgenbotham was one of ten students nationally who were chosen for the program this summer.

Margaret Beals Dance Concerts

The internationally known dancer Margaret Beals will give a series of three solo concerts, her first performances in Boston, on Nov. 29, 30 and Dec. 1 at 8:30pm in Kresge Little Theatre.

Ms. Beals is well recognized for her artistry as an improvisational dancer. She will perform "Millay Moments" a work which combines dance with a reading of poems by Edna St. Vincent Millay. Ms. Beals will also premiere a new

work and perform a section of improvisation with guest artist Gwendolyn Watson, a composer and cellist.

The concert is sponsored by the Institute for Contemporary Dance, the MIT Dance Workshop and the MIT Department of Athletics.

Advanced tickets are \$2.00 and are available at TCA in the Student Center or by calling 734-9334. Tickets at the door will be \$3.00.



A Hayden Corridor Gallery visitor meditates on the message of a silkscreen print in the Corita Kent exhibit currently on display. The Kent exhibit and an exhibition of collages and graphics by the later German artist Kurt Schwitters in Hayden Gallery will continue through Dec. 8.

—Photo by Margo Foote

THE INSTITUTE CALENDAR

November 21
through
November 30

Events of Special Interest

Share Thanksgiving - Students who would like to be a part of a family for the holiday and families who would like to share their holiday with a student, please contact Mrs. J.B. Feldman, 527-1022.

Inbal Dance Theater* - Famous Israeli dance theater will perform Thurs, Nov 29, 8pm, Kresge Auditorium, at the Abramowitz Memorial Lecture. Tickets, \$1, TCA office, Stu Ctr Rm 450 (Nov 19-21) & Bldg 10 Lobby (Nov 26-29). Limit of two per person, MIT ID required. Proceeds to benefit the Chelsea Fire Relief Fund.

Seminars and Lectures

Wednesday, November 21

The Politics of Failure* - Jamie Snell and David Held, graduate students. Sloan School and Urban Studies Seminar. 10:30am-12:30pm, Rm E52-151.

Low Income Housing Policy in Kenya* - Tara Chana, urban studies. Seminar on Foreign Students and Participation in Development. 7pm, Walker International Stu Lge.

Monday, November 26

The Fine Scale Structure of Two-Dimensional Turbulence* - Dr. Robert L. Kraichnan. Applied Mathematics Colloquium. 4pm, Rm 2-339. Coffee, 3:30pm, Rm 2-349.

Tuesday, November 27

Stabilization of Uncertain Systems Via Output Feedback* - Prof. B.D.O. Anderson, University of Newcastle, Australia. Electrical Engineering Decision & Control Sciences Group Seminar. 4pm, Rm 37-212.

Dual-Career Marriages** - Prof. Paul Rosenkrantz, clinical psychology, Holy Cross. Association of Women Students Seminar. 4-6pm, Rm 3-310. Refreshments, men & women welcome.

Technology, Society and Values in MIT Education* - Student and faculty representatives of Concourse. Technology Studies Program Colloquium. 4:10pm, Rm 14E-304. Coffee, 4pm.

Post-Transcriptional Modifications of Messenger RNA* - Dr. Robert P. Perry, Institute for Cancer Research, Philadelphia. Biology Colloquium. 4:30pm, Rm 6-120. Coffee, 4pm, Rm 56-520.

Strategies on How We Move and the Black Preacher** - Mr. Virgil Wood, SCLC, Boston. Community Fellows Program Seminar. 5-6:30pm, Rm E40-169.

Tillie Olsen* - Author of *Tell Me a Riddle*, will read from her work. 8pm, Stu Ctr Mezzanine Lge.

Wednesday, November 28

Cognitive Studies of Black Children in School and Community Settings* - Dr. C. Dalton Jones, psychology, University of Massachusetts, Amherst Joint Psychology & Division for Study & Research in Education Colloquium. 12n, Rm E10-013.

A UROP Symposium: Undergraduate Research in Physics* - Undergraduates presenting the results of their research. 2pm, Astrophysics Seminar Rm 37-252. Refreshments, 3:30pm.

Size Dependence of Self-Diffusion Coefficients* - T. Keys, graduate student. Nuclear Engineering Doctoral Seminar. 2pm, Rm 24-307.

Drifting Continents and the Localization of Creep Along Polymorphic Phase Change Boundaries in the Earth's Mantle* - Prof. Charles G. Sammis, geosciences, Pennsylvania State University. Earth & Planetary Sciences Colloquium. 4pm, Rm 54-100. Tea, 3:30pm, Rm 54-923.

Future Technological Developments and Policy for Postal Services* - Joseph Fleming, Herbert Hollomon, Charles Jackson, Abraham Tersoff & H.N. Upthegrove. Telecommunications Planning and Policy Research Seminar Series. 4-6pm, Rm 9-451. Coffee.

The Nature of Scientific Discovery* - Dr. Hans-Lukas Teuber, psychology. Respondent: Jerry A. Fodor, philosophy, psycholinguistics. Technology and Culture Seminar. 5:15pm, Rm 9-150. Buffet 6:45pm, Stu Ctr. Open discussion, 7:30-9pm.

Thursday, November 29

Optimum Imaging Through Atmospheric Turbulence* - Prof. J. Shapiro, electrical engineering, RLE. Communications Seminar. 3-4pm, Rm 26-217.

Difference Between Second-Law Entropy and Informational Entropy* - Dr. George N. Hatsopoulos, mechanical engineering, president, Thermo Electron Corporation. Thermodynamics Seminar. 4pm, Rm 3-343. Coffee.

Urban Noise: Can We Rise Above It?* - Dr. Joel M. Garelick, Cambridge Acoustical Associates. Interdepartmental Acoustics Seminar. 4pm, Rm 5-134. Coffee, 3:30pm, Rm 1-114.

Oil Pollution in the Oceans* - Prof. J.N. Butler, Harvard University. Analytical Chemistry Seminar. 4pm, Rm 8-105.

Chemical Stabilization of Enzymes by Intermolecular Cross-Linking* - Oskar R. Zaborsky, PhD, Esso Research & Engineering Co. Nutrition & Food Science Seminar. 4:15pm, Rm 54-100. Coffee, 4pm.

Technical Training for Development?* - Shoukri Roweis, urban planning, University of Toronto, and George Ruthgers, electrical engineering. Seminar for Foreign Students and Participation in Development. 7pm, Walker International Stu Lge.

Friday, November 30

A Shipper's View on How to Save the U.S. Railroad System* - William K. Smith, vice president, General Mills, Inc. Center for Transportation Studies Luncheon/Seminar Series. 12n, Stu Ctr Mezzanine Lge. Buffet \$2. Speaker 12:45pm (lecture free).

Lobster Tales, Turtle Tails and Monitor Trails* - Prof. Harold E. Edgerton & Mr. Charles E. Miller. Electrical Engineering Lecture. Slides & videotape. 12n-1pm, Rm 10-250.

Phase Transitions in Molecular Crystals* - Prof. Alfred Huller, physics, astronomy, University of Massachusetts. Material Science Colloquium. 4pm, Rm 9-150. Refreshments, 3:30pm.

Electron Energy Confinement in ATC** - Dr. E. Mazzucato, Princeton Plasma Dynamics Seminar. 4pm, Rm 36-261.

Challenge to Higher Education: A Single Standard of Excellence?* - Dr. Kenneth B. Clark, Distinguished Professor of Psychology, C.U.N.Y., president, Metropolitan Applied Research Center, NYC. Respondent: Jerome B. Wiesner, President, MIT. 5:30pm, Rm 9-150. Buffet 6:45pm, Stu Ctr. Open discussion 7:30-9pm.

Community Meetings

Women's Forum - Open Meeting, projects for the year and IAP. Mon, Nov 26, 12n, Bush Rm 10-105.

Pre-Professional Meetings - James Hollomon, assistant dean, American University Law School. Mon, Nov 26, 4-5pm, Rm 10-179. Dr. Joel Feinblatt, University of Massachusetts Medical School. Thurs, Nov 29, 4-5pm, Rm 3-133.

MIT Hillel Mattapan Day - A day of interaction with elderly from Mattapan. Thurs, Nov 29, 10:15pm-3:30pm, Bush Rm 10-105. Info, x8529 Dorm or x8856 Dorm.

MIT Press Book Sale - Student book sale, 50-95% off. Wed, Nov 28 & Thurs, Nov 29, 10am-10pm, Fri, Nov 30, 10am-4pm, Sala.

Student Committee on Educational Policy - Harold Hanham, Dean of Humanities & Social Science, will speak on Humanities. Wed, Nov 28, 7:30pm, Stu Ctr Rm 353.

Introductory PL/1 for FORTRAN Programmers - Non-credit course, consisting of lectures, exercises & machine problems. Nov 28, 29, Dec 3, 5, 7, 10, 12, 14, 17 & 19, 11am-12:30pm, Rm 39-530. Fee: \$15. Preregister, Lynne Penney, Rm 39-427, x3-6320.

Student Homophile League - Meeting Thurs, Nov 29, 8pm, Rm 14E-307. Hotline number has been changed to 494-8227 for information, talk, help in coming out.



INBAL DANCE THEATER—The world famous company from Israel will perform at 8pm Thursday, Nov. 29, in Kresge Auditorium as the 1973 Abramowitz Memorial Lecture. Inbal is being presented by the Department of Humanities in cooperation with Alpha Phi Omega fraternity as a benefit for the Chelsea Fire Relief Fund. Tickets are \$1 each and may be purchased today, Nov. 21, at TCA, Room W20-450, and Nov. 26-29 in the Lobby of Building 10. Tickets are limited to two per person and MIT identification is required.

Student Art Association** - Open drawing workshop. Tues 7:30pm, Stu Ctr Rm 429.

MIT Open House Committee** - Thurs, 7:15pm, Rm 26-065.

Urban Action Volunteer & Resource Center— Volunteer tutors, teachers urgently needed in Cambridge and Boston schools, as well as volunteers for other community agencies. Mon-Fri, 9am-5pm, Stu Ctr Rm 437, or call x3-2894.

