Massachusetts Institute of Technology

September 27, 1989 Volume 34 Number 7





Rene White, a graduate student in biological oceanography and an Ida Green fellow, digs for soft-shell clams (Mya earenaria) to study a blood disease that occurs in the clam population and that some equate with a type of leukemia. Clams are dug, identified as having the disease, then replaced in their natural habitat and monitored over time to determine how the disease progresses. Does it kill? How does it impact reproduction? Rene and colleagues also look for bivalve clams (Solemya velum), which have no digestive tracts. They hope to find out how nutrients are assimilated in the absence of a digestive tract. This would assist in forming a model system for similar creatures recently discovered living in deep-sea hydrothermal vent systems.

—Photo by Donna Coveney

EAPS' Lindzen is critical of global warming prediction

By EUGENE F. MALLOVE

News Office

Dire predictions of global warming through the greenhouse effect were roundly criticized last week by Professor Richard Lindzen of the Department of Earth, Atmospheric and Planetary Sciences.

"I argue that the greenhouse effect does not seem to be as significant as suggested." Professor Lindzen said. He spoke last week before an audience of 250 scientists at the Alexander von Humboldt Foundation Colloquium at Kresge Auditorium.

"I personally feel that the likelihood over the next century of greenhouse warming reaching magnitudes comparable to natural variability seems small, "he said. "And I certainly feel that there is time and need for research before making major policy decisions."

Professor Lindzen characterized the question of possible global warming as "a region in which the uncertainty is vast." He then proceeded systematically to expose major difficulties with projections of global climate.

Has warming already occurred?

What does the temperature record already show about global warming? Do the data conclusively indicate about one-half degree centigrade (plus or minus 0.2 degree) global warming over the last century, as some proponents suggest? No, contends Professor Lindzen.

Professor Lindzen cited many problems with the temperature records, an example being the representation of the Atlantic Ocean with only four island measurement sites. Urbanization also creates problems in interpreting the temperature record, he said. There is the problem of making corrections for the greater inherent warming over cities—in moving weather stations from a city to an outlying airport, for example

"The trouble with many of these records, "he said, "is that the corrections are of the order of the effects, and most of us know that when we're in that boat we need a long series and great care to derive a meaningful signal."

Nor, he said, was the temperature data collected in a very systematic and uniform way prior to 1880, so comparisons often begin with temperatures around 1880. "The trouble is that the earlier data suggest that one is starting at what probably was an anomalous minimum near 1880. The entire record would more likely be saying that the rise is 0.1 degree plus or minus 0.3 degree."

He referred to MIT Professor Reginald Newell's work that suggests that between the 19th century and the present there appears to be no change in ocean surface temperatures. Moreover, the record for the 48 contiguous states shows no evidence for warming over the past century.

"As far as the data goes, I would argue that we really don't have the basis for saying it's a half degree plus or minus 0.2. That is false use of science. What we have is data

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Science Smarts colloquium set

An MIT Colloquium on "Science Smarts: The Scandal of Scientific Illiteracy" will be held Monday, Oct. 16, the Institute Colloquium Committee has announced.

The speakers will be President Paul E. Gray, F. James Rutherford, chief education officer for the American Association for the Advancement of Science, and Sandra G. Spooner, assistant superintendent of schools in Cambridge.

Presentations will begin at 4pm in Kresge following a reception and refreshments in Kresge lobby at 3:15pm. A short question-and-answer period will follow.

At about 5:45pm, students and invited guests will return to student living groups for dinner and more discussion on the subject.

The committee, in announcing the topic, said that while there is a growing national consciousness of the need for reform in science and math education, the approach to that goal has been subject to debate and controversy.

The committee said Dr. Gray, "as head of the premier institution of scientific and technological learning, speaks with authority of what impact MIT and its students can have." Mr. Rutherford of the AAAS is director of Project 2061, named for the date of the return of Halley's Comet. The project is taking a long view of science education with a goal to detailed reform no sooner than the end of the next decade. Ms. Spooner, the committee said, "knows the challenge of tackling scientific illiteracy at the local level where teachers encounter students in the classroom."

For more information and information on how to become part of a living-group dinner/discussion, contact Donna Friedman, x3-9762.

The MIT Colloquium is a semiannual event supported by student efforts focused in the Interfraternity Conference, the Dormitory Council, the Student Committee on Educational Policy and the Graduate Student Council.

No Tech Talk

Tech Talk will not be published October 11 because of the Columbus Day holiday. The Institute Calendar in the October 4 issue will cover the period of October 4-22.

The deadline for submitting calendar listings, notices and classified ads will be, as usual, noon Friday, Sept. 29.

Kidspace

Technology Children's Center has three full-time openings available for children aged two years, nine months to five. For more information, call x3-5907.

Hurricane's fury seen to have upper bound

For those who suffer damage or injury in a hurricane it may not be particularly consoling, but a definable upper limit exists to such a storm's intensity. So says Professor Kerry A. Emanuel of the Department of Earth, Atmospheric and Planetary Sciences, whose research specialty is hurricanes.

"We know from theory that hurricanes cannot get arbitrarily intense," says Professor Emanuel. "In fact, of the hurricanes that form, only a very small percentage achieve this upper limit—for reasons that are not understood. But occasionally one will. Gilbert was an example, Camille back in 1969, and Alan was pretty close in 1980."

Moreover, he says, "If we actually calculate this upper bound from environmental conditions in the present climate and look at a map of hurricane intensity, the two distributions fit quite well."

The upper bound of intensity can be measured by the central pressure deficit [below normal pressure] within the hurricane. Average surface atmospheric pressure is about 1,015 millibars. Currently the lower limits are around 880 millibars in the Gulf of Mexico and the western Pacific. Most hurricanes don't come near this limit, though Gilbert was 885 millibars.

"The pressure deficit is correlated with the square of the wind speed," says Dr. Emanuel, "which in turn is a measure of the force on objects."

Professor Emanuel says that the limit of hurricane intensity changes as a function of the ocean temperature and of the temperature at the tropopause, the boundary between the troposphere and the stratosphere, which is about 15 kilometers up.

Professor Emanuel published an article in Nature about two years ago in which he demonstrated the sensitivity of the upper limit on hurricane intensity to climate change in general. In his view, computer projections of global warming are very uncertain, but he concludes: "If the tropical ocean temperatures were to go up a few degrees centigrade as some projections suggest, then the upper limit on the intensity of hurricanes will go up appreciably."

If the tropical ocean temperatures were to increase by two or three degrees centigrade, the minimum hurricane pressure would go down as low as 800 millibars in the Gulf of Mexico. "The pressure drop would also be about 50 percent more, and there-

(continued on page 5)

INSTITUTE **NOTICES**

- *-Open to public
- **-Open to MIT Community only
- ***-Open to members only

Announcements

Library Orientation Tours**-Barker Library - Engineering (10-500): Thurs, Sept 28, 10am. Dewey Library - Socical Sciences and Management (E53-100): Wed, Sept 27, 3pm; Thurs, Sept 28, 10am. Humanities Library (14S-200): Wed, Sept 27, 10am. Science Library (14S-139): Thurs, Sept 28, 10am. Institute Archives and Special Collections (14N-118): Call x3-5136 to set up a tour. Tours available on request at: Aeronautics and Astronautics Branch Library (33-316); Lindgren Branch Library-Earth and Planetary Sciences (54-200); Schering-Plough-Neurosciences (E25-131).

Career Planning and Placement Company Recruitment Presentations**-The First Boston Corp-Oct 10, 7:30-9pm, Rm 4-149. Intel Corp-Oct 10, 5-7pm, Rm 4-153. Monsanto Co-Oct 10, 6:30-8:30pm, Rm 8-105. McKinsey & Co-Oct 11, 7-9pm, Rm 4-153, GTE-Oct 11, 7-9pm, Rm 8-105. US Patent & Trademark Office-Oct 12, 4:30-6:30pm, Rm 4-149. CIA-Oct 12, 7-9pm, Rm 4-153. Apple Computer-Oct 12, 7-9pm, Rm 4-270. Salomon Bros (Sales & Trading)--Oct 12, 4:30-6:30pm, Rm 4-159.

Loan Counseling-All first-time student loan borrowers (Perkins, Technology Loan or Stafford Student Loan) are now required to attend a loan counseling session conducted by the staff of the Bursar's Office. a final session will be held: Sept 27, 2pm, Rm E19-220. Bursars Office, E19-215, x3-3343.

September Degree Candidates Reminder—Post cards must be returned promptly to Rm E19-335 to indicate whether diplomas are to be mailed or called for in person, or whether attendance at Commencement is planned, Mon, June 4, 1990. Hosts to International Students Program-MIT Women's League program to host foreign students coming to MIT for the first time. Provide a welcome, occasional hospitality and friendship. All financial and academic problems handled by specific MIT offices. Info/volunteer forms: Kate Baty, 861-6725 or Pam Daveta, x3-3656.

MIT Language Conversation Exchange**-Medical Dept program to assist members of the MIT community to practice a language with a native speaker. Applications accepted throughout the year. To exchange English or another language and be matched with someone with your interests, call the secretary of the Language Conversation Exchange, x3-1614.

MIT Student Furniture Exchange**—MIT Women's League store, Tues/Th, 10am-2pm, 25 Windsor St (N52), x3-4293.

Free Museum of Science Admission for MIT Students-With MIT student ID, provided by Mass Beta chapter of Tau Beta Pi, the National Engineering Honor Society. Reduced admission to special exhibits.

Arts Hotline-Recorded information on all art events at MIT may be obtained by dialing x3-ARTS. Material is updated every Monday morning.

Nightline**-a student-run campus hotline open every evening of the term, 7pm-7am. If you need information about anything or you just want to chat, give us a call. We're here to listen. x3-

Club Notes

MIT European Club**—fosters friendship and understanding between Europeans and others. Info: 876-3475.

Club Latino at MIT**-Student organization to promote exchange of cultural backgrounds between members of the MIT Hispanic community and other MIT affiliates. Info: Miguel

GAMIT**-Gays, Lesbians, Bisexuals, and Friends at MIT, Sexuality Rap, Oct 11, National Coming Out Day, 8pm, Student Center 3rd fl.. Friday the 13th Dance, Oct 13, 9pm, Lobdell, Student Center. Beer & wine. \$3. w/ student ID, \$4. w/out. Weekly study break, Thursdays, 9pm, Rm 50-306, Walker. Info:

MIT Association for Women Students**—Rape Awareness Week, Oct 2-6, events planned for each day. Info: x5-6402

MIT Radio Society and UHF Repeater Association Monthly Ham Exams**—All classes, Novice to Extra, Oct 18, Nov 22, Dec 20, 7:30pm, Rm 1-150. Reservations requested 2 days in advance. Contact Nick Altenbernd, 437-0320. Exam fee: \$4.75. Bring copy of current licence (if any), 2 forms of picture ID and completed form 610 available from FCC, Quincy, MA, 770-

MIT/DL Bridge Club*—Duplicate bridge, Tues, 6:30pm, Student Ctr Rm 491. ACBL masterpoints awarded; come with or without partner, newcomers always welcome. Handicap game, 3rd Tues every month. Info call Gary Schwartz, x8-2459 Draper, or Mark Dulcey, 247-2300. Admission for regular games: \$1/students, \$2/non-students.

MIT Student Bridge Club*-Duplicate games Mon, Thurs, Sat and Sun and teams following 7:30pm, usually at Student Ctr (see posters). Lessons, 7pm, if required. Refreshments. Info: Bo-Yin, x5-9865 dorm or David, x5-7522 dorm.

MIT Go Club*-Meets every Wed, 5-7pm, Rm 24-612 (ESG Lounge). Info: John Cox, x3-7887 eves.

MIT Science Fiction Society*-The world's largest open collection of science fiction books and magazines is located in Student Ctr Rm 473. Meetings, Fri, 5:30pm. Info: x8-5126.

MIT Outing Club*—Camping, cycling, climbing, canoeing, cabins. Meets 1st Mon of month, 6pm, W20-461. Rental hours, M/Th, 5-6pm, W20-461. Also, see our bulletin board in "Infinite Corridor" next to Athena. Info: x3-2988 or Jerylen, x5-9623

MIT Rugby Football Club**-Member, New England Rugby Union Men's B Division. Players wanted. Practice meets T-Th, 5:30pm, Rugby Pitch. No experience necessary. All welcome. Info: Cliff Federspiel, x3-3772.

MIT Soaring Association*-Weekend Soaring-Learn the exciting sport of soaring. We fly from the Mansfield airport every weekend and some holidays (weather permitting). Mansfield is 45 minutes south of Cambridge, off Rt 95. Student membership: \$175; typical flight: \$16. Contact: Cathy Keller, x0814 Linc or 327-3193 eves.

MIT Sport Parachute Club*-Learn to skydive: experienced jumpers go out every weekend; beginners, call for information on our first jump courses. AFF and Static-line. Carl, 225-0408.

MIT Nautical Association**-Sailing Pavilion on Charles River open every day, 9am-sunset, Sailing, windsurfing and coastal cruising. Free basic sailing classes, Wed, 5:15pm and Sat, 9am. Membership cards on sale at Cashier's Office: \$15 students, \$35 staff/faculty, \$45 alumni.

