Massachusetts Institute of Technology



May 25, 1977 Volume 21 Number 37

Fossil Fuel Dangers Studied

By WILLIAM T. STRUBLE Staff Writer

Can combustion processes for fossil fuels be engineered to produce soot of lower hazard to humans?

Are some fossil fuels intrinsically more dangerous in terms of the soot formed when they are burned?

To answer these questions, MIT has received a \$219,846 contract from the Energy Research and Development Administration to increase its efforts in genetic toxicology, using the latest technology in human cell mutation assays.

A multidisciplinary research team in three highly specialized MIT laboratories will carry out the investigation to provide an understanding of the relative advantages and health hazards of the use of fossil fuels—principally coal—as a primary energy source.

In particular, the research will focus on certain chemicals in soot—a group of organic compounds called polycyclic aromatic hydrocarbons (PCAH)—many of which are known to cause genetic changes in bacteria. Several compounds of the PCAH class are already known to cause cancer in

lower animals.

ERDA's Division of Biomedical and Environmental Research is sponsoring the initial phase of this research, and expects to provide continuing support for the program in future years. Support of this research is part of an expanding ERDA program aimed at achieving a better understanding of the environmental and health risks resulting from increased use of coal and other fossil fuels.

The investigation will involve a joint effort of faculty in MIT's Department of Nutrition and Food Science, the Department of Chemical Engineering and the Department of Mechanical Engineering working together under the aegis of the MIT Energy Laboratory and in cooperation with the (Continued on page 4)

HANGING CURTAINS in Rockwell Cage for commencement is Tony Gedraitis, shade man in Physical Plant. He is standing on an electrical staging and taking the curtain from the block and tackle used to hoist it. Thirty-six curtains, each 22 feet long, are hung at the four walls of Rockwell Cage each year for commencement. Hanging the curtains takes five work days for three men; taking them down, another five work days for four men.

—Photo by Calvin Campbell

Energy Slogan Winners Named

"You can't refuel Mother Nature," submitted by Jennifer Cairns of Melrose, won first prize in the slogan contest sponsored by the Physical Plant energy conservation program at Employees Open House.

More than 200 slogan suggestions were entered in the competition. Announcement of the winners was made last week by the Physical Plant Energy Conservation Committee. Ms. Cairns won a director's chair with an MIT emblem for her entry.

Second prize winner was Rita Couture of Everett who received a pewter pitcher with an MIT seal for submitting "Let's save and reserve, think to conserve." Philip Green of the Physical Plant drafting group won third prize, a pewter bowl with an MIT seal, for his entry, "Be energy wise, economize"

In order to insure objectivity during judging, contestants names were removed from entries. The Energy Conservation Committee has expressed its thanks to all who participated

1,200 to Graduate At Commencement

Approximately 1,200 seniors and graduate students will be awarded degrees at MIT's 111th commencement Monday morning, June 6.

Chairman of the MIT Corporation, Howard W. Johnson, will preside at the exercises to be held in MIT's Rockwell Cage beginning at 10:30am.

President Jerome B. Wiesner will give the commencement address and will present some 1,400 degrees (a number of graduates receive more than one degree), handing diplomas individually to graduates as their names are called by the deans of their respective schools.

Following commencement a reception for graduates, their families, friends, and faculty members will be held on Kresge Plaza.

Edward O. Vetter, president of the MIT Alumni Association, will be Chief Marshal, leading the academic procession and carrying the MIT mace.

Following Mr. Vetter will be members of the MIT Corporation, the faculty, guests of honor, and the principals. Guests of honor will include the deans of the five academic schools, the Dean of the Graduate School, the Dean for Student Affairs, the Registrar, and Dr. Paul M. Fye, director of Woods Hole Oceanographic Institution. MIT and Woods Hole offer joint programs of graduate study in many fields of oceanography and ocean engineering, leading to jointly conferred doctoral degrees.