Course Evaluation** - Sponsored by TCA & SCEP. Come help out. Info, lve msg at TCA, Stu Ctr Rm 450, x3-4885.

MIT Club Notes and Meetings

Bridge Club - ACBL Duplicate Bridge. Thurs, 6pm, Stu Ctr Rm 407. IMP-scored team games (similar to rubber scoring). Smaller IMP games Fri, 8pm, Sat, 2pm, Stu Ctr Rm 407. Jeff, x3-5285 or 864-5571.

Chess Club** - Sat, Sun, 1:30-5pm, Stu Ctr Rm 473.

Chinese Choral Society* - Singing. Sun, 3-6pm, Stu Ctr Rm 473.

Classical Guitar Society - Classes, group or private. Mon & Thurs, 5-8pm; Sat, 8am-12n; Rm 4-146, 149. New group class for beginners every month. Vo Ta Han, 494-8353.

MIT/DL Duplicate Bridge Club** - Tues, 6pm, Stu Ctr Rm 473. Jeff, x3-5285 or 864-5571. Annual meeting & banquet Tues, Nov 27. Gary, x8-1484 Draper.

Fencing Club** - Wed & Thurs, 6:30-9:30pm, du Pont.

Figure Skating Club** - Trying to organize a club for figure skating and ice dancing. If interested, call Gwen Champion, 327 McCormick, x8827. Must have athletic card.

Goju Karate Club* - Mon, Thurs, 7pm, Stu Ctr Rm 407. Beginners enter class first week of each month. Info, Terry or Dick, 440-9631.

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

Judo Club** - Sport and self defense. Mr. M. H. Yanagi, 5th degree Black Belt, chief instructor. Mon, Wed, Fri, 5pm; Sat 1pm, Exercise Rm, du Pont Gym. Beginners welcome. Info, Mike Portnoff, x3-7319.

Kung Fu Club** - Northern Praying Mantis. Tues, Thurs, 7-9pm, T Club Lge. Info, H.C. Wong, 876-5071.

MIT Karate Club** - Evening classes Mon, Wed, 8-10pm, du Pont Wrestling Rm. John Miller, x3-1588.

MIT Magazine: Free Parking - Weekly meeting. Sun, 8pm, Walker Mem Rm 316.

MIT Soaring Association* - Meeting Thurs, Nov 29, 7:30pm, Stu Ctr Rm 473. Coffee & donuts.

MIT Wheelmen* - Wholesale parts orders placed, racing & touring events planned, informal discussion of everything about bicycling. Wed, 7:30pm, Rm 1-203.

Modeling Club - Physiologic and Endocrinologic Models** - Meeting Thurs, Nov 29, 4:30pm, Rm 16-141. Info, Mitchell Swartz, Rm 13-3041, x3-6737.

Outing Club* - Mon & Thurs, 5-6pm, Stu Ctr Rm 461.

Rugby Club** - Practices, Tues & Thurs, 5:30pm, Briggs Field. Games, Sat, 1:30pm, Briggs Field.

Science Fiction Society* - Fri, 5pm, Rm 1-236.

Scuba Club** - Compressor hours: Mon, Fri, 4-6pm, Alumni Pool.

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

Student Information Processing Board Meeting* - Mon, 7:30pm, Rm 39-200.

Tech Engineering News** - General staff meeting. Sun, 5pm, Stu Ctr Rm 453.

Technique*** - Yearbook staff meetings. Sat, 11am & Wed, 7:30pm, Stu Ctr Rm 451.

Tech Squares*** - Western style square dancing. Tues, 8-11pm, Sala. Admission \$1, first time free.

Tiddlywinks Association* - Wed, 8-11pm, Stu Ctr Rm 491.

Unicycle Club* - Meetings Sun, 1pm, front Stu Ctr. Beginners welcome, we have unicycles. Play "unicycle hockey."

Volleyball Club** - Serious volleyball, eventually leading to participation in Boston area tournaments. Sun (except vacations), 2-4pm, du Pont Gym.

White Water Club** - Pool session. Tues, Nov 27, 8-10pm, Alumni Pool.

Women's Gymnastics Club* - Mon-Fri, 5-7pm, du Pont Gym. Info, Ursula, x3-5954.

Wellesley Events

Lilly Martin Spencer: The Joys of Sentiment* - Exhibition of many of the works by the Victorian painter. Through Nov 25, Main Gallery.

Wellesley College Theatre - Enter A Free Man* - By Tom Stoppard, directed by Paul Barstow. Fri, Nov 30-Sun, Dec 1, 8pm, Alumnae Hall Auditorium. Admission by Wellesley or MIT ID, or \$2.

Social Events

24-Hour Coffee House* - Inexpensive food, candy, non-alcoholic drinks are sold. Relax, play games, read. Daily, Stu Ctr, 2nd fl center lge.

Pot Luck Coffeehouse** - Live entertainment, cider, donuts, coffee. 8:30pm-12m, W20 Mezzanine lge, 3rd fl. Performers & others interested in helping out, call Doug, x8766 Dorm.

Friday Afternoon Club** - Music, conversation and all the cold draft you can drink. Fri, 6pm, the Thirsty Ear, Ashdown Basement. Admission \$1 men, 50 cents women. Must be over 18.

Muddy Charles Pub** - Join your friends for music, beer, wine, snacks, conversation. Mon-Fri, 11:30am-2pm, 4-8pm, 110 Walker. Call GSC, x3-2195.

Deutscher Tisch - Wir treffen uns freitags von 1-2 in Lobdell, um auf Deutsch und ueber Deutschland zu reden. Wir sind an der schwarz-rot-goldenen Tischflagge zu erkennen.

Movies

Two Daughters (Satjajit Ray) - Film Society. Fri, Nov 23, 7:30pm, 9:30pm, Rm 6-120. Donation \$1.

Slaughterhouse Five - LSC. Fri, Nov 23, 7pm, 9:30pm, Rm 10-250. Admission 50 cents, ID required.

The Absent Minded Professor and The Scratch - Midnite Movie Series. Fri, Nov 23, 12m, Sala. Free, ID required. Bring your own blanket.

Frenzy - LSC. Sat, Nov 24, 7pm, 9:30pm, Rm 10-250. Admission 50 cents, ID required.

Portrait de Moliere* - Foreign Literature. Tues, Nov 27, 5:15pm, Rm 10-250. Admission free, 60 minutes long.

Moment of Truth* - Humanities. Wed, Nov 28, 4pm, 7pm, Rm 10-250.

Member of the Wedding* - Humanities. Thurs, Nov 29, 7pm, Rm 10-250.

Lady Sings the Blues - LSC. Fri, Nov 30, 7pm, 10pm, Rm 26-100. Admission 50 cents, ID required.

Ugetsu (Kenji Mizoguchi) - Film Society. Fri, Nov 30, 7:30pm, 9:30pm, Rm 6-120. Donation \$1.

Things to Come - Midnite Movie Series. Fri, Nov 30, 12m, Sala. Free, ID required. Bring your own blanket.

Music

Noon Hour Concert Series* - The Wellesley Chamber singers, conducted by Peter Sipple, will perform Spanish Renaissance music. Thurs, Nov 29, 12n, Chapel. Free.

In Concert* - The Contemporary Chamber Ensemble from New York, directed by Arthur Weisberg, featuring soprano Jan DeGaetani, will perform works by Castiglione, MIT's John Harbison Wolpe & Schoenberg. Fri, Nov 30, 3pm, Kresge Auditorium. Free.

Recorder Ensemble** - Music provided, but bring instruments and any music you wish to play. Tues, 7pm, ESG Hdqtrs, 6th fl Bldg 24. All aficionados welcome, freshmen encouraged to attend. Details, David Dreyfus, x3-7787.

Dance

Concert - Margaret Beals* - A solo performance with guest cellist Gwendolyn Watson. Thurs, Nov 29-Sat, Dec 1, 8:30pm, Kresge Little Theatre. Tickets: \$2 in advance, \$3 at door, available TCA office, 4th fl Stu Ctr, or call 734-9334.

Folk Dance Club* - International, Sun, 7:30-11pm-Sala. Balkan, Tues, 7:30-11pm, Stu Ctr Rm 491. Israeli, Thurs, 7:15-10:15pm, T Club Lge, du Pont. **Afternoon Dance Break**, Fri, 12:30-1:30pm, Kresge Oval.

Exhibitions

Hayden Gallery* - Collages, prints and graphics by the German artist Kurt Schwitters in the Main Gallery and silkscreen prints by Corita Kent in the Corridor Gallery, through Sat, Dec 8. Gallery hours Mon-Sat, 10am-4pm. Free.

7 X 7* - An exhibition at the Creative Photography Lab of forty-nine photographs by seven midwest photographers. Thru Wed, Nov 28, W31-310. Hours: Mon-Fri, 9am-10pm, Sat, Sun, 12n-6pm.

Exhibition of paintings by Susan E. Schur - Over 70 oil paintings. Through Fri, Nov 30, Faculty Club.

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

Music Library Exhibit - In honor of St. Cecilia, patron saint of music. Scores, books, pictures.

Religious Services and Activities

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

Philosophical Talks on "Bhagavindam"* - Swami Chinmayananda will give a series of talks on the Hindu philosophy. Sponsored by SANGAM. Fri, Nov 16-Thurs, Nov 22, 4:15-8:45pm, Stu Ctr Rm 473. Info, Subramanian, x3-6231.

Campus Crusade for Christ/College Life Family Time* - Singing, sharing, prayer & teaching from God's Work. Fri, 7-9:30pm, Rm 1-132.

Celebration of Holy Communion* - The Revs John Crocker, Episcopal Chaplain; Peter Johnson, Boston/Cambridge Ministries; and Constance Parvey, Lutheran Chaplain. Wed, 5:05pm, Chapel. Supper following, 312 Memorial Dr.

Christian Bible Discussion Group* - Thurs, 1pm, Rm 20B-031. Prof Schimmel, x3-6739, or Ralph Burgess, x3-2415.