MIT Hobby Shop**-Complete supervised facilities for woodworking and metalworking, Rm W31-031, M-F, 10am-6pm; Wed, 10am-9pm. Fees: \$15/term students; \$25/term community. Info: x3-4343.

MIT Graduate Club Soccer**—Competitive soccer with teams from the metro-Boston area. Practices Thurs, 7:30-9:30pm; Games Sat, 10am or 2pm, Field A (artificial turf). Open to MIT community. Info: Dave, x3-4546 or Eric, 776-7910.

MIT Aikido Club**-Non-competitive martial discipline, meets M-F, 5:30pm, DuPont Exercise Rm. Beginners always welcome. Info: Mitch Hansberry, x8-1272.

MIT Wu Tang Martial Arts Club**—Learn Northern Chinese kung fu. Long fist and praying mantis styles, short sabre and sword. Meets T/Th, 8-10pm; Sat, 9am-12noon, Burton Dining Hall. Info: Matt Cordery and Paul Filmer, x3-1911.

MIT Karatedo Doshinkan Club*-Classical noncompetitive Okinawan Karatedo, MWF, 5:30-7pm, meet outside Dupont (W31) by BBQ pits. Rain schedule: MWF, 4:30-6pm, W31-225 Dance Studio. Info: Jim, x3-0472.

with emphasis on development of mind and body, Mon/Wed. 6:30-8pm, Burton Dining Hall; Fri, 6:30-8pm, T Club Lounge; Sun, 4-6pm, T Club Lounge. Hunger Action Group**-Meets Tues, 7pm, Baker Master

MIT Tae Kwon Do Club*-Traditional Korean martial arts

Suite Lounge. Volunteers at soup kitchens, Boston Food Bank; sponsors forums, films addressing hunger- and developmentrelated issues. Contact Susmitha, x5-8528 dorm or Irene, x5-

COCA (Committee on Central America)*-Meets at least once a month to plan activities relating to events in Central America. Info: Charlie Welch, 783-1668 eves/messages.

MIT Chapter of Habitat for Humanity**-Organizational meeting, Sept 21, 12noon, Rm 1-350; monthly meetings, 1st Thurs of the month, 12noon, Rm 1-350. Info: Mike x3-0448 or

MIT Entrepreneurs Club**-Brainstorm on new venture ideas; join or build a team to start a business. Meetings every Tue, 6pm, Rm 66-144. Info: Douglas x3-0757 or Richard 876-2271

Students for the Exploration and Development of Space*-Meets every Mon 8pm. Info: x3-8897.

Religious Activities

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

MIT Hillel*-Rosh Hashannoh services: Fri, Sept 29: Reform, 8pm, MIT Chapel; Conservative, 6:30pm, Kresge Little Theatre. Sat, Sept 30: Reform, 10am, MIT Chapel; Conservative, 8:30am & 7:15pm, Kresge Little Theatre. Sun, Oct 1: Conservative, 8:30am & 7:15pm, Kresge Little Theater. Holiday meals served in Kosher Kitchen (50-007); reservations required, thts available-x3-2987. Yom Kippur booth, Tues, Oct 4, Lobby 10. Yom Kippur Services: Sun, Oct 8: Reform, 7pm, MIT Chapel; Conservative, 5:45pm, Kresge Little Theatre; Mon, Oct 9: Reform, 10am & 4pm; Conservative, 8:30am & 5:30pm.Info: x3-2982.

Tech Catholic Community**-Masses: Sat, 5pm; Sun, 10am & 5pm. Tues & Thurs, 5:05pm, Fri, 12:05pm, MIT Chapel. Info/ Holy Day schedule: x3-2981.

Lutheran Ministry and Episcopal Ministry**-Weekly Service of Holy Comn -Wed, 5:10pm, MIT Chape Supper follows at 312 Memorial Drive. For further info, call x3-

United Christian Fellowship**-Large group meetings. Join us for worshipful singing, prayer, sharing and Bible teaching, and small group Bible studies during the week in various dorms, Fri, 7pm, Rm 6-321. Info: Tracy, x5-9688 dorm.

Graduate Christian Fellowship**-Come join other grad students, faculty and staff in learning about and growing in the Christian faith. Activities open to both Christians and those interested in learning more about Christianity. Info: Curt Bronkhorst, x3-4414 or Roz Picard, x3-7314.

MIT Islamic Society*-Infomation Table: talk about religion, pick up info about Islam, Sept 27-28, 10am-4pm, Lobby 10. 5 daily prayers in the prayer room, Ashdown House (Bldg W-1) west bsmt. Friday congregation: 1:10-1:45pm. Muslim Study Group: open to men & women meets Fridays 8pm-9:30pm. Introduction to Islam Classes: 1st Thurs of each month, 8pm, Rm 1-132. Additional presentations available on request. Info: x8-9755.

Christian Science Organization at MIT*-Weekly Testimony meetings, Thurs, 7pm, MIT Chapel

Lincoln Laboratory Noon Bible Studies*-Tues & Thurs, Kiln Brook III, Rm 239. Annie Lescard, x2899 Linc.

Morning Bible Studies**-Fri, 7:30-8:30am, L-217. Ed Bay-

Noon Bible Study*-Every Wed, Rm 1-150, bring lunch. Ralph Burgess, x3-8121. (Since 1965.)

MIT Bible Study Group*—The Economy of God, a look at God's eternal purpose to dispense Himself into man based on the revelation of the Bible, Fri, 8pm, Student Ctr Rm 407. Singing, prayer, Bible reading, fellowship.

MIT Campus Crusade for Christ*-Fridays, 7:17pm, Marlar Lounge, Rm E37-252, TGIF weekly meeting of MIT Campus Crusade for Christ. We "thank God it's Friday" every week with singing, biblical input, discussion and fun. Info: x5-9153 dorm.

MIT Vedanta Society*-Meditation and discourse on the Bhagavad Gita, Swami Sargvagatanda, religious counseler, classes held Fridays, starting Oct 6, 5:15pm, MIT chapel.

Graduate Notices

Fannie & John Hertrz Foundation Graduate Fellowship, 1990-91-Financial support for outstanding students pursuing graduate studies in applied physical sciences. NOT for students in biological sciences or for those seeking professional degrees or PhD and professional degrees (i.e. joint PhD/MD programs). Provides cost-of-education allowance of \$8,000 and a stipend of \$15,000 (9 months) US citizenship or documented evidence of application for citizenship required. Applications available in the Dean of the Graduate School Office, Rm 3-138. Deadline: Nov 1, 1989.

Rhodes Scholarships-a competitive award for two or three years study at Oxford University is available to students in any fields who have excellent scholastic records and other personal accomplishments. Information and applications are available from Professor Gilbert Strang, Rm 2-240, x3-4383. Deadline, October 23, 1989.

Graduates of Oxford or Cambridge University***-The Oxford and Cambridge Society of New England reception, after dinner, Oct 5, 7:15-9:30pm, lower Common Rm, Adams House, Harvard.

International Notices

IREX (International Research & Exchanges Board) announces 1990-91 Research Exchange Programs for research in Eastern Europe & the USSR. Deadlines: Eastern Europe: Oct 15, 1989, for participation beginning Sept 1990 or later; USSR: Oct 15, 1989, for participation during 1990-1; other programs have varying deadline dates. U.S. citizenship required. Info: x3-

MIT-Japan Program. A unique opportunity for MIT science, technology and management students to spend a year in Japan working at a major Japanese company or laboratory. Students are trained in Japanese language and culture at the Program's expense before being placed in Japan. Placement is tailored to the student's background and experience. Travel to/from Japan and living expenses will be covered. For further information, call Patricia Gercik, x3-3142, Ctr for International Studies, MIT-Japan Program, Rm E38-754.

Student Jobs

There are more job listings available at the Student Employment Office, Rm 5-119.

Special Note: The Student Employment Office has many "one time only" jobs. Many students find these jobs a good way to earn money fast.

On Campus Non-Technical:

Workers needed for food services. No experience needed. Flexible hours, as many or as few as you would like. Salary: \$6.35/hr. Contact: Thomas Rizzo, x3-6491.

On Campus Technical:

Help us maintain our IBM network of PC's, XT's and AT's. Develop interfacing for data collection and control of laboratory equipment and experiments. Work with editorial staff to develop documentation. Hours: Flexible Contact: Dick Pober, 12-003, x3-3878.

Off Campus Non-Technical:

Part time scientific programmer. Must know FORTRAN 77, be familiar with VMS, and have math experience through calculus. Familiarity with NOS and NOS-VE desirable. Located at the Geophysics lab at Hanscom AFB. Must have own transportation. Hours 10-15 hrs/wk. Salary: \$7.50/hr. Contact: Marian Greenspan, 377-4133.

Off Campus Non-Technical:

Banquet server. Food serving at Banquet functions at the Boston Marriot at Copley Place. Hours: flexible. Salary: \$11.00/hr. Contact: Please stop at the Human Resources Office of the Hotel ask for Ann Morley, 110 Huntington Ave, Boston 02116.

Off Campus Non-Technical One-Time:

Student aides are needed to perform the following functions at the National Symposium of the American Vacuum Society at the Hynes Auditorium in Boston: spot-checking registration badges of attendees in technical seminars, counting attendees in cal sessions, collecting tickets, assisting in seating, givin directions, assisting with audio-visual equipment. Hours: October 23 to 27. Salary: \$7.00/hr. plus free registration to the symposium and continental breakfast. Contact: Audrey Childs x3-7008 before September 29th.

UROP

Welcome to all students, old and new. MIT and Wellesley undergraduates are invited to join with faculty members in pursuit of research projects of mutual fascination. Faculty supervisors wishing to have projects listed should send project descriptions to the UEO. Questions? Contact us, x3-7909, Rm

The 1989-90 UROP directory is available in the Undergraduate Education Office (UEO), 20B-141. Project listings and guidelines will be posted on the bulletin boards located in the infinite corridor and in the UEO.

Hypercard. Student needed to help develop some software on the Macintosh using Lightspeed Pascal and Hypercard for a course in network optimization. The student should be quite familiar with Hypercard XCMD's. Contact supervisor: Prof. James Orlin.

Cognitive Psychology. Assist in research investigating how language comprehension takes place. Responsibilities will include preparing psychology experiment, testing subjects, and aiding in interpreting results. Background in cognitive psychology and/or familiarity with IBM or Macintosh computers helpful but not essential. Freshmen may apply. Contact Faculty supervisor: Dr. Maryellen MacDonald, E10-034C, 497-4859.

Project Athena. We are developing workstations to help second-language learners improve their pronunciation and listening skills. Student needed to help train students to use the programs we have developed. Programming skills would be helpful, but are not necessary. Faculty supervisor: Janet Murray, 20B-226. Contact: Dr. Sharon Manuel, 36-511; x3-3201 or x3-

Particle Detectors. Unique opportunity to design and develop new particle detectors of very high precision. This research project is a crucial step in the construction of a particle detector for the superconducting supercollider (SSC). Juniors and Seniors with some experience in electronics. Please leave name, address and telephone number: Professor U. Becker, Professor Gregor Herten, 44-122, x3-8418.

Imaging, Simulation and Animation of Self-Assembling Material. Programmer wanted to develop and exploit computer graphics, animation, image simulation and microscopy to understand the structure of novel electronic and biomaterials that automatically arrange themselves into desired geometries. The successful candidate will use Silicon Graphics workstations, video animation equipment and Cray supercomputers to predict their microstructures and interpret their electron-microscopic images. The candidate should have Fortran, C, X11 and Unix programming skills. An interest and knowledge of darkroom photography will be an asset. Contact faculty supervisor: Prof. Thomas, 13-5066, x3-6901; thomas@uzi.mit.edu or Jayesh Bellare, 13-5153, x3-6894, jayesh@uzi.mit.edu.

Microdroplet Aerosols of Self-Assembling Materials. Wizard experimentalist wanted to develop instrumentation to generate aerosol microdroplets of novel electronic and biomaterials that automatically arrange themselves into desired micro-geometries. The candidate will design, build, test and modify equipment based on technology used in ink-jet printers. Student should be a "hardware hacker," be good with their hands, and have equipment-design experience. Electronics and chemistry lab experience will be an asset. Contact faculty supervisor: Prof. Edwin Thomas, 13-5066, x3-6901, thomas@uzi.mit.edu or Jayesh Bellare, 13-5153, x3-6894, jayesh@uzi.mit.edu.

Interaction of Protein with DNA. Proteins are being isolated from human tumor cells as well as yeast that bind specifically to the left-handed conformation of DNA. These proteins have unknown functions and their properties are being analyzed. We plan to clone these proteins and express them in other systems so they can be studied in detail in order to uncover their biological activities. Contact faculty supervisor: Prof. Alexander Rich, x3-4715, 16-735 or Dr. S. Zhang, x3-4710

Cable Television Schedule

MIT Cable Television serves the MIT campus. For connection and programming information, call x3-7431.

This schedule is subject to change. For up-to-date information, çall Randy Winchester, x3-7431.