Seated with the guests of honor will be the permanent officers of the Class of 1977—David A. Dobos of Columbus, Ohio, president; Bruce R. Ruotolo of Glen Ridge, NJ, vice president, and Douglas J. McLeod of Bellingham, Wash., secretary-treasurer—and Robert W. Mann, Jr., of Marblehead, Mass., president of the Graduate School Council.

In addition to Mr. Johnson and Dr. Wiesner, commencement principals will include Chancellor Paul E. Gray, Dr. James R. Killian, Jr., former chairman and now honorary chairman of the MIT Corporation, Cambridge Mayor Alfred E. Vellucci, and the Rev.

Larry Hill, religious counselor at MIT, who will give the invocation.

Professor Walter A. Rosenblith, provost, will be marshal of the guests of honor, and Professor John Ross, chairman of the faculty, will be marshal of the princi-

On Friday, June 3, commissioning exercises for 13 Army cadets, 14 Navy midshipmen, and five Air Force cadets will be held at 11am in Kresge Auditorium. The tri-service commissioning buffet luncheon will follow the ceremony at 11:45am in the Sala de Puerto Rico. MIT is one of a small number of schools to offer programs in all three major service branches.

Commencement time at MIT is also homecoming time for alumni. As many as 2,200 alumni and family members are expected to participate in some part of the annual alumni day program with about 1,400 alumni and family members returning for class re-unions.

Technology Day on Friday, June 10, (formerly called Alumni Day) will highlight the work of some younger faculty members who are engaged in exploration of the fields of management and technological innovation, deep sea mining, the solar system, the environment, and computer music.

Photovoltaic Crop Irrigation To Be Tested

Early this summer, the nation's first crop irrigation system powered by solar photovoltaic cells—cells that convert sunlight directly into electricity—will go into operation on an experimental farm near Mead, Nebraska.

A unit designed by the MIT Lincoln Laboratory in Lexington will use approximately 120,000 solar cells to convert the sun's rays into electricity. This in turn will drive a 10 horsepower pump for irrigating 80 acres of corn and soybeans.

The irrigation experiment will be conducted by Lincoln Laboratory in conjunction with the University of Nebraska-Lincoln campus under sponsorship of the Photovoltaic Conversion Program, within the Division of Solar Energy of the Energy Research and Development Administration (ERDA). The ERDA Program Manager is Dr. Leonard Magid.

This experiment, the largest solar-cell-powered system built to date, will generate up to 25,000 watts peak power. The solar energy power unit will consist of solar cells arranged in two rows 325 feet long by eight feet high. Each row will be tilted to collect the sun's rays.

The solar cells will be connected to batteries in order to provide constant power to the pump motor despite large variations in the sunlight throughout the day. Inverters will convert the direct current (DC) electricity produced by the solar cells into alternating current (AC) required to power the pump motor and other loads.

The system will pump 1000 gallons of water per minute from a reservoir for a period of 12 hours a day during the irrigation season.

After the July-August irrigation
(Continued on page 8)

MIT Device Expands Job Horizon for the Blind

Blind since birth, Ann McDaniel, 21, has a chance to become the first sightless long-distance telephone operator—thanks to a device developed by MIT engineers.

Telephone operators use a computer console—shown in the foreground of this photo that appeared in the Arkansas Gazette, Little Rock—coupled to a video display. The MIT device has solenoid-operated pins, under Miss McDaniel's right hand (below), that give her in Braille the information a sighted person would read from the video display. An employee of Southwestern Bell Telephone Co., Little Rock, Miss McDaniel began training with the equipment May 20.

The MIT device was developed at the Sensory Aids Evaluation and Development Center and made available through Arkansas Enterprises for the Blind. Dr. Derek Rowell, director of the center, said the Braille display is expected to

expand greatly job opportunities for the blind. Any job that requires entering, manipulating or retrieving data or programs from a remote computer could be filled by a blind person—if a Braille display is used. George Dalrymple of the Sensory Aids Center developed the Braille display.