Christian Science Organization* - Meetings including testimonies of healing. Tues, 7:15pm, Chapel.

Hillel*: Services - Mon-Fri, 8am, Rm 7-102; Fri, Traditional 4:15pm, K kosher Kitchen, Non-Traditional 7:45pm, Chapel; Sat, 9am, Chapel. **Classes** - many interesting classes offered, for full schedule call Hillel office, x3-2982. **Shabbos Meal** - order by Tues each week. Info and to order, Herbie Levine, x8403 Dorm.

Islamic Society* - Juna prayers. Fri, 12:15pm, Kresge Rehearsal Rm B. Discussion on the Qur-anic Interpretations, Sat, 5pm, ISC Lge, 2nd fl Walker.

Latter Day Saints Student Association* - Discussion of beliefs. Tues, 8am, Stu Ctr West Lge.

Protestant Communion Service* - Wed, 5:05pm, Chapel.

Protestant Worship Services* - Sun, 11am, Chapel.

Roman Catholic Masses* - Sun, 9:15am, 12:15pm, 5:15pm; Tues, 5:05pm; Thurs, 5:05pm; Fri, 12:15pm. Chapel.

United Christian Fellowship* - Christians for Dinner and Sharing Meeting. Thurs, dinner, 5pm, Walker, followed by singing, sharing, prayer 6pm, Rm 6-321.

United Christian Fellowship* - Group study of world religions & Jesus Christ from biblical perspective. Sun, 9:30-10:30am, Rm 5-216.

Westgate Bible Study Meeting* - Includes study of the Gospel of Mark. Wed, 8pm, apt 1202 Westgate I.

Announcements

Raffle Chances* - Buy a chance for a \$1,300 stereo system, proceeds to the MIT Lacrosse Team. Available from any team member or in Bldg 10 Lobby.

Christmas is coming! Give someone you love a gift! Give yourself Maggie's self-designed fitness classes - everybody welcome, M,W,F, 12n-1pm, T,Th 1-2pm, M-F 5-6pm, fencing rm. Athletic card required.

Wives of Graduate Students** - Persons bilingual in Spanish-English or Portuguese-English needed to act as volunteers for Chelsea fire victims using local hospital. If interested, contact Mrs. Rodrigures, x3-4911.

Placement Interviews

The following companies will be interviewing Mon, Nov 26-Fri, Nov 30. Those interested may sign up in the Career Planning and Placement Office, Mon-Fri, 9am-4pm, E19-455, x3-4733.

Monday, November 26 - Stanford University School of Engineering; Whitlow Computer Systems, Inc; Aerojet Nuclear Co; McDonnell Douglas Corp.

Tuesday, November 27 - Aerojet Nuclear Co; McDonnell Douglas Corp; Booz Allen Applied Research; Brier Manufacturing Co; Fairchild Industries; Royal Dutch/Shell Co, Overseas.

Wednesday, November 28 - Boston Export Sales; Intel Corp; Joseph S. Ward & Asso; Northeastern University-Graduate School of Business; The Shell Co..

Thursday, November 29 - The Shell Co; Institute for Defense Analyses; The Warner & Swasey Co; General Motors Research Labs.

Friday, November 30 - General Motors Research Labs.

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

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

Send notices for November 28 through December 7 to the Calendar Editor, Room 5-111, Ext 3-3279, before noon Friday, November 23.

New UROP Listings

For more detailed information on UROP opportunities listed, MIT undergraduates should call or visit the Undergraduate Research Opportunities Program Office, Room 20B-141, Ext. 3-5949 or 3-4849. Undergraduates are also urged to check with the UROP bulletin board in the main corridor of the Institute.

Beth Isreal Hospital Boston
The Beth Israel Ambulatory Center (BIAC) has proposed the following projects for undergraduates: (1) Measurement aid for medical microbiology that would involve the design and development of a device for use in measuring and recording growth of bacterium on agar dishes; background in electronics desired; (2) Study of information subsystems in the hospital would involve the study of hospital operations to explore possibilities for implementation of modern information handling methods—background in operations research, management or systems engineering; and (3) Design and development of a device for checking number validity. An easy-to-operate device is needed to check the validity of recorded patient identification numbers; background in mathematics and experience with digital devices.

Massachusetts Port Authority Boston
The Director of Aviation is interested in discussing projects with undergraduates interested in all aspects of airport management and planning. At the present time there are various projects with the operation supervisors at Logan International Airport in providing safe and efficient management of traffic, passenger and aircraft flows through the Airport.

Special Research Grants Sponsored by the Class of 1970

As its class gift to the Institute, the Class of 1970 created a fund to support socially oriented research projects undertaken by undergraduates. Funds to cover research expenses

are awarded by a board, which includes representatives of the Class of 1970 and UROP on the basis of merit of the proposals submitted. Proposals should demonstrate substantial student initiative in choice of subject matter and formulation of problems; address a socially significant real-life problem through science and technology and/or the humanities. If you have a good idea but have not found the channel to work it through, this program could be the means of locating support. Basic modes and policies of UROP will apply concerning credits, materials and supplies support, on- and off-campus supervision, and style unless better counter proposals come forward. The Board tends to discourage requests for personal support.

Applicon, Inc. Burlington
Applicon designs, develops, manufactures and sells a mini computer (PDP-11)-based turnkey system for manipulating graphics, for providing graphical input of data, and for displaying results of computations as graphical output. A large, in-house PDP-11 system is dedicated to the use of software development, and several project topics are open there. Applicon also has a large hardware development program in electromechanical graphics devices such as digitizers and plotters. Their fully equipped hardward labs can be used for hardware projects and for combined hardware/software projects. Shuttle bus to Lincoln Lab, or public transportation to Burlington Mall or car required.

Graduate Studies

The following brief description of selected graduate fellowships and advanced study opportunities have been received recently by the Graduate School Office. More complete descriptions are available in the Office, Room 3-136.

Graduate Fellowships in the Atmospheric Sciences

A program of fellowships for graduate study

in the atmospheric sciences and in related fundamental disciplines is sponsored by the University Corporation for Atmospheric Research (UCAR). The program is aimed at enabling highly qualified candidates to become familiar with the opportunities that exist for scientifically challenging and rigorous research in atmospheric sciences, whether or not they have undergraduate training in the field. It also hopes to attract ethnic minority group members and women to the field.

The fellowships cover a year's study at any accredited US graduate school in the broad field of atmospheric sciences, including such topics as atmospheric dynamics; cloud physics; atmospheric chemistry and radiation; upper atmospheric, solar, and space physics; and oceanography. Studies in the related fundamental disciplines of physics, chemistry, mathematics, and engineering are acceptable in the expectation that these studies will serve as background for research in the atmospheric sciences.

As an important part of the total fellowship experience, each Fellow will be expected to be in residence in the Advanced Study Program at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado, during the summer preceding the academic year for which the fellowship has been awarded.

The initial fellowship award is for a period of one year, but may be renewed for a second year on a competitive basis with other fellowship applicants and holders. The fellowship stipend is \$3000 plus tuition for the academic year. The summer appointment at NCAR carries a stipend of \$500 per month.

Any student who will have received his or her bachelor's degree by the spring of 1974 is eligible to apply. Applications from women and minority group members are encouraged. At least two fellowships will be reserved for qualified ethnic minority applicants.

Deadline: Jan. 15, 1974. For more information please come to the Graduate School Office, 3-136.

Foreign Studies

Graduate Saint Andrew's Society of the State of New York

The society offers graduate scholarships to promote cultural interchange between Scotland and the US. The student may choose the area of study and the university. There are eight universities in Scotland: St. Andrews, Glasgow, Aberdeen, Edinburgh, Strathclyde, Heriot-Watt, Stirling and Dundee. The candidate must be of Scottish descent and an excellent scholar. He/she must have the character and qualifications that will make him/her a good ambassador for the US. The stipend is \$3,750 for one year. This is sufficient to cover transportation, tuition and all living expenses. The candidate will be selected in open, nationwide competition. Closing date for applications is Feb. 1, 1974. For further information see the Foreign Study Office, Room 10-303, Ext. 3-5243.

The Richard M. Weaver Fellowship Awards Program

This program of the Intercollegiate Studies Institute is "maintained exclusively for those who will teach, for the teaching profession presents the greatest opportunity to deal with the first concerns of civilization, and thus with its preservation." Twenty Weaver Fellows will be selected for the 1974-75 academic year. Each Fellow will receive a grant of \$2,000 and payment of tuition at the school of his choice. Weaver Fellowships are not restricted to any particular field of study or to universities in the US. The deadline for application materials is Jan. 15, 1974. Application forms may be obtained from: Richard M. Weaver Fellowship Awards Program, Intercollegiate Studies Institute, 14 South Bryn Mawr Avenue, Bryn Mawr, Pa. 19010. For further information see the Foreign Study Office, Room 10-303, Ext. 3-5243.

Graduate and/or Postdoctoral

Royal Institute of British Architects
Research Awards 1974-75 for Architecture Building and Planning. Awards for full-time and part-time research in contemporary and historical subjects. Details and application forms from RIBA Research Awards, 66 Portland Place, London W1N 4AD, England. Final date for application, including outline program research project is Jan. 28, 1974. For further information see the Foreign Study Office, Room 10-303, Ext. 3-5243.

Postdoctoral

Australian Institute of Nuclear Science and Engineering

AINSE research fellowships are offered by the Australian Institute of Nuclear Science and Engineering for suitably qualified persons wishing to undertake research projects within the Institute's field of interest. Candidates for these awards must be nominated by an Australian university or the Australian Atomic Energy Commission. Research Fellowships are intended for scientists and engineers who have qualifications equivalent to the degree of PhD and are at a relatively early stage of an independent research career. Minimum tenure is two years and the award may be extended for a third year. Emolument will be within the range of \$8,000 per annum to \$11,000 per annum (Australian currency), and the Institute may contribute to the costs involved in traveling to and from Australia. Closing dates for nominations are Feb. 28 and Aug. 31. Further information may be obtained from: The Executive Officer, Australian Institute of Nuclear Science and Engineering, Private Mail Bag, Post Office, Sutherland N.S.W. 2232, Australia. Also see the Foreign Study Office, Room 10-303, Ext. 3-5243.