Wednesday, September 27

Channel 10 10am-Physics 8.01 Help Session #3 with Prof Lewin. This

program will repeat until 12noon, 10/4. Friday, September 29

Channel 13

12noon—"Patterning of Vertebrate Axonal Projections" Dr. Marc Tessier-Lavigne, Howard Hughes Medical Institute Research Laboratories, Columbia University. Live from Harvard University

5-5:30pm—Live At Lobdell. TV36's weekly comedy program.

Monday, October 2 Channel 36

8-8:30pm-M. I. T. Live! MIT's newest tradition is a weekly call-in program featuring locations all over campus. Viewers may call in at 253-TV36.

Tuesday, October 3 Channel 8

4-5:30pm—Live coverage of the MIT VLSI Seminar: Walter H. Schroen, Texas Instruments, Inc. Thursday, October 5

5pm-Physics 8.01 Help Session #4 with Prof Lewin. This program will repeat until 10am, 10/13.

Channel 10

Channel 36

Friday, October 6

5-5:30pm—Live At Lobdell. TV36's weekly comedy program.

TECH TALK (USPS 002157)



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News Office

Kenneth D. Campbell Joanne Miller Elizabeth A. Thomson Donna Coveney Genevieve Parent and Karen Sklut of MIT Graphic Arts

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CEHS seeks grant proposals

Sciences (CEHS) has announced the availability of funding for MIT faculty interested in conducting feasibility projects related to the environmental health sciences.

Professor William G. Thilly, director of the cross-disciplinary research center established to explore how hazardous substances in the environment affect human health, said the environmental health sciences "include those parts of established disciplines that are focused on discovering which interactions between humans and chemicals, radiation, or biologicals are harmful to health."

The Center's faculty are continuously exploring ways to attract new groups throughout the Institute to participate in research and teaching efforts through the Center. To that end faculty from a variety of disciplines are encouraged to apply for grants of up to \$10,000 per project and to test out new ideas.

In the past the CEHS has funded researchers from the chemical engineering, chemistry, civil engineering, physics, materials science and engineering, and biology departments. Recent projects which were funded include the development of a controlled-temperature air sampling device through the Department of Chemical Engi-

CU seeks to return 'forgotten' money

The Supervisory Audit Committee of the MIT Employees Federal Credit Union is looking for some 60 members or former members of the community who have savings they may have forgotten in the Credit Union.

But they must get in touch with the Credit Union by November 1 or the money in their accounts will be turned over to the state treasurer. The law provides for accounts that have been inactive for five years to be turned over to the state.

These are the people the Credit Union is seeking:

Paul Gerard Adams, Subhash Chandra Agrawal, Benjamin H. Ashton, Susan F. Bairos, Craig M. Baker, Martin Beckerman, Daniel Alan Bergman, Arthur D. Bernhardt, Philip W. Bohunicky, William M. Bucelewicz.

Charles R. Burgess, John W. Burke, Joseph K. Cleetus, Susan Ruth Coccovillo, Gerard C. Coletta, John or Ann Collins, Keith Edmund Crowe, Sandra A. Delphin, Joseph R. Dipietro, Linda Joy Dorfman, Nancy Jean or Lawrence E. Dorion.

Isaac Y. Efrat, Angelo R. Fanara, Richard M. Fand, Joyce L. Fletcher or Nancy A. Stuart, Jay Wyland Flynn, Carol A. Gaston, Michael L. Gens, Catherine Spotow Gibbes, Sherilyn N. Harrison or James Harrison, William H. Henneman, Steven H. Izen.

Sushila Kanodia, Doris Katz, Elizabeth Jean Keating, William T. Kennedy, George E. King Jr., Karen M. Kinney, Randall L. Kroken, Richard Albert Larose, Frederick David Leach, Homer D. Lewis Jr., Angelo Maurici, Elizabeth Gay Matteson, Richard V. McDevitt, Namiko H. McFarling, Susan M. McNeil.

Horst Joseph Metz, John J. Moriarty Jr., Elizabeth A. Moskowitz, John P. Moussouris, Peter T. Newman, Frances A. Oliverio, Diane L. Payment, Frank V. Permatteo, Debra Lynn Pierre-Louis, Juan C. Pons.

Jeanne P. or Steven R. Rapacki, Susan M. Sheldon, Miriam Sherburne, Maria Sirgo, Christine Ann or Richard Charles Smith, James F. Smith, Maria Spahija, Salvatore A. Tuccelli, Dimitri

Vvedensky, Paul C. Xirouchakis, Walter Timothy Zwirble.

Readers who know the whereabouts of any of these people should drop a note to one of the members of the CU Supervisory Audit Committee:

R.H. Gagnon-Draper MS 69 Chuck Shaw-Rm E19-655 Lois Levine-Rm 5-119 John Matarese-Draper MS 69 Howard Miller-Rm 7-206.

The Center for Environmental Health neering, which has proven to be extremely effective in collecting volatile components of combustion exhaust, urban air and indoor air, Professor Thilly said. Future applications of this device may allow the characterization of low molecular weight volatile compounds in human exhalation.

Individuals interested in applying for funding for this fiscal year should forward a one-page description of a proposed research project and a detailed budget of support required to complete the proposed work no later than Oct. 15 to: Professor William G. Thilly, Center for Environmental Health Sciences, Building E18, Room 666.

The grant which supports these projects is received from the National Institute of Environmental Health Sciences, and runs from April 1, 1989 through March 31, 1994. Funds which are awarded during the current fiscal year must be utilized by the end of March. The Administrative Office for the Center may be contacted at x3-6220 if further information is needed.

'Information society' to be discussed

A panel of computer industry leaders and commentators will meet at MIT at 7:30pm Thursday, September 28, for a public discussion of the choices we face in creating an "information society.

The discussion will be held in Rm. 10-

The panelists will be Mitch Kapor, founder of Lotus Development Corp.; Esther Dyson, well-known computer industry analyst and editor of Release 1.0; Shoshana Zuboff, Harvard Business School professor and author of In the Age of the Smart Machine: The Future of Work and Power, and Paul Starr, Princeton University professor and Pulitzer Prize-winning author of The Social Transformation of American Medi-

Thomas W. Malone, Patrick J. McGovern Professor of Information Systems at the MIT School of Management and director of the new MIT Center for Coordination Science, will moderate.

The MIT Center for Coordination Science and the Institute for the Study of Human Knowledge are sponsoring the discussion, which is part of a series of symposia and other activities to increase understanding of how computers and other information technologies may affect people's lives, work, and social relationships. According to Professor Malone, "There are probably no inevitable 'impacts' of computers on people. Instead, we as a society have choices to make about how we use this powerful new technology."

RapeAwareness Week events planned

"Shame," a film about a woman who befriends a teenage girl who has just been raped, will be shown Monday, Oct. 2, to kick off MIT Rape Awareness Week, October 2-

Daily events for Rape Awareness Week, sponsored by the MIT Association for Women Students, are as follows:

Monday, October 2-"Shame," 7:30pm, Rm 6-120. A discussion will follow.

Tuesday, October 3—"It Can't Happen Here," a panel discussion on the realities of date rape, 5pm, Rm 26-100. Panelists are Ann Russo, a lecturer in the Women's Studies Program, Cheryl Vossmer, an officer in the Campus Police, and a representative from the Boston Area Rape Crisis Center.

Wednesday, October 4-A men's-only seminar on rape led by Men Against Sexual Assault, 6:30pm, Rm 6-120, and a women'sonly class on self-defense, 7pm, DuPont Wrestling Room (wear loose clothing).

Thursday, October 5-Rally on the steps of the Student Center, 6:30pm, followed by a women's Take Back the Night march and a men's candlelight vigil.

Friday, October 6-Rock against Rape, a 9pm dance at the Student Center. Admission is \$3; proceeds will go to local rape crisis centers.

Senior develops standing device

By CHARLES H. BALL

News Office

Penny L. Plummer, an MIT student from Fort Worth, Tex., took on her senior project as a technical challenge in mechanical engineering. But the real goal was never far from her mind.

'The psychological effect of being in a wheelchair can be very harmful," she explained. "People are always looking down at you. A vertical wheelchair not only raises the person, it also raises their self-esteem by enabling them to see people at the same eye-level."

Now, several months after she began, Ms. Plummer has designed and built a prototype of a "standup mobility device" that would enable a disabled person to move about freely in a near-standing position in such places as the home, office or classroom.

"It's still in the development stage, it's not a finished product by any means," she said recently while demonstrating the device in a basement mechanical engineering laboratory at MIT. "But it's coming along and we hope to test it with disabled people this spring, incorporate their suggestions and perhaps have a finished working model by the end of the school year."

Ms. Plummer's device doesn't look anything like an ordinary wheelchair. Nor is it really intended to take the place of a

Its purpose is explained by Ms. Plummer's faculty advisor for the project, Professor Ernesto E. Blanco, who consults both at Beth Israel Hospital and Massachusetts General in Boston and is widely recognized for his work in microsurgery instrumenta-

"We're not talking about a wheelchair in the normal sense of the word, that enables a disabled person to get about freely, crossing streets, for example," he said. "The idea is to provide mobility for people who normally stand up while working.

"Virtually everything in our society, except for desks, operates on the premise that people usually stand while working. This device is for people who are disabled and who must work at normal height. It reduces the effect of the disability tremendously.

"I'm thinking of teachers, for instance, who want to use the blackboard while lecturing, or store clerks who can reach shelves more easily, or housewives, particularly in the kitchen," he continued. "I was at a concert this summer given by the violinist Itzhak Perlman, who is disabled, and this device would allow him to stand in public while playing if he desired to do so.'

Ms. Plummer added, "Its most effective use might be in offices, where the appearance of physical disability can be awfully distracting and put someone at a disadvan-

For the device designed by Ms. Plummer, a five-wheel assembly taken from a desk chair serves as the base for a telescoping pole topped by a bicycle seat. The user, strapped into the device at the waist, and with the feet also placed in straps, propels the device using two four-pronged canes, also adjustable as to length.

The prototype does not yet automatically shift from a sitting to a standing position, but Ms. Plummer plans to accomplish that shortly using either pneumatic cylinders or a cable system. She's also developing a braking system to stabilize the chair for getting into and out of it.

At present, she said, the chair's stability in motion is very good. "We're having a small problem with cracks in floors," she said, "but larger casters should take care of that." She also plans to replace the bicycle seat with a scooter-type cushioned seat, although it must remain small enough for the legs to extend comfortably on both sides.

The user's legs are flexed while in the sitting position, as they would be in a normal wheelchair, and fully extended in the standing position. The user is raised to a height of nearly six feet.

"Its main limitation is that while it can be used by people confined to wheelchairs by illness, age or injury and by paraplegics, it is not suitable for quadraplegics," Ms. Plummer said. "But we think it also can be used by amputees."

The idea for the standup device came from Professor Blanco, Ms. Plummer said, when she asked him to recommend a research project she could pursue under MIT's



MIT senior Penny Plummer demonstrates her "standup mobility device," intended to enable wheelchair-bound persons to move about in a near-standing position in classrooms, offices and homes.

—Photo by Donna Coveney

Undergraduate Research Opportunity Program (UROP), which encourages undergraduates to participate with MIT faculty and staff members in a wide range of research activities.

"When we started out, I thought our idea might be unique," Ms. Plummer said. But she has recently learned of at least one other elevated wheelchair, although she said it is motorized, appears to be used as a regular wheelchair and is much more cumbersome than her device.

"Mine is more a lightweight device," she said. "It's manually propelled and it's meant to be more cost-efficient."

Ms. Plummer built her prototype over the summer, with the help of funds from UROP, shop personnel and material obtained by Robert J. Morrison at the MIT Furniture Exchange. "Without him, I couldn't have gotten the project off the ground," Ms. Plummer said.

Why has it taken so long for a vertical wheelchair to materialize?

Ms. Plummer returns to her original thought. "I think it's just a case that people have developed sensitivity to the problems of the handicapped. Now we have wheelchairs, and handicapped people can get around, but if we can offer them something that gives them a boost both physically and psychologically, so much the better."

Take a SPIN

SPIN, the Sponsored Programs Information Network, is available at MIT through the Office of Sponsored Programs (OSP).

SPIN is a database with profiles of thousands of government, foundation and corporate sponsors of research and training programs in academic disciplines. It also includes information on instrumentation, travel, curriculum development and sabbatical projects. The program was developed and is maintained by the Research Foundation of SUNY.

Researchers seeking potential sponsors may request a SPIN search at OSP where staff members are available to help design and run a search tailored to specific needs. For more information, call Diane Eisenhaur, x3-

September 27 - October 8

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

Seminars and Lectures

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.

Wednesday, September 27

Potential Vorticity in the Brazil Current*—Jim Zemba, MIT/WHOI Joint Program, Oceanography Sack Lunch Seminar, 12:10pm, Rm 54-915.

The Canton Delta in Contemporary China*—Prof Karen Polenski, Dept of Urban Studies, MIT, MIT Center for International Studies, Asian Council Seminar Series, 1-3pm, Rm E38-615. Refreshments.