NEWLY ELECTED officers and board members of the MIT Women's League are, left to right (front): Mary Ann Ray, Netta Murphy, Winifred McDonough, treasurer, Betty Dyer, vice chairman, Maureen

Feldman, chairman, Rose Carmichael and Ida Hughes; back row: Letitia Sarofim, Jan Koltun, Yvonne Sandel, Zene Athans, Marge Suomala, Collie Cook, secretary, and Norma Loomis.

New MIT Symphony Record Women's League Features American Concerti

The second in a series of four records of the MIT Symphony Orchestra to be released in 1977 was issued on May 18 on the Vox/Turnabout label. The record features pianist Ab-

bott Ruskin as soloist with the orchestra under the direction of David Epstein and pairs two American concerti: the Samuel Barber Piano Concerto, Opus 38, and the Aaron Copland Piano Concerto. It will be available at the Tech Coop within the week.

The orchestra, composed of more than 90 musicians from the MIT and Wellesley College communities, has gained widespread recognition in recent years through nationwide telecasts of a concert on the Public Broadcasting Service and through its spring tours to such cities as New York, Washington, Philadelphia, Chicago, Dallas and San Francisco. Its concerts in Carnegie Hall, Kennedy Center and other major concert halls across America have played to much critical acclaim. The recordings mark the orchestra's debut on a major record label.

The orchestra's recording of the Barber Piano Concerto is the first to appear since the original recording done in the mid-1960s by the Cleveland Orchestra under George Szell with John Browning as soloist. The work-Barber's only piano concerto-has its stylistic roots in the traditions of the romantic era in music. It was premiered in 1962 at Philharmonic Hall in New York during the opening week of Lincoln Center and won the Pulitzer Prize for Music in

Copland's Piano Concerto, written in 1929, is imbued with the flavor of jazz. Elements of the blues, fox trot, and the genre of swing popularized by Broadway musical theatre can also be heard. These themes are fused, altered in character, and constructed into a true symphonic form.

Mr. Ruskin is a graduate of the Juilliard School of Music where his first teacher was Rosina Lhevinne. He later studied under Sascha Gorodnitzki. He has won numerous prizes, including the Edgar Stillman Kelley Award of the National Federation of Music Clubs and the Kosciuszko Foundation's Chopin Award. He has performed as soloist with the Chicago Symphony, the Minnesota Symphony, and the Philadelphia Orchestra and was chosen by the distinguished Soviet composer, Dimitri Kabalevsky, to perform his Third Concerto when the composer conducted the National Symphony in Washington.

Dr. Epstein, professor of music at MIT and for the past 12 years conductor of the MIT Symphony Orchestra, is a composer and critic as well as a teacher and conductor. His compositions have been performed at numerous concert series in the US and Europe, including the Aspen Music Festival, International Society of Contemporary Music, Boston Symphony Chamber Players, and South German Radio Orchestra. He has received awards and commissions from, among others, the Fromm Foundation, New York State Council for the Arts, Ford and Rockefeller Foundations, and the Louisville Orchestra. Many of his works have been recorded. Recently he has been guest conductor with the Royal Philharmonic Orchestra in London, the Jerusalem Orchestra, the Berlin Radio Symphony, and the St. Louis Philharmonic.

The MIT Symphony Orchestra formed in 1884, is a vital part of the Institute's music program. Its season includes a concert series in MIT's Kresge Auditorium and a spring tour. Its repertoire combines standard works with contemporary music by major and younger composers.

Breitman to Give Library Recital

Pianist David Breitman will give a recital at 5:15pm on Wednesday, May 25, in the MIT Music Library

He will play three piano sonatas-Beethoven's Sonata in F Major, Op. 10, No. 2; Brahms's Sonata in F Minor, Op. 5, and Schubert's Sonata in C Minor, Op. Post.