Rough Crossing Got Him Into Channel Tunnel Project

The idea of a tunnel beneath the English Channel, to link England and France, goes back at least to 1751.

And it wasn't until 205 years later, in 1956, that Frank P. Davidson got into the act with some friends and business partners.

But the 17 years since then—climaxed by the signing of a treaty by the two countries last Saturday—have brought the project to the verge of reality. And no little credit, it seems generally agreed, has to go to Mr. Davidson, a Concord resident who teaches part-time at MIT.

Mr. Davidson might never have become involved except for a rough trip he and his wife made across the channel in 1956. But that experience—and his wife's complaints—convinced him there had to be a better way of crossing the channel (aside from fog-sensitive air travel) than spending nine hours tossing on a ferry.

Mr. Davidson, a lawyer whose special interest is macro-engineering (the study of large engineering projects) put his thoughts into action by offering American know-how and finance to two companies formed a century ago in England and France for the purpose of building a tunnel under the channel.

Subsequently, the Suez Canal Company, whose canal had just been taken away by then Egyptian President Gamal Abdel Nasser, learned of this initiative and contacted Mr. Davidson in New York City where in March of 1957, he founded Technical Studies, Inc. This was a company with only one business—making or sponsoring studies of all things that could have any bearing on designing, building and using the tunnel.

A number of American firms eventually became involved in the tunnel project, but the study group consisted basically of four companies:

Technical Studies, Inc.; the Suez Canal Company, and the two

companies that had begun a tunnel project in 1881 and were still in existence, Channel Tunnel Company, Ltd., and Société Concessionnaire du Chemin de Fer Sous-Marin entre La France et L'Angleterre.

Since July of 1957, the English and French governments have matched the group's private capital by advancing more than \$6 million to the group to continue its investigations.

This involved surveys and geological testing and studies of the costs of designing, funding and constructing the tunnel, as well as studies of the economic and environmental impact of the project in both countries and all of Europe.

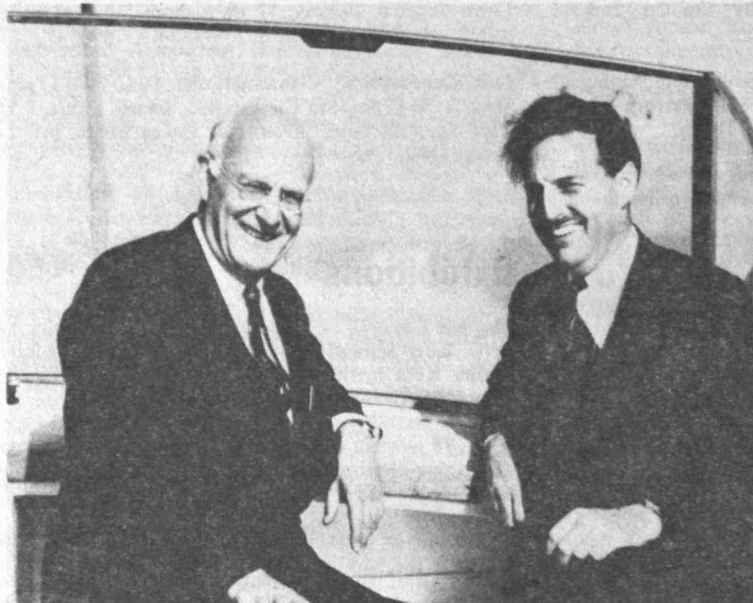
(In checking out the material under the channel—it was chalk, a continuation of the chalk on the white cliffs of Dover—technicians sent out ultrasonic signals from special transponders, some of them developed by MIT's Dr. Harold E. Edgerton, Institute professor emeritus, and professor of electrical measurements, emeritus.)

There was an Anglo-French coloration to his participation in the project from the beginning, Mr. Davidson said.

He had served in the Canadian Army. His wife was French, from Anglo-French stock, and her brother-in-law, Comte Arnaud de Vitry d'Avaucourt, was a co-founder and chairman of Technical Studies, Inc. (He received a master's degree in chemical engineering from MIT in 1951.)

The third co-founder of the company (whose role is now to be that of participant in the British and French companies set up for finance and construction) was Mr. Davidson's college friend, Cyril C. Means, Jr. At the time he became a co-founder he was arbitration director of the New York Stock Exchange.

The treaty signed by the English and French governments last



Mr. Davidson, right, with Sir Harold J. B. Harding, associate chief engineer of the Channel Tunnel Study Group, in the straits of Dover, in 1964, to witness first core borings at sea. The material under the English channel turned out to be chalk—a continuation of the chalk on the white cliffs of Dover.

weekend gave a go-ahead for preliminary tunnel construction on both sides of the channel. Under this agreement, the governments in 1975 would make a final decision on completion—making it possible to have the tunnel open by 1980.

The tunnel would carry rail traffic exclusively because of ventilation problems, the danger of breakdowns if vehicular traffic were allowed, and the greater "throughput" that a rail tunnel can handle. The plan is to have cars driven aboard flatcars at one terminal and driven off at the other.

Mr. Davidson said he foresees no major technical problems in constructing the tunnel.

The chalk under the channel is ideal for tunneling, he said, and huge mining machinery now exists to do the job safely and efficiently.

The tunnel will actually be three tunnels. There will be two large bores 21 feet in diameter and a smaller one between the two—a service tunnel approximately 11 feet across. The undersea portion

will be 23 miles and the total length from portal to portal—from the Calais area in France to the Folkstone area in England—will be about 32 miles.

At MIT, Mr. Davidson is a senior research associate with the System Dynamics Group. He teaches, with others, a class called "Failure of Human Systems," sponsored by the Alfred P. Sloan School of Management, the School of Engineering and the Department of Urban Studies.

But while he has a professional interest in failure, his experience with the tunnel project has demonstrated that he has a strong orientation toward success.

What are his feelings now that the tunnel project is close to reality?

"Well, there is a great deal of personal satisfaction for all of us, of course," he said.

But above all, he added, the experience had shown how to bring together diverse groups and bold men to create something for the common good.

Grad Students Announce Plans For New Paper

A group of MIT graduate students has announced plans to publish a twice-a-month newspaper that will specialize in news of interest to graduate students. It will be called *The Graduate Focus*.

Eliot Rosen, a chemical engineering graduate student, said the Graduate Student Council has approved the project and provided some of the necessary funding.

Additional funding is being sought, Rosen said. Members of the group working to establish the newspaper are Rosen, Ernest Lindner, civil engineering; Nikhil Malvania, electrical engineering; David Lampe, mechanical engineering; Silane Mwenechanya, metallurgy and materials science; and K. Subramanian, mechanical engineering.

Rosen said they expect to publish the first issue early in December. The paper will be a four-page tabloid at the outset, but additional pages are planned for the future, Rosen said.

Graduate students interested in working on the paper should contact Rosen in 12-092, X3-4576, or Lindner in 1-385A, X3-7141.

Obituary

H. I. Romnes, 64

H.I. Romnes, 64, of Chatham, N.J., chairman of the executive committee of the American Telephone and Telegraph Company and a member of the MIT Corporation, died Monday, Nov. 19, in Sarasota, Fla.

Mr. Romnes was first elected to the MIT Corporation in 1967 and was re-elected to a five-year term in 1972.

A native of Stoughton, Wis., Mr. Romnes received the BS degree in electrical engineering from the University of Wisconsin in 1928. He began his career with AT&T as a toll transmission engineer upon his graduation. He rose through the ranks, becoming president and member of the executive committee in 1965, chairman of the board and president in 1970, and chairman of the executive committee in 1972.

Two Chemistry Nobelists Were Visiting Faculty

Both co-recipients of the 1973 Nobel Prize for Chemistry have been visiting professors at MIT in the Department of Chemistry.

Professors Ernst Otto Fischer, of Technische Universitaet, Munich, Germany; and Geoffrey Wilkinson, of Imperial College, London, have been Arthur D. Little Visiting Professors. Dr. Fischer was A.D. Little Professor in April, 1973, and Dr. Wilkinson in April, 1967.

Dr. Wilkinson also did research in inorganic chemistry at MIT in 1950 as a research associate in chemistry with Professor John W. Irvine, Jr.

An article describing the Nobel laureates' research—by MIT Professor of Chemistry Dietmar Seyfurth, and Associate Professor Alan Davison (a former student of Dr. Wilkinson's)—is scheduled for the Nov. 16 issue of *Science* magazine.

Funds Deadline

Friday, Nov. 23 is the deadline for filing applications for capital equipment funding for student and community activities with the Activities Development Board. Application forms are available in Room 7-101.

NSF Deadline

Monday, Nov. 26, is the deadline for applying for National Science Foundation graduate fellowships. Pre-application forms are available in the Graduate School office, Room 3-136.

Computer System

Turn-On Later

The computer system controlling MIT's George R. Wallace Observatory will not be unveiled until sometime this winter, as engineering on the system is not yet complete.

The October 31 turn-on date reported in the October 17 issue of *Tech Talk* was incorrect. The observatory and its computer system, which was designed by Wallace Observatory engineer Grant Snellen and computer specialist Steve Parola, was made possible primarily by a gift from retired Fitchburg, Mass., industrialist George R. Wallace.

Drop Deadline

Friday, Nov. 30, is the final day for dropping subjects without approval of the Committee on Academic Performance. Freshmen in particular are alerted to check their credit limits.

'Eyes at MIT Will Focus On 'Comet of the Century'

(Continued from page 1)

rather than being the product of some formation process in distant interstellar space. Radio astronomers at other installations will search the comet's head for formaldehyde and other interstellar molecules whose presence might indicate that the comet was formed in interstellar space.