Numerical Methods in Crystal Growth**—John Strain, Courant Institute of Mathematical Sciences, NYU, Dept of Mathematics Numerical Analysis Seminar, 4pm, Rm 4-163. Refreshments, 3:30pm, Rm 2-349.

The Middle East in the 1990s: Prospects and Challenges***— Ambasador Herman Eilts, Director, Center for International Relations, Boston University, MIT Center for International Studies, Workshop on Reconstruction in the Middle East, 4pm. Rm E53-482.

Cloning of the Na+/H+ Antiporter. A glycosylated membrane protein phosphorylated by growth factors**—Claude Sardet, University of Nice, Whitehead Institute seminar, 4pm, Whithead Auditorium.

Democratization and Development***—Prof Samuel Huntington, Harvard University, Harvard-MIT Joint Seminar on Political Development (JOSPOD), 5:30pm, MIT Faculty Club.

How Process Formed Image*—Jim Dow, photographer, lecturer, School of the Museum of Fine Arts, MIT Museum Slide Lecture, 7pm, MIT Museum.

Thursday, September 28

The Liberalization of Air Transportation: A European View*—Daniel Tenenbaum, director general, Civil Aviation of France/president, European Civil Aviation Conference, Flight Transportation Laboratory Seminar, 2-3:30pm, Rm 33, 310

Pulsar Timing, Gravitation, and Cosmology**—Prof Joseph Taylor, Princeton University, Physics Colloquium, 4:15pm, Rm 10-250. Refreshments, 3:45pm, Rm 26-110.

Models of the Product Development Cycle*—Ralph E. Gomory, President of the Alfred P. Sloan Foundation, Sponsored by the Program on Science, Technology and Society and the Center for Technology, Policy and Industrial Development, 4pm, Rm E51-329.

Variance Reduction Techniques for Algorithm Simulation*—Catherine McGeoch, Dept of Math & Computer Science, Amherst College, Operations Research Center, 4pm, Rm E40-298

Four Looks at the Future of Geotechnical Engineering**— Dr Harl Aldrich, Chairman of the Board, Haley & Aldrich, Dept of Civil Engineering, Mathis Lecture Series, 4-5:30pm, Rm 3-770

The Malaysian Economy after Twenty Years of NEP***— Prof Robert Lucas, Center for Asian Development, Boston University, Boston University-Harvard-MIT Faculty Seminar on South and Southeast Asia, 5:30pm, MIT Faculty Club.

The Information Society: What are our choices?**—A panel discussion with Esther Dysan, Editor, Release 1.0; Mitch Kapor, Founder, Lotus Development Corp. & ON Technology; Prof Paul Starr, Princeton University; Prof Shoshana Zuboff, Harvard Business School & author, In The Age of the Smart Machine: The Future of Work and Power; Prof Thomas Malone, Sloan School of Management, Center for Coordination Science & The Institute for the Study of Human Knowledge, 7:30-9:30pm, Rm 10-250.

Friday, September 29

Blunt Delta Wing Hypersonic Flow Simulations**—Kuok-Ming Lee, MIT Aero/Astro Dept, Dept of Aeronautics and Astronautics Fluid Dynamics Seminar, 12-1pm, Rm 33-206. Coffee & refreshments.

Primary Liquid Products from Rapid Pyrolysis of Coals and Lignites**—Georgios Darivakis, Chemical Engineering Seminar, 2pm, Rm 66-110.

Three End Effectors: Intelligent Design and Control**— Prof Harry West, MIT Dept of Mechanical Engineering, Center for Information Driven Mechanical Systems, 3pm, Rm

A Mixed-Integer Nonlinear Programming Approach for the Optimization of Process Systems**—Prof Ignacio Gross-

man, Cargegie-Mellon University, Chemical Engineering Seminar, 3:30pm, Rm 66-110.

Geophysical Signals in the Rotation of the Earth**—Dr. Thomas A. Herring, MIT, Dept of Earth, Atmospheric, and Planetary Sciences CONOCO Lecture, 4-5pm, Rm 54-915.

Monday, October 2

A Personal View of Being HIV Positive—Dr. Thomas C. Mills, MIT '77, San Francisco VA Hospital/Fear of AIDS in the Workplace**—Prof Mary Rowe, MIT Sloan School of Management, AIDS: Scientific Challenge and Human Challenge Context Subject Seminar, 3-5pm, Rm 6-120.

A Comparison of Capabilities and Formulations of Several Modern Multi-Body Dynamics Codes**—Dr J. Turner, Cambridge Research, Dept of Aeronautics and Astronautics, Materials, Structures, Aeroelasticity Seminar Series, 3pm, Rm 33-206. Refreshments.

The Bode Integrals and Feedback Design**—Dr Glenn Kissel, JPL, MIT/DraperDynamics, Guidance and Control Seminar Series, 4pm, Draper Rm 1409-B. Refreshments.

Numerical Simulation of Reacting Shear Flows**—Prof Ahmed Ghoneim, MIT Dept of Mechanical Engineering, Fluid Dynamics Seminar, 4-5pm, Rm 5-234.

Space Nuclear Power Systems and Applications*—Michael G. Houts, National Co-Chairman, Students for The Exploration and Development of Space (SEDS), Students for the Exploration and Development of Space lecture, 8pm, West Lounge, 2nd fl, Student Center..

Tuesday, October 3

Fatalities from Superfires in Nuclear War**—Prof Theodore A. Postol, MIT Defense and Arms Control Studies Program, Defense and Arms Control Studies Program, 3-5pm Rm E38-620.

Advanced Packaging Trends**—, Walter H. Schroen, Texas Instruments, Inc, VLSI Seminar, 4pm, Rm 34-101. Reception, 3:30pm.

Fluctuations in the Cosmic Microwave Background*—Dr Mark Birkinshaw, Harvard University, Center for Space Research Astrophysics Colloquium, 4:15pm, Rm 37-252, Marlar Lounge. Refreshments, 3:45pm, Rm 37-252.

Investigation of Endwall Vortex Cavitation in a High Reynolds Number Pump**—K. Farrell, Applied Research Laboratory, Pennsylvania University, Gas Turbine Laboratory Seminar, 4:15 pm, Rm 31-161. Refreshments 4:pm.

The Search for Middle East Peace: Prospects and Perspectives*—Ambassador Richard Murphy, Fellow, Council on Foreign Relations, MIT Center for International Studies, Emile Bustani Middle East Seminar, 4:30pm, E51-332.

EEG and Behavior Studies of Sentence Processing**—Dr Michael Tanenhaus, Dept of Psychology, University of Rochester; commentary by Jane Grimshaw, Brandeis University, MIT Center for Cognitive Science, 7:30pm, call x8-5565 for room info, paper available 20B-225.

Wednesday, October 4

Freons and Oxygen in the Eastern Mediterranean*—Dr. Reiner Schlitzer, University of Bremen, Oceanography Sack Lunch Seminar, 4pm, Rm 54-1324.

Thursday, October 5

Feeding Process Simulation for Resin Transfer Molding (RTM) & Structural Reaction Injection Molding (SRIM)**—Hiroshi Aoyagi, Center for Composite Materials, University of Delaware, Laboratory for Manufacturing and Productivity, 2pm, Rm 35-338.

Inflation and Quantum Cosmology**—Dr Andrei Linde, Lebedev Physical Institute (Moscow) and CERN, Dept of Physics Colloquium, 4:15pm, Rm 10-250. Refreshments served, 3:45pm, Rm 26-110.

Molecular Genetics of the Herpes Simplex Virus Latency*— Dr. Priscilla Schaffer, Harvard Medical School/Dana-Farber Cancer Institute, Harvard-MIT Division of Health Sciences and Technology Lecture on Biomedical Research, 4pm, Rm E25-111, Refreshments.

Four Looks at the Future of Geotechnical Engineering**— Donald Goldberg, Chief Executive Officer and Chairman of the Board, Goldberg, Zoino, & Associates, Dept of Civil Engineering, Mathis Lecture Series, 4-5:30pm, Rm 3-270.

Does the United States Need a Merchant Marine?*—Andrew Gibson, Emory S. Land Professor of Mechant Marine Affairs, Naval War College, MIT Shipping Club, 4:15pm, Rm E51-328.

The Culture of Celebrity*—Prof James Naremore, Indiana University; Prof Leo Braudy, University of Southern California, MIT Communications Forum Seminar, 4-6pm, Bartos Theater Rm E15-070.

Friday, October 6

Managing Traffic Congestion in the New York Metropolitan Area**—Matthew Edelman, Manager, Transcom, MIT Center for Transportation Studies Luncheon Seminar Series, 12:45-2pm, Rm 1-236. Optional luncheon 12-12:45pm. \$2-students/\$4-non-students.

Plasma Physics in Neptune*—Prof Ralph McNutt, Dept of Physics, MIT, Plasma Fusion Center Seminar Series, 4pm, Rm. NW17-218.

Late Proterozoic Evolution of the North American Cordillera**—Dr Nick Christie-Blick, Lamont-Doherty Geological Observatory, Dept of Earth, Atmospheric, and Planetary Sciences, CONOCO Lecture Series, 4-5pm, Rm 54-915.

Community Meetings

Back from the Brink: Stories of Family Crisis and Recovery from Drug and Alcohol Use*—Speakers: Eve Sullivan, other parents and teens from local drug and alcohol treatment programs, sponsored by the MIT Child Care Office, 12-1:30pm, Rm 6-233.

Alcoholics Anonymous (AA)**—Meetings every Tues, 12-1pm; Thurs, 12-1pm, Rm E23-364. For info call Sarah, x3-4911.

Al-Anon**—Meetings every Fri, noon-1pm, Health Education

Conference Rm E23-297; every Tues, noon-1pm, Rm 1-246; and every Mon, 12-1pm, Lincoln Lab Bldg 1218, Family Support Ctr. The only requirement for membership is that there be a problem of alcoholism in a relative or friend. Call Sarah, x3-4011

Alcohol Support Group**—Meetings every Wednesday, 7:30-9am, sponsored by MIT Social Work Service. For info call Sarah, x3-4911.

Co-Dependents Anonymous (CoDA)*—Meetings every Thurs, 6:30-8pm, Rm 66-144. Info: Sarah, x3-4911.

Narcotics Anonymous*—Meetings at MIT, every Mon, 1-2pm, Rm E23-364 (MIT Medical Dept). Call 569-0021.

Overeaters Anonymous (OA)*—Meets Thurs, 1-2pm, Rm E23-364. On requirement for membership is the desire to stop eating compulsively. Info: Sarah, x3-4911.

MIT Faculty Club**—Grand reopening later this month watch for details.

Office Workers Issues Group**—Women's Forum informal support staff meetings, Wed, 12:10-1pm, Rm 8-219. Bring your lunch; network or talk about office worker's issues.

MIT Women's Book Discussion Club**—Meets 1st & 3rd Thurs each month, 1-2pm, Rm 10-340. Sept selection, After the Second Set: Conversations with Simone de Beauvoir, by Alice Schwarzer, 1984. Bring lunch. Info: Ellie Bonsaint, x3-5763.

Working Mothers Support Group**—Meets every other Tuesday, 12-1:30pm (drop in any time), Rm 8-219. Next meetings: Oct 3 & 17. An ongoing support group that meets to discuss parenting-related issues in a casual atmosphere. Info: Janette Hyde, x3-4290.

Tai Chi Class**—Women's League/Taoist Tai Chi Society of Massachusetts lessons of ancient meditative exercise which can relieve stress and improve concentration and perception. 10-week class through Nov 7, 5:10pm, Rm 10-340. Wear loose clothing. Info: Nancy Collins, x3-8381, John, x3-4434, or Pam, Women's League office, x3-3656.

Informal Embroidery Group*—MIT Women's League Group meets Oct 4 & 18, Nov 1 & 15, Dec 6, Jan 3 & 17, Feb 7 & 21, March 7 & 21, April 4 & 18, May 2 & 16, June 6, 10:30am-1:30pm, Rm 10-340.

Wives' Group**—All women in MIT community welcome. Afternoon Group meetings 2-4pm, Rm 491 Student Ctr, babysitting in Rm 407 Student Ctr: Sept 27:Traveling in New England-short video & Tunie Hamlen, N.E. Sights (husbands invited).

Health Education

Anti-Cancer, Anit-Heart Attack Diet**—Three sessions beginning Wednesday, Oct. 11, noon-1pm in Rm E23-297. Janet Washington of Brigham and Women's Hospital is the instructor.\$30 fee, Advance registration required. Info/registration, x3-1316.

From Smoker to Non-Smoker**—Medical Dept Smoking Cessation 5-week program meets weekly starting Thur, Oct 12, 12-1:30pm. Leader: Janet Van Ness. Cost: \$30, \$25/MIT Health Plan Members. Info/registration x3—1316.

Noon Hour Birth & Parenting Program**—"Mid-wife with Woman" video tells the story of midwives and shows labor and birth. Barbara Merrifield, nurse-midwife in the Medical Dept will answer audience questions, free, no registration needed, Oct 2, 12-1pm, Rm E23-297. Info: Connie Bean x3-1316.