The sonata by Brahms was written in 1854 when the composer was 22. It is characterized by a youthful passion not found in his later works. Brahms played this sonata when he was introduced to Schumann who was so impressed by the young composer's talent that he brought him to the attention of the

Mr. Breitman received the SB degree in humanities and science from MIT in 1976. He is an instructor in the MIT piano lab and studies and teaches piano privately in Cambridge. He played harpsichord with the MIT Chamber Players at their December, 1976, con-

Coppi Receives ERDA Award

A certificate of appreciation, recognizing his "numerous and innovative contributions to the field of fusion research," has been given to Dr. Bruno Coppi of the MIT Department of Physics by the director of ERDA's Division of Magnetic Fusion Energy.

"The leading role you played in initiating tokamak research in the United States and in establishing a tokamak experiment at MIT has had a profound and lasting effect on both the U.S. and international fusion programs," Edwin E. Kinter of ERDA told Professor Coppi in a letter accompanying the certificate.

Dr. Kinter said the successful operation of Alcator itself and the attainment of record values of density and confinement "are all a tribute to your dedicated efforts. Your continuing contributions to the theoretical understanding of tokamaks are also recognized both here and abroad."

Report Issued

The MIT Women's League has recently issued its 1976-77 Annual Report. It contains summaries of the year's events by the outgoing officers: Artemis Gyftopoulos, chairman, Maureen Feldman, vice chairman, Collie Cook, secretary, Winifred McDonough, treasurer, and Dorothy Bowe of the nominations committee.

In addition, the report contains summaries from those in charge of the League's service activities and interest groups. The report also contains a list of recent contributions to the MIT Women's League Moore Fund, the interest from which partically supports many League activities. Copies of the report are available at the Women's League office, Rm 10-342, x3-3656.

CE Professor Given Initiation Grant

Dr. Rafael L. Bras, MIT assistant professor of civil engineering, is one of 61 engineering faculty members from 46 institutions nationwide to receive 1977 National Science Foundation Engineering Research Initiation

The NSF program is directed towards full-time engineering faculty members who have had no substantial prior research support. The 61 recipients were chosen from among 237 applicants on the basis of research proposals submitted in December, 1976.

Dr. Bras will use his \$19,900 grant for a project titled "Search of Theoretical Models of Hydrologic Parameters Using Derived Distribution Techniques.'



May 25-May 31

Wednesday, May 25 Channel 16 10am-2pm

THE MIT EXPERIMENTAL MUSIC STUDIO WITH RICH STEIGER, by Barry Brams/Mark Abbate. Recorded 11/23/76. THE MIT WRITING PROGRAM WITH KEN SKIER, by Barry Brams/Mark Abbate, Recorded

Thursday, May 26 Channel 8: 12noon-1pm

BASEMENT VIDEO PRESENTS

Friday, May 27 Channel 8: 3-4pm

BASEMENT VIDEO PRESENTS (R)

Monday, May 30 MEMORIAL DAY-No scheduled

Tuesday, May 31 Channel 10: 10am-2pm

THE MIT EXPERIMENTAL THE MIT EXPERIMENTAL MUSIC STUDIO WITH RICH STEIGER. by Barry Brams/Mark Abbate. Recorded 11/23/76.
THE MIT WRITING PROGRAM WITH KEN SKIER, by Barry Brams/Mark Abbate. Recorded 11/23/78.

INSTITUTE **NOTICES**

Announcements

Official Notice-Second term grade reports will be mailed on Mon, June 6. US and Canadian students to home addresses. Foreign students to term addresses. Students should report corrections in addresses to Registrar's Office, Rm E19-335, no later than Tues, May 31. Telephone requests will not be accepted.

Freshman Advisors-Needed for the 1977-78 academic year to assist freshmen with various academic and non-academic decisions and situations they will face. If you'd like to get to know a few freshmen well and feel you can offer something to them in their adjustment to MIT, contact Freshman Advisory Council, Rm 7-103, x3-6771 for information.