To learn about the actual structure of the "dirty snowball," another team of scientists working at Haystack will study the change in strength of a distant radio source as the comet's tail passes in front of it on its voyage through the solar system. The team consists of Dr. Gordon H. Pettengill, MIT professor of earth and planetary sciences, Dr. Radford, graduate student Barbara P. Smith and Haystack staff member Joseph Kallasch. If the radio source weakens slightly as the comet passes in front of it, the scientists believe that this is an indication that the tail may consist of a flying bank of individual ice chunks or crystals. If the radio source is unaffected, the particle size is likely to be much smaller.

Astronomers at MIT's George R. Wallace Observatory will measure the spectrum of reflected sunlight off the comet's nucleus and coma, (the nebulous region around the nucleus).

According to Dr. Thomas B.

McCord, associate professor of earth and planetary sciences, who will help direct the effort along with graduate student Alan Goldberg, "We have found in the past that we can tell a great deal about the mineralogy of asteroids and other solar system bodies by the interaction of sunlight with their surfaces. If we can disentangle reflected solar radiation from the emissions from the comet itself, we should be able to determine something of the mineralogy of the iron-silicate, or "dust" portion of the comet. If we do succeed, it will be the first time the composition of a comet's nucleus has been determined directly."

Professor McCord, Mr. Goldberg and their team of graduate and undergraduate students will also attempt to make highly precise electronic images of the comet's tail at several different wavelengths where the comet is known to emit energy because of excitation by the solar wind. The solar wind is the constant stream of hydrogen ions which flows outward from the sun.

With such fine images of the comet, the scientists hope to map the structure of the comet's coma and tail.

Closed Nov. 22

The Information Center, Room 7-111, will be closed on Thanksgiving Day, Nov. 22.

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, Room 5-111, 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, November 23.

For Sale, Etc.

Pr radial stud snows, Fulda (Ger), narrow ww, t-less, sz 185 SR14, lk nw, \$50. Paul, x3-5483.

Sony cassette rcldr, nw: TC66, \$70 nw, \$40; TC110A, was \$130, \$80; TC40, was \$100, \$65. Don, x8-3333 Draper.

Blazon lg rock horse, \$20, now \$10; sz 14-16 gldn opposum long fur, nvr worn, nw \$180, ask \$175. x3-4329.

Wool rug w/pad, lt gray, exc cond, 13.5x14, \$100 or best; bassinet, \$10; carseat, \$7; inf st, \$1.50; playtex nrsr, \$3; safe gate, \$1.50. x3-6322.

'58 Mercedes 219 parts car; 5 tires, 6.50x15. x3-7931.

Motorola clr TV, 25", nds minor wk, \$150; 2 clk r: amfm digital, \$20, reg, \$15. Call, 664-4449.

AC, Chrysler Airtemp, 15,000 BTU, 5 mos, exc cond, \$160 or best; GE Trimline 500 stereo phono, gd cond, \$20. Call, 494-8118.

Child sz 11 ski boots, \$4; child 100 cm skis w/bngds, \$10; w sz 14 ski pants, worn once, \$20. David, x3-2816.

Sm mod dark bl used sofa, \$45. John, x3-2030.

Wh Fr Prov full sz bed fr, \$20. Yvonne, x3-7296.

LR set: red vlt sofa w/2 chrs, v gd cond. Yvonne, 522-6700, morn.

Teac 4010SL stereo tape deck, exc cond, \$325; pr Atlec Segovia spkrs, minor water dmge, cheap. Bruce, 646-6176.

Asst hseplants, most 50 cents, big ones more, Wed only. Peter, Rm 13-3078.

Rosemont ST 100 ski boots, m, sz 10, used 1 seas, \$20 or best. Call 776-9481, aft 6.

Filter flow filter, 24' pool, gd cond, \$50; 18' pool liner, no leaks, free. Call, 663-8182.

Hardwick stove, gas on gas, \$75. Joan F, x3-2697.

Chilton's Porsche repair guide, \$2; Castrol 20-20w oil, 60 cents/qt. Jim, x8-1466 Draper.

K chrs, 3, \$2/ea; cptn chr, \$12; Danish uphol matl, brn wl, nw, enuf for 3 & 2 seater, was \$200, \$50; baby carriage, lk nw, \$25; b wntr coat w/hat, sz 6-10, \$4.50. Mrs. Gundersen, x3-6085, aft.

Elec flash for camera, Capro mdl FL6, w/rechrg, 5 mos, \$25. x9508 Dorm.

Dokorder r-to-r, \$7; Wstghe compact stereo, \$45; Voronado m hot comb, \$5; Polaroid swng, \$7, Sunbeam f hrdry, \$11. Call, 494-9142.

Wide 15" stud snows, half-worn, fit Volvo or bigger, \$10/pr. Jim, x3-1926.

Chest, 4 drwr, \$20; mirror, \$20; exc cond. Dave, x3-3781.

Stud snows, 7.75x15, mtd '68 Ford, gd 1 seas. Al, 8-1419 Draper.

Stud snows, 2, Semperit, 6.00x12, \$10/ea; 4 Austin Amer whls, \$10/ea. Call, 891-5091.

Pr sz 8 1/2 ski boots, worn once, \$30. Ivan, x8-1379 Draper.

Antartex shpskn coat, f, sz 12, brn w/wh curly fur trim & lining, yr old, was \$225, \$125. Chris, x3-2889.

Snows, 2, Frstn, 1 seas, E78-14 dbl stripe ww, 1 nds tube, \$80 nw, \$40/pr. Sandy, x3-4341.

Upright piano, nds tuning, you move, \$50; bumper pool, fl mdl, used once, was \$120. \$75. Call, 665-7374, aft 7.

Leath coat w/fur trim; navy P coat; quilt bl all wthr coat; brn wl midi w/hood; all sz 14, must sell, nego; bl bdsprd, \$5. Pat, x8819 Dorm, lve msg.

Teac 350 tape deck, \$200; Bose 901 spkrs w/equalizer, \$400; Dual 1212 trntbl w/crtldg, etc, \$400; Koflach ski boots, sz 10 1/2, \$30; all exc cond, nego. Paul, x9640 Dorm.

HK630 rcrrv, 6 mos, exc cond, best. Bob, x9366, aft 6.

Grand piano, med (7'), gd play cond, w/seat, in Carlisle, \$200. Jim, x195 Linc.

Sgl bed w/Sealy matt, hdgrd, sprd, nr nw, orig \$125, \$80; antique wh ceramic 14" dia mortar & 18" pearwd handled pestle, \$80. Call 489-3515, aft 6.

Pr Delta E70-14 glass belt ww snows, \$10. x3-6116.

Rex convert carriage, is carst, carbed, stroller, incl rock chr, \$60 or best. Call, 232-3409.

Thayer sleeper stroller, \$15; inf carbed, \$5. Call, 872-7264.

Danish mod lge chrs, 2; sm early amer cof tbl. Jeff, x3-1708.

Beaut wint desk, 30x60, orig \$250, \$120 or best. H. Newman, 495-2828.

Skin coat, \$120; Pers lamb (Kurakul) coat, \$250; both hi qual, f, unused, nego. Call, 494-8768, evgs.

Pedometer, \$5; oriental pearl necklace, \$200. Dr. A. Buyrn, x3-4155.

Rare Mason & Hanlin upright piano, in Bedford, gd cond, all ivory, (nw, no ivory, cost \$1,900), \$350. x177 Linc.

Hcky skates, m, w/grds, sz 9, 2 seas, v gd cond, \$8. Call, 494-9237, evgs.

Rem 700 elec typwrtr, lk nw, was \$180, \$100. 8E Tang, 494-8881.

Ski boots, f, Rieker, 5 bckl, sz 8 1/2, prac nw. Carl, x3-2250.

Blond sgl drwr desk; chaise lge, brngdy velvet, \$60; IBM elec typwrtr, \$150. x3-3330.

Hart mtl skis, 185 cm, \$20. Nina, x3-7444.

Mtl tennis rckt, 4 5/8, best. x8-1193 Draper.

Nw Topcon Super D body, \$175; nw Topcon 135/f3.5, \$80; Sony TC8 crtldg rcrrd, make own 8 trk car tapes, \$65. x7611 Linc.

Tire, 6.50x13, gd cond, 10 K, \$5; trunk-type ski rack, amer car, \$10; plastic compact car cvr, \$10. x7785 Linc.

Skis, Kneissl White Star, 210 cm, w/step in bndgs, \$75. Don, 492-6210.

Exc qual Danish dining set; nrly nw carpet (Greek flokati); beaut handwoven crtns. Call, 494-9337.

Bike, m, 3 spd, \$10; fenders, wtr bottles for 10 spd. Call, 227-9535, aft 6.

Trolley roll signs, best. Model RR Club, x3-3269.

Wdn clarinet, gd cond, \$75. Glen, x8-3584 Draper.

Ice skates: b hcky sz 7, f fig sz 8, \$10/ea; full-lgth dresses, sz 16, \$10/ea. x8-4095 Draper.

Panasonic 8 trk stereo tape plyr, gd cond, \$25. Call, 536-5497.

Coleman thru wall vent frnce, 40,000 input, 28,000 output, does 3 rms, yr old, was \$200, sell \$80. x181-56-119 Haystack.

Pr '67 Opel rims, w/much used tires, \$5. Bob Santerre, x3-4710.

Kryptonite bike lock, \$12. x0496 Dorm.

Lving, must sell: Masterworks stereo sys, exc sound, \$125; f 3 spd Eng bike, \$35; ladder-bk rock chr, 100 yrs, \$60; gd art books, rcrrds, nego; sunlamp, \$5. x3-4996.

Vehicles

'61 Rambler, free to handy stu capable of repeing eng trouble, nw tires, batt, br, lving cntry. x3-5547.

'62 Jeep 1 T truck, p br, 4 whl dr, hubs, dump body, plow, gd tires, gd mech, \$1,850. Corry, x3-5783.

'63 Chevy pick-up truck, 3/4 T, 6 cyl, best. Nick, x3-7830.

'64 Ford Gal, poor cond, runs, fix or for parts, ask \$100. x3-6295.

'64 Dodge Coronet, 4 dr, 63 K, nw trans, rebtl r br, r, gd body & int, best over \$300. x3-1913.