Nursing Mothers' Support Group**—Pregnant and breastfeeding women at MIT meet to gain confidence and share info and practical tips. First Tues of each month, 10-11am and third Weds of each month, 4-5pm, Rm E23-297. Babies welcome. Info: Connie Bean, x3-1316.

MITAC

MITAC, the MIT Activities Committee offers discount movie tickets for General Cinema (\$3.75) and Showcase (\$3.75). Tickets are good 7 days a week, any performance.

Tickets may be purchased at MITAC Office, Rm 20A-023 (x3-7990), 10am-3pm. Mon through Fri. Tickets are also sold in Lobbies 10 & E18 on Fridays, 12-1:15pm. Lincoln Lab sales are scheduled in Rm A-263 from 1-2pm, Tues-Fri. Check out our table of discounts for dining, musical and cultural events available to you through MITAC.

Fiddler on the Roof, Wed, Oct 4, 7pm, Wang Center. Tradition! Join Topol, as the charismatic and inspiring Tevye, reaffirming life in its most basic - but most profoundly moving - form: "Life is still about tradition, love, family, hope, dignity, marriage, children, and their children." The Tony and Oscar award-winning musical returns to the stage! Tkts are \$26.50/each (reg \$29/each) Rejoice in the spiriti of life!

Hal Holbrook in Mark Twain Tonight. Sat, Oct 14,8pm, Opera House. Tickets \$25/ea (reg \$28); available in the MITAC office.

F.Y.I. I Don't miss the North Shore Music Theatre's production of *My Fair Lady*, Oct 5-28. And, receive \$5 off the box office price (for this or any other Broadway show at the NSMT) with the NSMT's Corporate Discount Card. (It's free) Available in the MITAC office. Call, or stop by, the MITAC office for more details.

F.Y.I. II Exotic Car Expo, Oct 6-8, Bayside Expo Center. Discount coupons available in the MITAC office.

The City Books are Here. Only \$1 ea (reg \$7.50). Discount coupon books, from dining to health clubs to car washes and more. (Coupons valid through Oct 15, 1989.) And, look for the new City Books arriving in mid-Oct (with coupons valid through Feb 1, 1990).

Riverside Park Discount Coupons. Riverside Amuseument Park, Agawam, MA. Admission \$10.95 (reg \$14.95), or \$7.95/child under 48" height (reg \$10.95). Available in MITAC Office, valid through Oct 1.

The Steamship Authority Discount Coupons are Here. Offering reduced fares to Nantucket and Martha's Vineyard. With the discount coupon, round-trip fare to Martha's Vineyard is \$6/ adult (reg \$7.50), \$3/child (reg \$3.80), and round-trip fare to Nantucket is \$13.60/adult (reg \$17) and \$6.80/child (reg \$8.50). Discount coupons valid thru Oct.14, 1989 are available in the MITAC office.

Council for the Arts Museum Passes. On campus, there are 10 passes employees may borrow for free admission to the Museum of Fine Arts. To check on availability, call the MIT Libraries, x3-

5651. At Lincoln Lab, passes are available in the Lincoln Lab Library, Rm A-150.

PLEASE NOTE: Museum of Science tickets no longer available. Due to the recent revamping of the Museum of Science Corporate Discount Ticket Program, the \$1 discount tickets are no longer available.

Important! To avoid disappointment, purchase tickets and make reservations early as we are limited by ticket availability and transportation. All MITAC events and ticket purchases are non-refundable due to the non-profit nature of our organization.

Social Activities

MIT Islamic Society Picnic*—Sat, Sept 30, 12-3pm, all welcome, BBQ Pits between Kresge and Rockwell.

5th Anuual Welcome Party, "Festa Da Chegada"**—MIT Brazilian Student Association, 8pm-12:30am, Student Center Meeting Rm 407. Info: Augusto, x3-7393 or 247-0841.

Rock Against Rape**—Sponsored by the MIT Association for Women Students, Oct 6, 9pm, Lobdell, Student Center. Beer & wine, admission \$3. Info" x5-6402 Dorm.

Japanese Lunch Table**—Every Tues, 1pm, Walker Rm 220. Bring bag lunch and speak Japanese with native speakers. All levels welcome.

Movies

For the latest Lecture Series Committee movie and lecture information, call the LSC Movieline, x8-8881.

Ugetsu*—MIT Japan Program/MIT Japanese Language Program movie, Fri, Sept 29, 7:30pm, Rm 10-250. Donation: \$2.

Birds of Prey*—A social-cultural film from the Philipines, sponsored by the MIT Filipino Students Association, 7pm, Kresge Auditorium. \$1.50/MIT students; \$4/others; \$2/children under 12.

Music

For recorded information on upcoming concerts and lectures call the MIT Music and Theater Arts Concert Line, x3-9800. Updated weekly.

Thursday Noon Chapel Series*—Sept 28: The Barbecue Brass outdoor concert of "pops-"type music, 12:05pm, Kresge Oval. Rain location: MIT Chapel. Oct 5: No Dogs Allowed: Stephen Umans, clarinet; Thomas Stephenson, bassoon; Ray S. Jackendoff, clarinet. Francois Devienne's Trio; Peter Schiclele's Diversions; Francois Poulenc's Sonata; Swan Hennessy's Trio. 12:05pm, MIT Chapel. Voices Recital*—Patricia Griffin, mezzo-soprano with pianist Sheila Waxman, Fri, Sept 29, 12:05pm, Killian Hall. Faure, Schumann, and Barber.

Jazz Masterclass*—Masterclass by jazz pianist Michel Camilo. Oct 6, 12:05pm, Killian Hall.

Jazz Concert*— Michel Camilo, jazz pianist. (Trio), Oct 6, 8pm, Kresge Auditorium.

Theater

MIT Dramashop Auditions**—Fall '89 Major Production, Sept 20, times TBA, Kresge Little Theatre. Call x3-2877 for script availability and audition times.

Dance

MIT Folk Dance Club*—weekly dancing-Sun, Beginning International Dancing, 7:30pm, Student Ctr Sala de Puerto Rico; Tues, Advanced Balkan and Western European Dancing, 8pm, Student Ctr Rm 490; Wed, Israeli Dancing, 7pm, Lobby 13 (subject to change). Beginner's Night Review—Wed, Sept 20, Lobby 13. Info: x3-3655.

MIT Ballroom Dance Club Workshops*—Sun, Oct 1: Quickstep 1, 1-2pm, \$.50/member, \$.75/nonmember; Rumba 2, 2-2:30pm, \$.75/member, \$1/nonmember; Waltz 4, 4:30-5:30pm, \$3/member, \$4/nonmember. Morse Hall, Walker Memorial, no partner necessary. Info: x8-6554.

Rhythmic Gymnastics Classes for Women**—MIT Women's League classes, Thurs, 12-1pm, Rm 10-340. Info: Helena, 596-2396 eves.

Yoga*—Ongoing classes in traditional Hatha and Iyengar style. Beginners: Mon, 5:10pm, Rm 10-340; Intermediate/Advanced: Mon, 6:30pm, Rm 10-340. For information call Ei Turchinetz, 862-2613.

MIT Student Dance Performance Workshop*—needs creative, enthusiastic people to dance in workshop performances Dec 1&2. No exp needed, all levels, men encouraged. Choreographers are Valerie Anderson and Lodi McCellan, members of Beth Soll & Co, MIT's resident professional modern dance company. 1st meeting. 201. Info: x3-5623/2877.

MIT Dance Workshop Classes*—An activity of the Theatre Arts program taught by members of the Beth Soll & Co, MIT's resident dance company. Begining Modern Technique, M,W, 3:30-5pm, T-Club Lounge, Dupont Ctr; Intermediate Modern Technique, Tu,Th, 5:30-7pm, Walker-201; Discussion, Tu 4-5pm, Walker-201; Composition/Improvisation, Th 11-12:30, Walker-201; Technique/Repertory/Improvisaton, Th 11-12:30, Walker-201. Info: x3-2877.

Exhibits

LIST VISUAL ARTS CTR

Trouble in Paradise: Approximately 15 New England artists will address topical political and social issues which face the U.S. Painting, sculpture, photography, architecture, and environmental installations by local artists working in a variety of styles. Remo Campopiano: In Residence. Creating a roomsize installation, including among other elements, a coffee-table landscape inhabited by a colony of live ants. Through Nov 19. Still Performance: Rimma and Valery Gerlovin. Collaborative photographs by Soviet emigre artists which mix language and portraiture in the creation of poetic and paradoxical visual formlulas to explore philosophical questions. Catalogue available. Through Oct 8. Hours: Weekdays, 12-6pm, Weekends, 1-5pm. Closed holidays.

Hurricane's fury has upper bound

(continued from page 1)

higher," he says.

'But again this is an upper bound. We cannot say anything about the average intensity of hurricanes, nor can we say anything at all about their frequencysomething I cannot emphasize enough. The factors that determine the frequency of hurricanes are very, very different."

The statistics of hurricane frequency are too poor to draw any firm conclusions, he says. "There is little doubt that New England and the east coast in general have experienced a hurricane 'drought' in the last 15 years. There were many hurricanes in the '50s and early '60s and then very few, and this probably reflects random variability.

Hurricane tracking is aided considerably by satellite monitoring, but the present generation of weather satellites are "next to useless" for hurricane forecasting. "If you want to make a good quantitative forecast, you need to have good quantitative initial conditions, which means the three dimensional distributions of wind, temperature, and water vapor content in the atmosphere,'

With very good initial conditions, it should be possible to predict hurricanes a week to ten days in advance, he suggests. Presently, there is no way to do even this.

"One peculiarity of hurricanes, which is responsible for the fact that they're relatively rare, is that they are examples of finite amplitude instability—a fancy way of saying that hurricanes never form spontaneously. There is almost always a huge reservoir of potential energy for hurricanes,

fore the force that the wind exerts would be yet hurricanes are relatively rare. That about 50 percent more. The wind speed means you give the atmosphere a little push itself would be more like 20 to 25 percent and nothing happens—a substantial perturbation of the right geometric form is

> "To get a hurricane, you quite literally have to have a kicker-a trigger of some kind, which in practice is some storm whose mechanism is dynamically independent from the hurricane."

"A hurricane in the mature stage is actually a very beautiful Carnot heat engine," says Dr. Emanuel. "It takes latent heat from the ocean at high temperature. At very low temperature—say minus 80°C in the very high atmosphere, the excess heat is radiated off as electromagnetic radiation into space. Something has to get this engine started and that is what interests me. I'm working on why it is true in the first place that small perturbations don't amplify.

Once we answer this intellectually challenging question, we can begin to find out how to forecast hurricanes.'

Professor Emanuel mentioned another idea about hurricanes that he is considering, his belief that hurricanes rarely reach their upper limit because they have the ability to churn up cold water from deeper in the ocean—a phenomenon that has actually been observed. For example, Gilbert cooled off a large swath of water in the Gulf of Mexico by about 5°C.

This self-limiting mechanism might be particularly effective, he says, if the surface warm water layer isn't deep and if the hurricane is big and slow moving. He claims to have seen some evidence for this in the behavior of Hugo and other hurricanes that he has studied.

Here & There

There was a time, admits Carley Sherry, an administrative assistant in the Department of Linguistics and Philosophy, when she wondered why she continued to live in Cambridge and work in Building 20.

For one thing, she found the barrackslike surroundings of Building 20 something of a downer. And then a few months ago someone stole her daughter's bicycle from their house on Maple Avenue in Cambridge. But that wasn't all. Her daughter Heather, 12, a student at the Longfellow School, arranged on her own for the purchase of a new \$360 mountain-style bike by paying for it over time with money earned from babysitting. Then came the crusher. Two weeks ago, someone broke into the house and took several items, including the bike. The police told Carley the thieves most likely had seen the new bike and went

"So why do I stay in Cambridge and work in Building 20?" Carley asks.

The following note her daughter received explains it all, she said:

"Dear Heather, Some linguists and philosophers and friends from MIT heard about the theft of your bike. It made us sad and angry. So we decided to do something about it by muttering a bunch of words that only linguists and philosophers and friends understand. It worked! Here is a check so you can replace your bike! It comes with tons of good wishes and three important pieces of advice: 1. Have your chain oiled; 2. Make sure your tires have the right pressure; and 3. Enjoy!"

Carley's reaction: "You know, I'm honored to work in Building 20."

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Retired mathematics professor Dirk Jan Struik has received a major new honor—the first Kenneth Ownsworth May Prize for History of Mathematics-in time for his 95th birthday this Saturday, Sep-

Dr. Struik, who lives in Belmont and says he "never felt better," traveled to Hamburg, Germany, in August to receive the prestigious prize at the 18th International Conference on the History of Science.

It was presented to Dr. Struik by The International Commission on the History of Mathematics and the International Union of the History and Philosophy of Science "in recognition of an outstanding career devoted to scholarship and the international appreciation of the history of mathemat-

ics." He shared it with Professor A.P. Juschkewitch of Moscow.

Dr. Struik came to MIT as a lecturer in 1926, became an assistant professor two years later, advanced through the faculty ranks to full professor and became emeritus in 1960. He is the author of several books in the fields of mathematics and the history of

CLIPS AND QUOTES:

-Meteorology professor Kerry A. Emanuel told The Boston Globe there are still shortcomings in the tools and methods used for tracking hurricanes, such as Hugo, whose higher clouds can be as much as twothirds of a storm: "We just don't get a good measurement of the upper part of the storm."

—A letter writer took Boston Woman magazine to task for not including a section for women in science among an "Interesting Women" feature. She nominated three from MIT: Professors Sheila Widnall (aeronautics and astronautics), Vera Kistiakowski (physics) and Susan Carey (brain and cognitive sciences).

-Charlie Ball

Sloan Foundation president to speak

Ralph E. Gomory, president of the Alfred P. Sloan Foundation, will speak on "Models of the Product Development Process" Thursday, Sept. 28, at 4pm in Bowen Hall (E51-

Dr. Gomery was senior vice president for science and technology at IBM until last June. A graduate of Williams College, Dr. Gomory studied at Cambridge University and received the PhD degree from Princeton University. He chairs the advisory committee to the President on High Temperature Superconductivity and has been a member of the boards of several academic institutions and national scientific socie-

The lecture is part of the series on Critical Issues in Science and Technology Policy sponsored jointly by the Program in Science, Technology and Society and the Center for Technology, Policy and Industrial Development.

THE MIT MUSEUM

MIT Museum Bldg (N52)-Lahore: The City Within. The cultural, artistic, and architectural center of Pakistan explored through historical and modern photographs, maps, textiles, and paintings, with performances, films and lectures, Through Dec 17. Image and Imagination: 150 Years of Photography. An exploration of photography's technological evolvement. Includes artifacts, hands-on equipment, and photographs. Cosponsored by the Polaroid Corporate Archives. Sept 24 through Dec 31. Math in 3D: Geometric Sculptures by Morton C. Bradley, Jr. Revolving sculptures based on mathematical formulae. Form and color relations lend these works a unique visual appeal, ongoing. Holography: Types and Applications. Changing exhibit demonstrating the uses of this three-dimensional imaging medium. Works include scientific, medical, technical, and artistic imaging drawn from the work of the Spatial Imaging Group at MIT's Media Laboratory, ongoing. Light Sculptures by Bill Parker, MIT '74. Changeable, touchable plasma sculptures by the artist who developed this medium, ongoing. Hours: Tues-Fri 9am-5pm. MIT Museum closed to the public on Mondays; Open 12-4pm Sat-Sun.

HART NAUTICAL GALLERY

Ongoing exhibits: George Owen '94: Yacht Designer-Line drawings and half-models designed by one of the early professors of naval architecture at MIT. Half Models in Naval Architecture and Ship Building-Half-models, ship drawings and photographs illustrate how the half model has aided ship and yacht designers and builders.

Edgerton's Strobe Alley-Exhibits of high speed photography. Main corridor, 4th floor

CORRIDOR EXHIBITS

Corridor Exhibits: Building 1 & 5, 2nd floor: John Ripley Freeman Lobby, Building 4: Norbert Wiener, Karl Taylor Compton. Community Service Fund, Ellen Swallow Richards. Women at MIT. An overview of the admission of women at MIT. Five photographic panels with text documenting the circumstances that increased the number of women in the oom since Ellen Swallow Richards, Building 6: Labor tory for Physical Chemistry

WIESNER STUDENT ART GALLERY

A selection of works from the Student Art Association on view until Sept 30, Student Center 2nd fl. The Association offers classes in painting, drawing, photography & pottery. Info x3-7019.

OTHER EXHIBITS

Institute Archives and Special Collections-1887: The Founding of the Lawrence Experiment Station. Second in a series of three exhibits in commemoration of the Lawrence Experiment Station's 100th anniversary. Jerome C. Hunsaker, Father of Aeronautics at MIT. Chronicles his founding of aeronautics at the Institute; his design and construction of Navy airships and NC-4, the first airplane to cross the Atlantic, and his role in leading the Dept of Aeronautical Engineering from 1939-51. Happy 50th, Class of '39. Hall exhibit cases in 14N, 1st

Sports

HOME EVENTS: Sept 28: W's Soccer vs Simmons College, 3:30pm; Field Hockey vs Wellesley College, 4pm. Sept 30: W's Tennis vs Mt. Holyoke, Ilam; Baseball vs UMass-Boston, 12noon; Field Hockey vs Clark University, 1pm; Football vs Western New England College, 1pm. Oct 1: Varsity Golf vs Tufts University, 1:15pm.Oct 3: Fall Baseball vs Brandeis University, 3pm; M's V Tennis vs Babson College, 3:30pm Field Hockey vs Simmons College, 4:30pm; W's V Volleyball vs Brandeis University, 7pm. Oct 4: Baseball vs Boston College, 3pm; M's V Tennis vs Harvard University, 3:30pm. Oct 5: W's Soccer vs Curry College, 3:30pm; Field Hockey vs Pine Manor College, 4pm. Oct 6: Baseball vs Merrimack College, 4pm. Oct 7: M's V Sailing Smith Trophy, 9:30am; Football vs UMass-Boston, 1pm; Water Polo MIT Invitational Oct 8: Varsity Golf vs University of Vermont, 1pm.

Wellesley Events

Jewett Arts Center*-Style and Science: Examining a Polykleitan Statue. A technical and stylistic analysis of the most important work of classical sculpture in the Wellesley College Museum collection. Through Oct 22. Giorgio Vasari's Holy Family: Master and Pupil in a Renaissance Workshop. Examination of a Renaissance masterlpiece reveals clues to the structure of the Renaissance workshop. Through Oct 22. 150 Years of Photography, Part I: Invention. Exhibition of daguerreotypes, cyanotypes and cartes-de-viste from the permanent collection. Through Oct 22.

Jewett Arts Ctr Gallery*-150 Years of Photography, Part I: Invention. Daguerreogypes, cynotypes and cartes-de-visite by pioneering photographers. Through Oct 22.

The Wellesley Polykleitan Statue: Reading an Ancient Sculpture*—Gregory Leftwich, asst prof of Greek Art, Boston Univeristy, Wellesley College Museum Gallery Talk, Sept 27, 12:30pm, Jewett Main Gallery,

How White Privilege Commonly Frames US Academic Writing: Examples to Consider from 5 Disciplines*—Peggy McIntosh, associate director, Ctr for Research on Women, Luncheon Seminar, Thurs, Sept 28, 12:30-1:30pm, Cheever House, Info: 235-0320 x2500

Giorgio Vasari's Holy Family*-Jean Cadogan, guest curator, Wellesley College Museum Gallery Talk, Oct 3, 4:30pm, Jewett Main Gallery,

The Nomura Kyogen Players*-Featuring one of Japan's most renowned actors, Mansaku Nomura, will perform two kyogen comedies, "Tied to a Stick," and "Snail." Oct 5, 8pm, Wellesley College, Alumni Hall. Reception with actors to

Florentine Mannered Ladies*—Lilian Armstrong, Mildred Kemper Prof of Art, Wellesley College, Wellesley College Museum Gallery Talk, Oct 8, 12:30pm, Jewett Main Gallery.

MIT Cable Listings-Submit announcement in writing to Rm 9-050. We prefer a day's warning, but faster action may be possible. Useful also for correcting errors, notifying about cancellations, and dealing with emergencies. If you have met the Tech Talk deadline, your announcement is automatically put on cable (except for exhibits and some multi-meetings programs). We are now accepting requests via e-mail. Announcements are shown on MIT Cable channel 12, which is displayed on the receivers in Lobbies 7 and 10. Announcements should be of interest to the general MIT community. Classified ad type messages will not be accepted. Messages should include: date. title of event, speaker or sponsor, time and location. MIT Cable reserves the right to edit your message to fit the screen. Include your MIT phone number. E-mail your announcements to: tvmessages@telecom.mit.edu. Messages will usually be posted within 24 hours of their receipt.

Send notices for Wednesday, October 4 through Sunday, October 22 to Calendar Editor Rm 5-111, before 12noon Friday, September 29.

This Week in sports

The MIT football team scored its second highest single game point total in Saturday's 45-13 trouncing of Stonehill College. Senior quarterback Tim Day of Oklahoma City led the Beavers with a 241-yard, three-touchdown passing afternoon. Day tied his own school single-game record with the three touchdown passes, and became the career leader in TD tosses with 14.

Wide receiver Tony Lapes, a senior from Cohutta, Ga., had his second best day as a collegian, pulling in 7 balls for 172 yards. Lapes hauled in two of Day's scoring strikes, while running back Shane LaHousse grabbed the third. Day, LaHousse and junior fullback Garret Moose all scored on the ground. Day was named to the ECAC Division III New England Weekly Honor Roll for his play, and was named the first Offensive Player of the Week in the new Eastern Collegiate Football Conference. Lapes was ranked in the top ten receivers in the country for his efforts against Stonehill.

Sophomore Mike Piepergerdes from Kansas City, Mo., finished 10th in last Saturday's Southeastern Massachusetts Invitational Meet.

The Engineers finished fifth in the 17 team field.

Despite heavy winds and muddy conditions, the women's Cross Country team fared well at the Southeastern Massachusetts Cross Country Invitational this past weekend. The overall team performance was strong for this point in the season. Tufts swept the meet with ninety points, while MIT finished ninth out of seventeen

teams, with 221 points. "Performances were outstanding for such a short training period. Improvements, even from last week's meet, were significant," said team member Sharlene Day '91.

Captain Theresa Fuentes '91 led the team, finishing 11th in collegiate scoring, 14th overall, out of a field of 120 runners. She was followed by Chris Goh '92 in 24th place and Amy Rovelstad '92 in 59th place. The varsity was rounded out by Kristen Nummerdor '93 in 62nd, Gabrielle Rocap '92 in 67th and Stacy Holander '92 in 87th. The team was missing its seventh runner, Sharlene Day '91, due to a back injury.

The junior varsity team showed signs of strong improvement and development. "There are many new faces on the team this year. The JV performance ensured a strong and lasting future for the women's cross country team. We are looking forward to a promising season," were Captain Theresa Fuentes's sentiments. Junior varsity runners included Theresa Derderian '92, Jean Condon '92, Nora Nerses '91, Darlene Ford '93, Sharlene Afshani '93, Jen Hill '92 and Cindy Evanko '92. The women will be competing at the Connecticut College invitational this coming weekend.

The MIT men's basketball team will compete in the Eastern Invitational Basketball Tournament at Catholic University in February. MIT will join the host school, Mary Washington College, Babson College, Colby College, Emory University, Nazareth (NY) College and Vassar College in the tournament.

CLASSIFIED

Tech Talk ads are intended for personal and private transactions between members of the MIT community and are not available for commercial use. The Tech Talk staff reserves the right to edit ads and to reject those it deems inappropriate.

INSTRUCTIONS: Ads are limited to one (of approximately 30 words) per issue and may not be repeated in successive issues. All must be accompanied by full name and extension. Persons who have no extensions or who wish to list only their home home telephones, must come in person to Rm 5-111 to present Institute identification. Ads using extensions may be sent via Institute mail. Ads are not accepted over the telephone.

MIT-owned equipment may be disposed of through the Property Office.

Deadline is noon Friday before publication.

For Sale

Queen sz bx spring, 3yrs old, \$100; Dynaco SCA80Q amp & FM3 tube tnr, \$175; Goodyear C78-14 snw tires, \$25/pr. Don

2 tix, Boston Symphony open rhrsls, 10/25, St Clair, Tchaikowsky 5th. Marvin x8-1424 Draper

Sunrf wind deflector for '83-'87 Honda Prelude, exc cond, easy to install, \$40 or bst. Jon Barron x2272 or x7186 Linc

2 accordians, Magrarate Scholar b&w keys, Victoria Castelfidardo Armonia red &wh; 2 snw trs 13"; 15-spd bike. Call 395-

Rabbit fur jckt, sz 7/8, v gd cond, grey, \$75 or bst. Cheryl x3-2848. MWF.

Sony 8mm camcorder w/8.1 zoom, autofocus, never usd, manuals & warr, \$900 or bst. Claude x3-4608.

Sears a/c, 11,000 BYU, recently svcd, not pretty but runs gd, \$50. Pam x5-7590 dorm.

Usd snw and reg tires, v gd cond, asking \$10 ea reg, \$25 snw (P185/R14, P175/R14). Miguel x3-5958 or 494-1182.

Man's brown 3/4 length leather coat, sz 46 reg, gd cond, under \$100. Maria Muollo x3-2101.

Twn mattress, bxsprng, metal frame, gd cond, \$25. Constance

Leading Edge Model D computer, 20MB HD, 1 FD, 640K,

mouse, Intel copressr, lots of sftwr, exc cond, \$850 or bst. Lars 666-3422 mssg

Steinway grand piano, 5'10", well cared for, appraised \$9K, will accept best offer. Call x3-2502 or 924-4646.

M's Raleigh 10-spd w/light, \$35; weight bench w/acc, \$40; wooden LR set, \$125; captain's chair, \$12. Maya 354-7506

Brown-striped, cushy, sink-down sofa, v comf, \$75. Maryann x8-4001 Draper days, 944-4242 eves.