'65 Corvair cpe, 55 K, eng gd, tires v gd, genrly poor, w/2 stud snows, mtd, \$100 or best. Daryl, 899-9389.

'65 Chrysler Imp, 52K, \$300 or best. Michelle, x3-6121.

'65 VW, \$150. Call, 899-8781.

'66 Ply Blvdr, 8 cyl, 4 dr, p st & br, v cln, well kept, great eng, nw br, shocks, exh, tape deck, \$325 or best. Call, 522-6700.

'67 BMW 2000, 4 dr sed, 52K, v gd cond, nw clutch, exh, Michelin XAS, \$1,000 nego. Panos, x3-7010.

'67 Chevy sport van, V8, oversz tires & rims L70-14 for beach, (2) G60-14 spares mtd, (2) 850-14 mtd snows, equip for beach & camp, 3 brnr gas stove, gas bottle, cntr & sink, etc, sacrifice \$800. Charlie, x3-5274.

'68 VW sqbk, gd cond except 4th gear, \$600 or best. Bill, x3-3223.

'69 Rambler, 6 cyl, 60 K, v gd run cond, \$950. x3-2412.

'69 Ford Frne, mint cond, 30 K, ac, p st, auto, nw tires, \$1,700 or best. Audrey, x3-2029.

'70 Volvo sed, 30K, exc mech cond (nw clutch, br, etc), 2 nw tires (incl snows), \$2,000. x3-5115.

'71 VW bus, combi, nw eng, 49K, v gd cond, \$1,600. Gustavo, x3-5054.

'71 Vega GT, 4 spd, 21 K, exc cond, \$1,700. Call, 738-5455.

'72 XS 2 Yamaha 650 cc, 8k, exc cond, well maintained, must sell, \$1,000 firm. Bill, x7213 Linc.

'73 Ford Torino, 11K, 2 dr hdtp, V8, auto, p st, disk br, r, snows, \$2,550. Bill, x366 Linc.

'71 Bel Quay dory, 13.5', 50 hp mtr, elec start, auto bilge pump, run lites, exc cond, v few hrs, \$1,395. Dick, x3-5940.

Sailboat, 20' Barnigat, slps 2, 5 1/2 hp outbrd, gd cond, \$1,500. x8-2572 Draper.

Mooney exec avail for rental. Jan, x3-1676.

Want Volvo B18 eng, run cond; shop manual for Volvo 544. Rob, 492-4785.

Housing

Bos, Sawyer Ave, Rm to rent. Boris, x3-5553.

Bos, Beac H, unusual, attrac BR apt, panel LR, sm bldg, \$165. Call, 723-2118.

Bos, Beac H, BR sub avail Jan, \$165. Henry, x3-3117.

Camb, 2 BR, LR, K, B, v cln & roomy, 7 min Stu Ctr, sub 1/1-8/31, \$240 incl util; also sell furn. Call, 876-6526.

Camb, 8E2 Tang Hall, avail now, grad or undergrad, MIT, \$111. Call, 494-8881.

Chelsea, Wdlawn & Pratlville area, 2 apts, no pets, sec dept, w/fnshd attic: 3 Rm, \$150 + util; 4 Rm, \$185 incl all but elec. A.M. Ruggelo, x5713 Linc.

Concord, 4 BR hse, 3 m Linc, finshd bsmnt, 2 car gar, well insul, gas h, avail 12/1, \$370. Aina, x3-2194.

Linc, grdn apt, mod 4 Rm, nr trn, all srvc & Mass audobon, avail nr 1/1, \$265 incl h. Steven, x248 Linc.

Wtrtwn, 6 Rm apt, 1st fl, refrig & bsmnt, nr T & shops, avail 11/26. x7637 Linc.

Ski lodge, 2 1/2 hrs Bos, nr 3 alp ski areas Wh Mt Nat Frst, 2 BR, slp 6+, frpl, elec stove, h, avail Dec-Apr, seas pref. Norma, x3-2629.

Canadian ski hse, nr Jay Peak, all util, slps 15, v reas. Christine, x3-2742.

Animals

Doberman Pincher pups, 2 m, 1 f, AKC, wormed, shots, 5 wks, v lovable, \$250. Eunice Taylor, x3-4393.

Tiger kittens, 2, take 1 or both. Call, 547-9580.

Blk cocker spaniels, AKC, 3 f, 2 m, \$100/\$125. Mary, x7422 Linc.

Free blk & wh cat, f, less yr old, to gd home. Call, 522-1506

Lost and Found

Found: slide rule, Bldg 1 classrm. Ann, x3-7140.

Lost: Strobe beacon taken 11/8 from top Brn Bldg, urgently requested. Prof H. Edgerton, Rm 4-405, x3-4629.

Found: Slide rule, in Bldg 7 Lobby. Mike, x3-7175.

Wanted

Carpool or ride, Townsend-Linc, 8:30-5. John Harris, x7124 Linc.

Rmmate, f grad or wking, 3 BR duplex Bel, w/2 wking f, 7 min T, avail 12/1, \$85 incl h. Call, 484-8289, evgs.

Rmmate, 2, share lg 4 1/2 BR hse w/2, Arl Cntr, thru June, \$82 + util/ea. Jack, x3-6978.

Wl pay 2 m \$30/ea for 4 hrs, help me move. Eleanor, x3-4641.

F, 1-2 shares avail, 26+, coed condo, on mtn, ski to & from lift, all mod conv. x3-7022.

Start carpool, Melrose Hlands-Linc. Rhonda Keenom, x7033 Linc.

Nd people to assemble 30 electronic kits, \$3/hr, start 12/3. John Reese, x0355 Dorm.

Borrow or buy rcrd or tape, instrumental music of movie "Never on Sunday," out of stock. Catherine Chvany, x3-6341.

Grads of NYC specialized high sch, stu, fac or staff, in Bos area, write M. Frankston, Rm 54-625.

Old, used, cheap medical texts: anatomy, gen phys, diag, drug therapy, int med, surg, hematology, old PDR. Margaret, x0486 Dorm, kp try.

Late mdl used van, gd cond, bigger VW bus, econoline sz perfect. Andy Celentano, 899-9389, aft 7.

People, 2, share lg Bel hse w/2 f, 2 chldrn, 4 cats, non-smokers. Martha, x3-4771, lve msg.

Stu for summer NSF grant, analysis of caloric & vitamin content in plants, \$80/ wk, 10wks, exp in lab work nec. x9285 Dorm, nite or wknd.

People to donate sm amt blood once month, \$2/ donation. Bola, x3-7301.

Airdale m pup for bday gift for 8 yr old girl. Pat, x3-2603.

Rmmate, f, own BR in 4 BR apt, lg K, LR, 10 min walk H & Cent Sq, avail now, \$67 + util. Call, 547-0292, evgs.

Ride from Medfield area, 2-3 dys/wk, 8-5. Mac, x3-7273.

Tbl & chrs for toddler, exc cond. x3-5557, lve msg.

Stu w/hitchhiking exp for survey on hitching practices. Ken, 247-8691.

Used bike, 3 or 10 spd. Michael, x3-5859.

Rmmate, f, share spac 4 Rm apt w/mother & child, \$90. Gael French, x8-2897 Draper.

Miscellaneous

Exp typist wl do theses & term papers, incl tech. x8-3494 Draper.

Exp voice tchr/perf welcomes nw stu, reas. Joan, x9519 Dorm.

Wl do Eng-Ger or Ger-Eng translations, not too tech, native Ger 18 yrs US. Erika, x3-2728.

Thesis typing, gd rates. Call, 698-2030.

Exp typist wl do non-tech drafts, final copies, fast & accurate. Chuck, x3-7410.

Sgl car gar to rent, secure, nr B'way, Camb, \$30/mo w/elec opt. B. Morris, x3-1677.

Parking

Note to parking sticker swappers: please remember to inform your supervisor and the Campus Patrol of the exchange you have made so that their records accurately reflect your new parking area.

Wl swap Windsor for West or Albany. Rob, x3-7053, aft.

Positions Available

This list includes all non-academic jobs currently available on the MIT campus. A duplicate list is posted each preceding Tech Talk publication date on the Women's Kiosk in the Bldg. 7 lobby, and on the bulletin board outside the Office of Minority Affairs, 4-144. This list is also posted in the Personnel Office E19-239, on the day of Tech Talk publication. These postings are provided to encourage individuals from within the Institute 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 Liebsny 3-1595
(secretary - Dixie Chin)

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

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

73-1179-R DSR Staff P-T/Temp
73-1174-A Sr Libr Asst Temp
73-988-R React Oprtr IV
73-1059-R Temp Machinist "B"
73-1167-R Adminis Staff (canc)
73-1004-A DSR Staff
71151-R Secretary IV
73-1030-R Gen Helper
73-1143-R Sr Clerk III
73-1173-A Sr Libr Asst IV Temp
73-1147-A DSR Staff Temp
73-1146-R Secretary IV
73-1161-R Secretary III P-T
73-1171-R Admin Staff
73-1094-R DSR Staff Progrmr

The following positions are on HOLD pending final decision:

73-1018-R Admin Staff
73-1158-R Microfilm Trainee
73-1057-R DSR Staff
73-795-R Admin Staff

Administrative Staff member will work in the area of resource development dealing with individual contributors. Develop strategies and programs, prepare reports, provide advice and counsel of a legal nature for resource development activity. Some travel required to represent MIT. Must have legal training and preferably some experience as a counselor in practice or a job situation utilizing legal training. Writing and organizational ability; motivation, enthusiasm required. 73-480 (5/30).

DSR Staff member will plan, manage, and execute high-quality research projects having a strongly experimental orientation. Familiarity and experience with low-speed flight and wind tunnel testing methods and advanced piloting aviation type aircraft; Ph.D. in Aerodynamics and five years applicable research and development experience required. 73-488-A (6/20).

Biochemist - DSR Staff member will participate in lipoprotein studies, and will supervise the activities of several technicians in a clinical research setting. Ph.D. or M.D. in Biochemistry required, as well as experience with lipoprotein and supervising. 73-515-R.

Manager of Subsystem Development - Administrative Staff in the Programming Development Office will provide technical direction of the design, development, and maintenance of software subsystems under the OS/360, OS/VS2, and Multics Operating Systems. Minimum of 7 years professional experience, and 2 years experience in technical management. 73-912-R (9/12).

Systems Analyst - DSR Staff at the Cambridge Project will adapt Time Series processor programs for use with the Consistent System on Multics. Knowledge of calculus, econometrics, statistics, and linear algebra; extensive PL/1 programming experience on Time Sharing Systems; familiarity with TSP-CSP required. Position is temporary until 6/74. 73-845-R (8/29).

Environmental Engineer - Administrative Staff in Physical Plant will organize and direct an Institute-wide energy conservation program. Survey campus buildings to determine areas of possible energy economy; plan procedures; maintain the Institute's compliance with environmental requirements. BS in Electrical Engineering with a basic knowledge of building Mechanical systems for heating, ventilating, and air conditioning. Experience in engineering design or operation of buildings. Experience in energy conservation helpful. 73-875-R (9/5).

Director of Personnel Development - Administrative Staff will coordinate the Career Development and Training Programs for all non-academic personnel. Responsible for organization development; assess training needs; plan and develop new training programs; coordinate existing training and development programs; develop career planning and counseling capability. Experience in organization development and career development and planning desirable. 73-1116-A (10/17).

DSR Staff in Metallurgy will perform scanning transmission electron microscopy and high spatial resolution electron probe microanalysis of biological specimens; prepare thin films to use as microanalysis standards; technical subjects. BS with experience in the performance of high spatial resolution and physical constants of thin film, or MS degree required. 73-1127-R (10/24).

Technical Librarian - Administrative Staff will design and implement procedures for organizing and maintaining an Industrial Administrative Information Systems. Process and document EDP reference manuals, technical journals, internally prepared documentation. Aid in implementation, and thereafter maintain, formal methods of interfacing with vendor support personnel. Be directly involved in process of documenting material developed by technical support group, including editing and re-writing of such material. Will also edit and re-write material for a Programmer's User's Guide. Knowl-

(Continued on page 8)

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edge of methods for development and maintenance of a Special Library required; minimal knowledge of data processing concepts and terminology desired. 73-953-A (9/19).

Administrative Staff in the Office of Personnel Relations will assist the Wage and Salary Administrator with the development, implementation and long term maintenance of a formal, integrated classification and salary administration program. BS degree or equivalent and 2-4 years of direct experience with the administration of a formal exempt classification and compensation system required. Familiarity with basic statistical methodology is desired. 73-1108-A (10/17).

Administrative Staff - Program Administrator in the Office of Sponsored Programs will represent the department with respect to sponsored programs in a number of academic departments and laboratories, including proposal review and submission, grant contract negotiation and post-award administration. Experience in an academic department or research laboratory working with faculty principal investigators on sponsored programs preferred. Experience in MIT financial or business administration valuable. 73-1156-A (10/31).

Systems Programmer - Administrative Staff will provide technical expertise; develop and implement methods of improving computer performance. Minimum of two years S/360 or S/370 BAL (ALP) Assembler Language Programming experience. Knowledge of tele-processing, and COBOL or PL/1. 73-265-R (4/73).

DSR Staff - Systems Programmer at Project MAC will perform system analysis and system programming on a research version of the Multics operating system. SM or EE degree required; 2-3 years programming experience in the supervising of some advanced operating system required. Ability to contribute to research and work with students important. 73-1137-A (10/24).

Computer Operator IV will operate IBM Model 135 and all peripheral equipment associated with it, including disk drives, tape units, card reader/punch, printers. Must have a good knowledge of DOS job control, multi-programming experience and be capable of understanding operating instructions. Midnight to 8:00am shift. 73-1221-R (11/21).

DSR Staff at the Laboratory for Nuclear Science will program for the APC group. Work on existing bubble chamber data analysis programs and develop new programs. Familiarity with FORTRAN; BS or equivalent in physics or math required. 73-116-R (11/7); 73-1234-A (11/21).

DSR Staff - Systems Analyst at Cambridge Project will adapt Time Series Processor programs for use within the Consistent System on Multics. Knowledge of calculus, econometrics, statistics, and linear algebra; extensive PL/1 programming experience on Time Sharing Systems; familiarity with TSP-CSP required. This position is temporary 7/1/74. 73-749-R (8/8).

Librarian - DSR Staff - (part-time/temporary) will be in charge of the Division for Study and Research in Education Reading Room. Set up room, establish procedures, select and purchase materials. Library experience and academic background in education required. 10 hour work week. Temporary for approximately 4 months. 73-1233-A (11/21).

DSR Staff in Earth and Planetary Science will interpret Mars picture data, and diffuse reflection spectral features arising from electronic transition; perform spectroscopy of asteroids and reflection spectroscopy of lunar samples; coordinate research and projects in the Planetary Astronomy Laboratory; supervise undergraduate assistants; write reports, proposals and papers. Experience in the fields of planetary surfaces, observational astronomy, igneous petrology, optical properties of solids, lunar sample analysis and computer programming. Candidate should have an academic background in geology and principles and techniques of optical astronomy. 73-1218-A (11/21).

Technical Assistant - Academic Staff in Nutrition and Food Science will be trained to do routine chemical analyses manually and using the Technicon Autoanalyzer, and trained in the operation of an amino acid analyzer and mass spectrometer. Individual should have a college degree and background in chemistry or biology to perform chemical analyses on body fluids. Experience in chemical chemistry helpful but not necessary. 73-1213-A (11/21).

Planner/Architect - Administrative Staff in Planning Office will concentrate on long-range planning for existing environmental conditions, define problems, develop plans and

design concepts; degree in Architecture required; degree in Planning preferred. Minimum of 5 yrs experience and the ability to work independently important. 73-880-R (9/15).

Administrative Staff Planner will direct long-range physical planning for the various efforts of the planning team; develop budgets and schedule of government agencies and community groups. Must have a Masters degree in Planning and a minimum of 5 yrs experience. 73-535-R (6/13).

Engineering Assistant - Exempt in the Fuel Research Laboratory of Chemical Engineering will analyze and calculate emission rates of nitric oxide, carbon monoxide, carbon dioxide, and soot from gas range burners. Will also design and make modifications to the equipment. Associate degree in Physical Science or engineering minimum requirement. 73-1084-A (10/17).

Student Accounts Representative - Exempt in the Student Accounts Office will assist students in understanding the accounting charges and credits to their accounts; determine the accuracy and make corrections if necessary; review and assist students in the financial registration process. Candidate should have the desire to assist students, the patience to listen to their problems, the ability to communicate effectively. 73-1206-R (11/14).

DSR Staff - Temporary in Earth and Planetary Sciences will analyze and interpret seismic data, especially P and S waves from the earth's core, and surface waves generated by explosions and earthquakes. Will also use the computer. MS in geophysics preferred; experience in computer programming and data analysis important. Job is temporary until 8/31/74. 73-1148-A (11/7).

Administrative Staff - Assistant to the Director of Financial Aid will assist students and their families in describing and resolving financial problems related to study at MIT. Evaluate financial need of individual students; participate in the aid delivery system; coordinate Institute resources; allocate funds to students; prepare governmental reports; assist with the admission process; contribute in research and survey studies on aid policies and procedures. Candidate should have a sincere interest in students and all aspects of college administration and management. Good communication skills required. 73-1180-R (11/14).

Technical Instructor - Temporary Academic Staff in Physics will develop and construct, under faculty guidance, prototype experiments for an undergraduate instructional laboratory. Job involves woodworking and elementary machining of metals and some elements of electronics. BS in Physics is necessary. Job ends 6/30/74. 73-1199-R (11/14).

DSR Staff in the Center for Space Research will analyze and interpret plasma data from satellite-bone plasma experiments. Recent Ph.D. in space plasma physics or related area required. Candidate should have had direct experience with the analysis and interpretation of experimental results related to the interplanetary plasma. 73-1183-A, 73-1184-A (11/14).

Senior Secretary V in the Radioactivity Center will perform general secretarial duties necessary for smooth office functions. Contact patients and invite them to come to MIT for Studies; maintain all records; handle correspondence, travel arrangements and hospitality duties. Knowledge of medical terminology helpful; excellent skills and maturity important. 73-1197-R (9/12).

Secretary IV in Mechanical Engineering will handle general secretarial duties for a group of faculty, researchers, and students. Maintain accounts; type technical reports, proposals; transcribe from shorthand and machine dictation. Excellent typing required. Shorthand and dictaphone skills, ability to organize within a very busy office is important. 73-1058-R (10/10).

Senior Secretary V in the Arteriosclerosis Center will coordinate the office activities of the Director of a multi-faceted medical research program. Schedule appointments, conferences, lectures, maintain student records and appointments and a variety of office files; periodically prepare reports; type manuscript reviews and other materials. Individual will have extensive telephone contact with other medical areas and patients. Good organizational skills; ability to establish priorities and supervise junior secretaries required. Knowledge of medical terminology and machine transcription helpful. 9:30-5:30. 73-1088-R (10/10).

Secretary IV in Academic department will type correspondence, proposals, DSR reports, manuscripts, these (much of it technical); keep DSR account records; maintain small library; compose routine letters; assist professor with details of registration. Ability to work independently and to write let-

ters important; accurate typing essential; knowledge of shorthand, technical typing and bookkeeping preferred. 73-578-R (6/27).

Senior Secretary V to the Ocean Engineering Department Head will perform a variety of complex duties. Answer correspondence independently or from verbal instructions; maintain busy schedule of appointments; assist with salary reviews; act as department liaison with other Institute offices; organize and maintain departmental files; coordinate work of other secretaries during peak periods. Excellent shorthand or speedwriting, and typing skills; several years responsible secretarial experience required; ability to organize and to establish priorities; initiative and poise essential. 73-1159-R (11/7).