Kenmore hvy duty almond gas dryer, lrg capacity, all features, exc cond, \$175. Paula x3-1777

Fuji 10-spd bike, 18" frame, lt blue, v gd cond, \$100; Advent mod 400 FM radio, white, mono, \$95. Call 547-5357 mssg.

Tuxedo, nw, orig \$400, sell for \$250. Call 523-7519

SEGA video sys, barely usd, w/3-D glasses & 6 games (grt xmas present!), all for \$150. Call 891-3842 aftr 7pm or x3-3279 mssg.

1M's, 1F's 10-spd bike, 1 exercycle, 1 rowing machine, \$20 ea. Louis x3-0815 or 254-5068.

Mac II, 70meg Jasmine HD under warr, hi-res color mntr. Datadesk ext kybrd, sftwr, Laserwriter IINT, barely usd, \$6700 or bst. Lorraine 492-3167 aftr 7pm.

Tenor sax, Conn 10M w/gig bag, \$400. Forrest x3-6647 or 782-

iano, exc cond. \$1000; sectional sofa, \$250; mcrwy oven, \$50; Yamaha cass dck, \$40; M's 3-spd bike, \$25; file cab. \$20; ans machines, \$60 ea; ironing bd, \$12. Call 484-3393.

20 megabyte Rodime extrnl HD for Mac, nw, still in sealed bx w/1yr warr, \$450 or bst; Microsoft Word 4.0 for Mac in sealed bx. \$75 or bst. Bruce x3-8636.

Minolta Freedom 100 camera, autofocus, built-in flash, usd only once, perf cond, retail \$116, sell for \$60 firm. Boon x3-5353 or

Sofa, \$55; lrg desk, \$85; ktchn table w/leaf, \$55; a/c 7500 BTU, \$100; 2 lrg speakers, \$65; 2 sm speakers, \$25; 2 oak corner tables, \$45 ea. Call x3-3175 or 332-8251.

Cntry ktchn table, nwly refnshd, maple 32"x60", \$150; Precor 615e rowing mach, \$15; NBA Huffy bsktbll hoop w/bckbd, never usd, \$75; wallpapering table, \$35, 86-88 Corvette bra, never usd, \$45. Eve 277-3716.

Compaq Desk Pro/286, 20meg, nw, never usd, cmptr w/NEC, multi/sync II color mntr, \$2500 firm. J. May x8-2843 Draper or 661-9779.

MacIntosh Plus cmptr 1meg, 1 disk drv, Applewriter II, all cables, kybrd, like nw, Microsoft Word & Microsoft Excel, \$1700 or bst. Jan Blair, x8-2843 Draper or 492-4759.

Refrigerator, 12 c.f. Kenmore frost-free, nw cond, \$100; dresser, 9-dr, 5'6" wide, \$25; moving, mst sell. Lynn 646-4137.

Matching solid & rocking easy chrs, wood frame, exc cushions, \$35 ea; side table, \$10; misc hsehld items. Michael x3707 Linc or 617-969-7476.

HP DeskJest Plus, never usd w/manuals & extra font cartridge, \$700. Mary-Lynne x3-2826.

Free, Motorola table-model TVs: 19" color & 21" b&w, nd modest repair, mst pick up. Bob x3-3357.

IBM-AT cmptbl, Leading Edge D2, 80286 @ 6/10 MHZ, 640K RAM, expndbl, 30MB HD, 1.2MB FD, EGA, amber mntr, p/s ports, exp slots, DOS 3.2 GWBASIC, exc cond, \$1250 or bst. Waiming x3-0991 or 661-2565.

Vehicles

1976 VW Dasher SW, 76K, one ownr, almst nw trs, batt, brks, runs well. David x3-5121 or 729-2203 eves

1978 Chevy Malibu, 82K, auto, a/c, gd cond. Call x3-3416 or 621-0494 mssg.

1979 Honda motorcycle, CB750-K (special ed), 26K, Kerker racing pipe, quad-carb sys (tuned), perf cond, chrome, leather, etc., \$1000. Pete x5-7550.

1979 Honda Accord htchbck, std, 98K, nw trs/mfflr/batt, runs grt, some rust, \$750 or bst. Call 868-4308 or x3-5934.

1980 Subaru sta wgn, 5-spd, \$600. Call x3-3708 or 864-4565.

1980 VW Rabbit, 34K, nw exhst sys, wheel bearings, stckr, maintenance records, nds brake work, \$600. Call 862-2271.

1980 Honda sta wgn, exc cond, reliable, one ownr. Julie 508-653-6667, 5-8pm

1981 Toyota Corolla, 96K, grt mech cond, v dependable, body dents & dings, \$900. Bill 577-1759 days.

1981 Mercury Lynx, htchbck, 81K, std, gd cond, \$900. John

1981 4WD GL Subaru sta wgn, 75K, for parts, runs well, nds exh sys work, grt winter car, mving mst sell, \$600 or bst. Jennifer x5-

1982 Toyota Starlet, red, body gd cond, runs well, AM/FM, nw frnt trs. nds nw mfflr. \$450. Howard x3-8385.

1982 Buick Skylark, exc cond, a/c, 53K, AM/FM, askg \$2400.

1983 Ford Escort, 2-dr, 4-spd, 82K, nw mfflr & exh pipes, recent tune-up, \$1400. Call 577-8822.

1984 Chevy Chevette, bright red, black int, 90K, rstprfd, lovingly maintained, pfct city car, \$1400 or bst. Peter x3-2206

1984 Nissan Stanza, 4-dr sdn 5-spd, a/c, \$3250 or bst. Call x3-

1985 Caprice Wagon, V8, 8-pass, AM/FM/cass, auto, ps, pb, chap lock, 57K, \$6400. Marie x3-1777.

1986 Olds Cutlass Sierra, mint cond, 4-dr, auto, ps, pb, a/c, rear dfstr, pwr lcks & wndws, AM/FM/cass stereo, book \$6800, sell for \$6200 or bst. Dave x5-8245 dorm.

1986 Honda Rebel cycle, 250cc, under 2K, exc cond, \$600. John x7345 Linc, 861-7971 eves.

1986 Ford Taurus wgn, 45K, gd cond, loaded w/options, \$6900. Call 661-4659.

Housing

Belmont, room to rent to F non-smkr, \$400/mo. Mary Ellen x3-

Sunny, lux 1BR apt in mod bldg nr Boylston & Mass Ave, 24 hr sec, pool, jacuzzi, prkng, avail 10/16, free rent till 11/1, \$770.

Foliage in Waterville area, 2B, 2b, slps 6, spectacular views, ennis, \$175/wknd. Sandy x3-2783 or Debbi 944-5005 eves

I.A.P. sublet offered, 12/15 - 2/1, on campus (Westgate), fab vw of Boston skyln, furn, prkng, pay my subsdzd rent, utils inc. Rob x3-2690 or 621-2952.

Somerville, on dir bus line to MIT, quality 3BR apt, den, deck, nw ktchn, fridge, D/W, tile bath, hdwd flrs, pref 2 people, \$950. Call x3-7361 or 942-2626.

Condo for sale or rent (immediate) thru May, 1BR & study, quiet str, nw rnvtn, off-str prkng. Kathy 497-5525.

Dedham, nr ctr, charming 3BR colonial, exc cond, \$159,900. Call x4516 Linc or 461-0829.

Smokehouse Bay Club, Marco Island, FL, bayside wtr view, brand nw condo, 2BR, 2b, screened lanai, W/D, furn, \$2200/mo, \$850/wk, 2-4 ppl only, no pets. Call x3-4251 or 646-1876.

Camb, 2BR apt, sunny 3rd flr of 3-family, 2 prchs, nw bathroom, nr Alewife T, \$850 + util. Call 354-0691.

Wanted

Will trade Windsor Lot prkng stckr for E. Garage or Main Lot stckr. Dave x3-2806

2 tix to Boston Symphony, Sat eve 10/14. Lisa x3-6040.

Teacher's Aide, Tech Children's Ctr, asst Day Care Teacher in clssrm M-F, 2-5pm, mst have high school diploma & intrst in children. TCC, 60 Wadsworth St, Camb, 02142, x3-5907.

Family of 4 nds temp housing for month of Nov at least. Prefer hse-sttng arrangement. Elizabeth x3-6773 bef 3pm, 244-0303

Albany or East prkng space to swap for West prkng space. Jane

Looking for free or very inexpnsv hsing for German volntr, M, 25, poss exch for lt hshld duties/occ babysttg. Barbara x3-5259.

Roommates

Dorchester, F non-smkr to shr 2BR apt, Adams Village, safe, quiet, nr Rt 93, 5 min wlk to Red Ln, \$300/mo +. Maria x3-5641.

Central Sq., M grad stdnt looking for rmmtes for 3BR apt w/lrg ktchn, LR, 1 blk to T, \$425/\$450 +util. Eric x3-1420 or 868-1932 mssg.

EAPS' Lindzen is critical of global warming prediction

(continued from page 1)

that says that maybe it occurs, but it's within the noise."

Problems with models

Climate inherently has a natural variability that is often attributed to possible variations in solar output, volcanic dust, etc. However, Professor Lindzen highlighted a more fundamental source of natural variability. "The point we have to keep in mind is that without any of this at all our climate would wander-at least within limits. The reason is that we don't have a closed sys-

"Even if the Sun's output were fixed, even if the radiative input were absolutely constant, even if there were no change in the absorbing gases, the ocean itself can take up and store heat and release it. It has a stable layer that normally does not communicate with lower levels, but every so often there is upwelling that suddenly presents the atmosphere and the surface world with an erratic energy source." The ocean is extremely complex and not well handled in computer models of climate change, Dr. Lindzen argued.

He said that the models showing that warming will occur with increasing CO. predict after-the-fact (post-predict) that since the 19th century we should have seen between about one and two degrees of warming. "Clearly by any standards this is only marginally compatible with the temperature record." The models overpredict warming from 1880 to present and greatly overpredict the estimated warming from earlier, he claimed.

"I would say, and I don't think I'm going out on a very big limb, that the data as we have it does not support a warming. Whether it contradicts it is a matter of taste.

"It is interesting that before this last appearance of 'greenhouse warming' (1970 to present), there were actually quite a lot of books on the coming ice age. Now a new set of books on the coming warming are hitting the stands."

Professor Lindzen said that in 1983 a panel of the National Academy of Sciences recommended a technique to validate climate models known as "fingerprinting"efforts to find at least regional effects in modeling that are correct. "This has turned out to be a disaster in methodology, because all the models differ even in their signs [directions] of predicted change, and they don't even agree on these features for the present climate."

"The only thing they agree on is the occurrence of enhanced warming at high latitudes. This has been a period of almost steady cooling in those latitudes-exactly the opposite to what one would have expected from climate theory."

Complexity of the problem

Getting most attention as the source of warming is the emission of infrared radiation by the atmosphere's trace but growing amount of carbon dioxide that is heated by sunlight. However, Professor Lindzen pointed out that "in the upper atmosphere around 50 kilometers, this is the dominant

Waltham, non-smkng rmmte for lrg twnhs, prkng, \$460 inc utils. Call 508-875-9193.

Camb., Porter Sq., 2F sk mature, non-smkng rmmte to shr huge 9rm apt, \$425/mo + util. Barbara L. x3-4373

Medway, non-smkng hsemte(s) sought to shr rural 4BR w/2F, 30s, \$333+ or \$250+, Call 508-533-8168 eves.

Winchester, prof M looking for prof or grad stdnt to shr hse, quiet nbrhd, 2-car garage, 6 rms, 1 1/2 baths, \$600 inc utils. Tom Bechard 729-6355

Carpool

Want-to make xtra money? Willing to pay for ride from Westboro Hosp, to Camb, every other Sat. Barbara 868-5341,

Drivers to shr carpool from Shoppers World Frmghm to Draper Lab, Iv 7:20am, depart 5pm from Camb. Arthur x8-1582 Draper.

Lost and Found

Found in Albany garage, 1 set of keys. Rich x3-8276.

Miscellaneous

RKO #214, pls call Frank x3-5890.

mode of cooling, so an increase in CO. undoubtedly means that the upper atmosphere will cool more."

He said, "That has implications for ozone, because the colder that part of the atmosphere, the less destruction of ozone. Several people have already commented that these may be compensating problems."

He characterized water as a much more

important source of potential warming. Water is terrifically absorptive. We see the bumps [in the absorption spectrum] from CO2 and ozone and methane only because they occur in a window of the water vapor absorption spectrum. Water vapor is far and away the most important greenhouse gas, except for one form which isn't a greenhouse gas: clouds.

"Clouds themselves as liquid water are as important to the infrared budget as water vapor. Both swamp by orders of magnitude all the others. With CO2 one is talking about three watts per square meter at most, compared to a hundred or more watts per square meter for water."

Thermal radiation alone does not explain the temperature of the atmosphere. Professor Lindzen emphasized that the atmosphere must convect-vertically circulate-to bring about its present temperature. Radiative cooling by itself would mean an atmosphere that would already be some 20 degrees hotter today.

"Upper level humidity-especially above five kilometers—is rather important and the models are lousy at handling this. In the models, most warming comes from the increase in water that accompanies the warming. Whether such an increase in water vapor above five kilometers actually accompanies warming is doubtful.

"We don't know how to calculate cloudiness," Professor Lindzen said. Some studies have found that the dominant radiative effect of clouds is cooling. Only a few percent change in cloud cover will more than swamp the estimated CO, effect, he suggested. "In the current models, for reasons that puzzle almost everyone, the cloud feedbacks are positive rather than negative." That is, they increase the temperature.

"There are other tricky things that no one has explored," he said. One example: the feedback through albedo-the reflectivity of the Earth such as can be affected by snow cover. In the models this feedback is positive, but it could as well be negative in certain ranges of temperature, he said.

"On the planet the most wonderful constituent is water with its remarkable thermodynamic properties. It's the obvious candidate for the thermostat of our system, and yet in most of these models, all waterrelated feedbacks are positive. I don't think we would have existed if that were true.

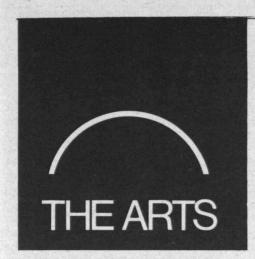
"All of you know that the greenhouse warming has become a 'happening'-some would say a circus. It has engaged us in a realm of argument that is in some ways foreign to us." He criticized editorials that simultaneously state that we don't know whether warming will occur, but that we should nonetheless undertake "virtuous things"-altered energy policy, forestation, etc. To call for action, he said, "has become a litmus test of morality."

Comparing the greenhouse warming debate to an earlier controversy, he found fault with a statement by Princeton physicist Freeman Dyson that "nuclear winter" was "bad science but good politics.

"It seems to me," said Professor Lindzen, "that if science doesn't have integrity, it isn't of much use to people."

Frank Press: A Contrary View

As Tech Talk went to press this week, Dr. Frank Press, now president of the National Academy of Sciences and a former professor at MIT, addessed the scientific and policy aspects of global warming at a Technology and Culture Seminar event held on Monday. Though he acknowledged the possibility of inaccurate projections by global climate models, he accepted in general their range of forecasts and seemed eager to begin implementing policies that assume significant warming will occur in the next century. Tech Talk will publish a more comprehensive account of his assessment and recommendations next week.



The MIT Office of the Arts today presents the first Arts Month-at-a- Glance for the 1989-90 year. Please save these pages for reference during the month.

Last of September

Two noon concerts: The Barbecue Brass Quintet plays rags, jazz and pop tunes from the roaring 20's to La Bamba in a special outside Thursday noon Chapel Series tomorrow, Sept. 28, 12:05pm on the Kresge Oval. Next day, mezzosoprano Patricia Griffin (below) sings, with pianist Sheila Waxman, in the Voices at Noon series in Killian Hall Friday, Sept. 28, at 12:05pm. 253-2906



October at MIT

4 Wed

Urdu Music, Dance and Poetry MIT Museum Lecture: "The Magic of Classical Music, Dance, and Urdu Poetry"-Performance/Demonstration by Dr. Brian Silver, chief, Urdu Division, Voice of America. In connection with the exhibition about Pakistan's ancient city of Lahore. 7pm, MIT Museum. 253-4444

5 Thurs

No Dogs Allowed in Chapel No Dogs Allowed, the wind trio founded by three MIT alums 20 years ago, plays the Thursday noon Chapel series in MIT's Chapel. Francois Devienne's Trio; Peter Schickele's *Diversions*; Francois Poulenc's

Sonata; Swan Hennessy's Trio. 12:05pm, Chapel. 253-2906

6 Fri

Jazz Masterclass

Masterclass by jazz pianist Michel Camilo. Funded by the Marvin Asnes Performing Arts Series. 12:05pm, Killian Hall. 253-

Jazz Master Performs

Michel Camilo, chosen by Billboard Magazine as the "Number One Jazz Pianist" is brought free to the MIT campus as the first performance in the new Marvin Asnes Performing Arts Concert Series. One national critic said Camilo is "bursting with joy. . .the surprise hit of the year." 8pm, Kresge Auditorium. 253-2906

Trouble in Paradise Begins at List

Some 15 New England artists appear in Trouble in Paradise, addressing American political and social issues, including freedom of expression, homelessness militarism, environmental pollution, AIDS and substance abuse. Opening with a reception today, 5-7pm, at the List Visual Arts Center in the Wiesner Building. Weekdays 12-6, Weekends 1-5. 253-4680

8 Sun

Still Performance Closes at List Collaborative photographs by Rimma and Valery Gerlovin, Soviet emigre artists, mixing language and portraiture as they style and photograph each other's faces. List Visual Arts Center. Weekdays, 12-6 Weekends 1-5, 253-4680

11 Wed

Pakistan Dance and /Music

Lecture/Film of North Indian classical dance, Kathak, from the Mughal Court, with introductory talk by Vishakha Desai, assistant curator of Indian, Southeast Asian and Islamic Art at the Boston Museum of Fine Arts. In connection with the Lahore exhibit,7pm, MIT Museum.

12 Thurs

Chamber Music in Chapel

Charles River Chamber Players: John Curtis, guitar and Jane Garvin, flute. Faure, Tekemitsu, Miyagi, Pinkham. 12:05pm, Chapel. 253-2906

MIT Artists Behind Desks

Opening today in the Compton Gallery (off Lobby 10), a selection of works from 29 visual artists employed at MIT. Everyone is invited to today's reception, 5-7, for Artists Behind The Desks, a juried MIT Support Staff Exhibition. A black and white version of one selection, Summertime, a color photograph by Bea Bailey who works in the Vision and Modeling Group of the Media Lab. A professional photographer in her off-campus life, Bailey posed an MIT friend in this picture. Her model is Lynne Butler who is a lab technician in biology and who is shown wearing the wedding dress in which last year she married Charles Butler, a technical assistant in Graphic Arts. This exhibit runs from Oct. 13-Jan.12, weekdays 9-5, Saturdays, noon-4. 253-4444

14 Sat

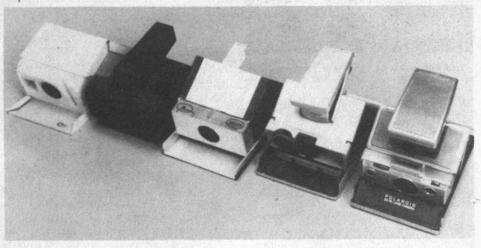
Museum holds Family Workshop

"Imaging Your Imagination: A Hands-On Workshop in Photography"—Family workshop led by Elaine O'Neil, photographer/lecturer at the School of the Museum of Fine Arts. In connection with the MIT Museum's Image and Imagination photography exhibit. 1-2:30pm, MIT Museum. 253-4444. Preregistration required: 253-4422

26 Thurs

Baroque Comes to Chapel

Jan Pfeiffer, baroque cello and John Finney, harpsichord. Vivaldi and Bach. 12:05pm, MIT Chapel. 253-2906



18 Wed

20th Century Photography and Beyond

"The Advent of Electronic Imaging"-Slide lecture by Polaroid's Richard Kee, accompanying the photography exhibit. Above, design models from Polaroid Archives show part of the process of designing a camera. 7pm, MIT Museum. 253-4444

19 Thurs

Jazz Quartet plays Chapel

The Steve Durgin Jazz Players; piano, brass, drums and vocals quartet performs old standards, up-tempo jazz, Bossa nova, Latin and showtunes. 12:05pm, Chapel.

27 Fri

Hearing Voices in Killian

Mezzo-soprano Gloria Raymond with Karen Sauer, piano. Schubert, Duparc, and Copland, in the Voices at Noon Series. 12:05pm, Killian Hall. 253-2906

MIT Affiliated Artist Concert

Eleanor Perrone, piano. All-Chopin program. 8pm, Killian Hall. 253-2906

28 Sat

MIT Symphony Orchestra

David Epstein, director. Schoenberg's Suite for String Orchestra and Sibelius' Symphony No. 2. 8:30pm, Kresge Auditorium. Pick up free tickets in Lobby 10 and from the Information desk in the Student Center. \$1 at the door. 253-2906

30 Mon

Disguised Musicians

In its annual Halloween Extravaganza, the MIT Concert Band, John Corley, director, with everyone in costume. This unusual all-wind and percussion band went out on the new music limb 40 years ago and has become known for commissioning and playing pieces from modern masters, from young composers and from students. 6pm, Lobby 7. 253-2906

All Month

MIT Museum

Lahore: The City Within Exploration of the cultural, artistic, and architectural center of Pakistan.

Image and Imagination: 150 Years of Photography The evolution of the technology of photography from earliest days to visions of the future. MIT Museum, 265 Mass Ave.

Tues-Fri 9-5, Weekends 10-4. 253-4444

List Visual Arts Center

Remo Campopiano: In Residence Minneapolis-based artist Remo Campopiano creates a room-sized installation, including among other elements, a coffeetable landscape inhabited by a colony of live ants, to weave together strands from an array of thought systems, myths, and matters of the heart. Weekdays 12-6 Weekends 1-5. 253-4680

All events are free except where prices are noted.

These events came from the Arts Network. Celia Metcalf, regular designer for the Month-at-a-glance, is on vacation. This page was compiled, edited, and designed by China Altman and Lynn Heinemann.



13 Fri

Kalajian in Voices Recital

Mezzo-soprano Jocelyn Kalajian (below) & Larissa Sokoloff, piano. Ravel, Mahler, Brahms, Williams, in the Voices at Noon series, 12:05pm, Killian Hall. 253-2906



List Center presents photographer

Richard Ross: Museology Triptychs is the title of a new exhibition of the photographs of this Santa Barbara-based artist who uses a child's plastic camera to seize details of old master paintings from museums around the world. His strangely lit and scaled juxtapositions create " soap opera of art history." List Center. Weekdays 12-6, Weekends 1-5. 253-4680

Poetry at the Media Lab

Reading by poet David Slavitt, author of Equinox, presented in Media Lab series. 7:30pm, Bartos Theater. 253-0684

20 Fri

American String Quartet

This year's Guest Artist Series begins with the American String Quartet (below) playing Schubert's Quartet in B-flat Major No. 8, Op. 168; Berg Quartet No. 3; Beethoven Quartet in F Major Op. 59 No. 1. 8pm, Kresge Auditorium. 253-2906





Photos by Donna Coveney

Andrea Arenovski, a graduate student in biological oceanography, measures marsh grass (Spartina alterinflora) in Great Sippewissett Marsh in Falmouth. She is studying the effect of factors such as salinity and sulfide concentrations on nitrogen uptake and retention in the grass. The tall form of Spartina occurs along the creek banks, which are frequently flooded and washed by the tides. It is possible that the more oxidized sediments and lower sul-

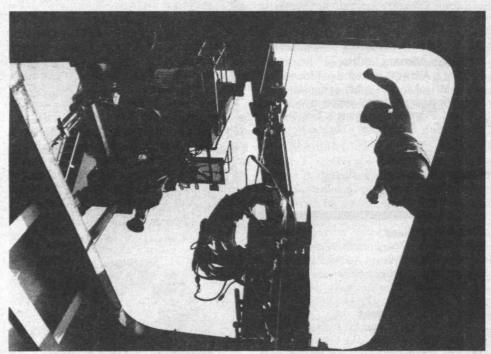
fide concentrations there allow for a more productive growth form. A few meters from the creek bank sulfide builds up in the soil, less oxygen is available, and the plant can't take up nitrogen because of the sulfides. Stunted growth results. To maintain osmotic balance the plants must excrete salt. One hypothesis is that increased washing of plants by the tides may reduce the possible damaging effects of salt crystallization on the leaves.



Niall Slowey, an MIT/WHOI joint program graduate student in geological oceanography, prepares core sub-samples of carbonate sediment taken from the ocean floor in the Bahamas in1988. Niall is trying to understand changes in the concentration of nutrients and temperatures of thermocline waters in the western North Atlantic since the last Ice Age. The different sections of core samples represent a time line; different depths in the core were deposited at different times in the past. The core gives him a history of how water has changed through time at the ocean floor. The carbonate sediment that comprises the core sample consists of shells of organisms that live on the sea floor. Niall can infer changes in the water chemistry and temperature over time from the chemistry of the sediments, or nutrient concentrations, during different periods in the core sample.

MIT beyond Cambridge

Staff photojournalist Donna Coveney visited the Woods Hole Oceanographic Institution (WHOI) this summer to record some of the MIT projects being conducted there. WHOI is an independent institution which, with MIT, operates five joint graduate degree programs in physical, chemical and biological oceanography, marine geology and geophysics, and oceanographic engineering. The Joint Program involves the MIT Departments of Earth, Atmospheric and Planetary Sciences; Biology; Civil Engineering; Electrical Engineering and Computer Science; Mechanical Engineering; and Ocean Engineering.



Gear is offloaded from the hold of the Atlantis II, a research vessel belonging to WHOI, as it prepares to depart for Bermuda. The Atlantis II is 210 feet long and houses seven laboratories (a total of 3,000 square feet of lab space), 28 officers and crew, 19 scientists and nine members of the deep submergence sub Alvin team. Alvin is also housed aboard the Atlantis II, and is launched from it for research purposes while at sea.