Secretary IV in the Office of the Vice President and Treasurer will handle general secretarial duties, assist with administrative functions. Candidate should have the ability to grasp the basics of the insurance industry and to deal with legal terminology. Excellent secretarial skills required; shorthand preferred. Maturity to make decisions, establish priorities, and ability to work under office pressures important. 73-1159-R (11/7).

Secretary IV to a Professor in Economics will handle all general secretarial duties; type correspondence, course material, technical manuscripts; perform editorial secretarial duties for *Econometrica*. Good typing and organizational skills required. 73-1170-R (11/7).

Editorial Secretary IV at Graphic Arts will type on a variety of typesetting units; proofread and make corrections, do paste-ups; operate to meet deadlines for publications; responsible for processing using the Ektomatic developing and stabilizing unit. Will also perform other clerical duties and assist customers on the phone and in person. Excellent typing required; previous commercial experience preferred. Knowledge of proofreading symbols, codes and units of measure important. 73-1141-R (10/30).

Secretary IV to two Professors on Committee on Biomedical Engineering and Man Vehicle Laboratory in the Center for Space Research will handle general secretarial duties. Excellent typing and dictaphone skills required; ability to work independently doing editing and research important; familiarity with medical terminology desirable. 73-1138-A (10/31).

Secretary IV to the Director of the Industrial Liaison Office will handle all office procedures including accounting and some statistics necessary in operation of a large office. Excellent typing and shorthand skills are essential; previous experience required, preferably at MIT, business school background preferred. 73-1031-R (10/3).

Secretary IV for Institute Secretary for Corporations will organize and run the office. Very accurate typing needed for some letter-perfect copy. Other typing duties required speed. Preliminary research on corporate prospects; gather backup information for visits; draft not-too-technical correspondence. Work closely with other Institute offices in obtaining pertinent data; receive visitors. Flexible, adaptable, good telephone presence. 73-1091-R (10/10).

Secretary IV in Mechanical Engineering will handle bookkeeping for computerized accounts; maintain budget records; prepare materials for courses; type technical reports. Secretarial school background or previous experience preferred; knowledge of bookkeeping, keypunching, or other computer techniques helpful. Good typing and the ability to work for several people required. There is a lot of student contact in this job. 73-1194-R (11/14).

Secretary IV in the Civil Engineering will handle general secretarial duties for a professor and two colleagues. Organize and maintain files; perform some administrative duties; type correspondence, class material, technical reports; handle several accounts. Good typing skills required; ability to work with students, faculty and staff important. 73-1195-r (11/14).

Secretary IV (part-time) in the Center for Advanced Visual Studies will handle general secretarial duties. Excellent typing skills needed for final-draft manuscript typing and general correspondence. Individual should have editorial skills and an interest in the arts. 20-25 hour work week. 73-1162-R (11/14).

Secretary IV to the Assistant Director of the Center for International Studies. Handle some administrative responsibilities; assist with general headquarters work and report production; greet visitors. Excellent typing skills required. Flexibility important in dealing with people and working under pressure. 73-1196-R (11/14).

Secretary IV to the Executive Officer of Chemical Engineering will handle general secretarial duties; maintain petty cash account; receive visitors. Previous secretarial experience preferred; ability to anticipate, maturity to handle problems and work independently required. Good shorthand and typing skills necessary. 73-1191-R (11/14).

Secretary IV in Mechanical Engineering will handle general secretarial duties necessary for the smooth function of this busy office. Type technical reports, proposals, papers, class notes; answer routine correspondence; maintain files. Previous secretarial experience, excellent typing skills required; experience in technical typing, shorthand preferred; ability to establish priorities important. 73-1193-R (11/14).

Secretary IV in the Office of the Dean of the Graduate School will handle general secretarial duties for the Assistant Dean. Answer routine correspondence; draft progress and fiscal reports; prepare memoranda and institutional surveys for MIT distribution, assist with processing of fellowship programs, applications and proposals. Good typing, shorthand, and dictaphone skills required. Familiarity with MIT helpful. 73-1200-R (11/14).

Editorial Secretary IV in Economics will prepare galley and page proofs; check grammar, style, format; proofread and act as liaison with publishers. Will also type mathematical manuscripts and general material; assist with other various functions. Ability to work with cryptic instructions; editorial skills required. Previous academic experience and excellent technical typing skills important. 73-1232-R (11/21).

Secretary IV in Nutrition will perform general office duties for three faculty; maintain files, handle correspondence. Good typing, shorthand and dictaphone skills required; some knowledge of medical, biological and/or chemical terminology helpful. 73-1230-R (11/21).

Secretary IV in the Sloan School of Management will handle routine secretarial duties for several faculty members in the Management Science group. Type correspondence, class materials, manuscripts (some technical), ability to establish priorities and to effectively deal with industrial contacts important in the smooth operation of this one-person office. 73-1219-R (11/21).

Secretary IV in Metallurgy will perform general secretarial duties for two professors. Type class material, correspondence from machine records and files; coordinate busy office schedules; handle petty cash fund. Good typing and shorthand skills required; ability to set priorities; familiarity with technical terminology and computers helpful. 73-1120-R (11/21).

Secretary III (part-time) in the Dean for Student Affairs Office will assist with general secretarial and administrative duties necessary for the operation of Talbot House, Student Center/Kresge. Good secretarial skills; and the ability to learn quickly important. 12 hour work week. 73-1198 (11/21).

Secretary III for a group of faculty members and research staff in the Research Laboratory of Electronics. Type technical manuscripts, including setting format and verifying footnotes and references; handle all other general office duties. Excellent typing experience preferred. 73-861-R (9/5).

Secretary III in Mechanical Engineering will assist with general secretarial duties in Headquarters Office. Good typing skills, ability to work accurately in a busy office important. 73-1152-R (10/31).

Secretary III in the Student Accounts Office will assist with the preparation of the degree list and review of students financial status; will also handle all general secretarial duties. Accurate typing skills required; ability to deal effectively with students in a busy atmosphere important. 73-1154-R (10/31).

Secretary III - Temporary in the Dewey Library will handle secretarial, some administrative and library assistant duties. Type and file catalog records; assist at the Library's public service desks; perform secretarial duties for the Head Librarian. Good typing skills essential; previous secretarial and/or library experience highly desirable; ability to work accurately and efficiently without close supervision required. Occasional evening or weekend work may be required. Job ends 1/14/74. 73-1205-A (11/14).

Secretary III in Biology Headquarters will handle correspondence, memorandums, typing of class notes and quizzes for the Undergraduate Officer; assist with the registration process; maintain files. Accurate typing required; ability to deal with students, faculty and staff important. 73-1212-R (11/21).

Jr. Programmer V in the Arteriosclerosis Center will assist in design, development, and evaluation of a Medical Data Management System. Candidate must have a sincere interest in working in a medical environment and have the ability to collaborate with medical personnel. Previous data management experience, knowledge of PL/1 and familiarity with 360/370 OS desirable. 73-1182-A (11/14).

Senior Clerk III in the Microreproduction Laboratory (Libraries) will process requests for microfilm and photocopies; type invoices, work orders; prepare statements for the Accounting Office. Ability to assist customers over the phone and in person is essential; accurate typing skills required; bookkeeping knowledge helpful. 73-1160-R (11/7).

Senior Clerk III will take and process orders at Graphic Arts. Price and schedule Xerox work, handle requisition details. Knowledge of photography preferred, but not essential. 73-946-A (10/10).

Technical Assistant IV - for Lincoln Labs in Cambridge. Data librarian and computer operator. Assist in record keeping for a library of seismic data. Maintain a document library. Run jobs on small computer system. Keypunching. Dispatcher and coordinator for jobs submitted to other computers. Some training or experience in computer technology. Familiarity with elementary computer concepts and equipment. Fortran exposure desirable. One or two year technical institute course or equivalent satisfactory. Enthusiasm and interest in learning more important than extensive training or experience. Dorothy Petrovich, x7305 Linc.

Sr. Library Assistant IV in the Barker Engineering Library will be assistant in the Processing Office for Monographs and Catalog Maintenance. Verify catalog records; process incoming monographs; supervise various card catalog processes. Previous library experience in cataloging/processing department, some library science courses on bibliographic experience is a necessity. Accurate typing required. 9-5 or 10-6. 73-1231-R (11/21).

Library General Assistant III will assist the Project MAC librarian with circulation of reading room material, and in performing clerical tasks. Interest in helping users; ability to work independently and accurately with details important. Some previous work experience required. 35 hour work week. 12n-8pm. 73-1222-A (11/21).

Library General Assistant III (part-time/temporary) in the Processing Section of the Rotch Library will assist with a variety of clerical duties; search and file in the card catalog; maintain records. Accurate typing essential; ability to handle a variety of details important. Previous library experience desirable. 17½ hour work week, job ends 6/30/74. 73-1192-A (11/14).

Microfilm Assistant II or III in the Microreproduction Laboratory will be trained in the techniques of micrographics: planetary and rotary camera filming, microfiche production, photographic enlarging, and other methods. Candidate should have an interest in technical photography, mechanical aptitude, and a willingness to learn. Some experience in microphotography desirable but not necessary. 40 hour work week 8-5. 73-1224-R (11/21).

General Cook at the Faculty Club must be able to read, understand and follow recipes for all types of food preparation. Make sauces, cook meats, vegetables, prepare salad ingredients. Prepare menu items for luncheons and some items for dinner. General knowledge of all types of food preparation; good experience in first class club or restaurant required. Ability to read and understand English important; will generally prepare American-type food. 6am-2pm. 73-1228-R (11/21).

Waitress/Waiter (part-time) at the Faculty Club will set up silver and china on dining room tables. Take member orders; serve food and beverages. Clear, clean and reset tables. Experience helpful, but not necessary. Shift: 5pm-9pm. Position may require weekend work. 73-1201-R (11/21).

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 (4/73).

Electrician for Physical Plant will install and maintain all types of electrical equipment and systems. Ability to work from blueprints, verbal instructions or sketches as necessary. Some electronic experience desirable. Must be able to work all shifts and on irregular schedule. Minimum of five years experience and Mass State license required. 73-1107-R (10/17).