Weight Control Program—Sponsored by the Health Education Department. The group will meet for ten Fridays, June 3-Aug 5, 11:30am-1pm, Infirmary (Bldg W5) 3rd Fl conference rm. Peter Bent Brigham nutritionists, Wendy Midgley and Helene Fuchs, will lead the group. Their approach stresses awareness of eating behaviors and modifications of those behaviors to make permanent weight control possible. Cost is \$40 for Health Plan members and \$55 for non-members. For registration call Health Education Office x3-1316.

New UROP Listing

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

Nutrition and Food Science

There is an opportunity for an undergraduate to participate in a research project on the physical stability of protein dispersions at the Food Material Science and Fabrication Laboratory. The student will be involved in measuring the physical parameters concerning the stability of protein dispersion systems. Credit will be offered. Contact: Dr. Cherl-Ho Lee, x3-3688, Rm 16-239,

or Prof. Chokyun Rha, x3-3492, Rm 56-137.

John W. Gilbert Associates: Ship Design

Boston Gilbert Associates designs fishing trawlers, tugs, oceanographic vessels, barges, and ferries. Opportunities are available for students to participate in all aspects of ship design: structure, hydrostatics, some specification, equipment layouts, piping systems, heat balance systems, speed and power preliminaries, mass and rigging, preliminary weight estimate, cross curves of stability (preliminary rought lines)

Contact: UROP Office, or Keatinge Keays, Rm 5228A, x3-4330.

Quadex Corporation

Quadex Corporation, a manufacturer of computer systems for text processing, has projects which may be of interest to computer science students: 1) Operating Systems—de termining procedures to enhance the performance of a multi-user operating system Performance monitoring and "fine-tuning" of scheduling algorithms. 2) Data Management Systems-evaluating data structures and access algorithms for text and accounting data bases. Simulation of multiuser operation and implementation of pilot system. 3) Text Processing Applications—design of computer procedures to set complex text on phototype setters. Special areas of concern are mathematical equations and full page make-up. Detailed projects can be arranged on an indi-

New Subject

15.851J Dynamics of Physical and Social (Same as subject 1.193J, 3.146J, 13.49J, 22.005J)

Prereq: none Year: U(1)

Introduces the conceptual and technical foundations of system dynamics, a method for analyzing the behavior of systems. The objective of a system dynamics analysis is to understand the behavior of complex systems, and erstanding to alter policies or structures to improve the performance of the actual system. By focusing on the common characteristics of systems-such as the process of integration and the structure of feedback loops-the subject emphasizes the unity, rather than the uniqueness, of diverse disci plines. Stress is placed on structure and policies within real-life systems, and on how to convert descriptive knowledge to formal simulation models. Subject content ranges from historical and philosophical background, to "hands-on" experience with developing and simulating dynamic system models on the computer. Numerous case examples from engineering, medicine, management, economics, urban policy, and population-environment interactions demonstrate the transferability of system insights from one field to another, J.W. Forrester, C. Chryssostomidis, J.P. Clark, K.F. Hansen, F.E. Perkins.

Student Jobs

Center for Cancer Research needs person to collect, and prepare glassware. Must be concientious and willing to follow directions. 20 hrs./wk. for about 8 weeks. Salary: negotiable. Contact Dr. Bevins' office for an interview x3-6428.

Student needed to work the 1977-78 academic year at Schneider Center of Wellesley. The job entails responsibility for the total operation of the center, including general supervisory duties, scheduling, cash out procedures, etc. 20 hrs/wk. mostly evenings and weekends.

\$3.45/hr. Contact Steve Nelson, 235-0320, x701. Drive a U-haul trailer to Atlanta, Georgia, at the end of June. Boston to Atlanta, one way. Salary to be arranged. Contact Dalya Kutehei, 50 Carey Ave., No. 6, Watertown, MA. 924-5007

EE student to work on a new idea to be proposed to the MIT Innovation Center for production. Experience in circuit design and interest and/or experience with the stereo industry. Contact B. Albom, 494-8652.

Graduate Studies

Senate Legislative Fellows Program

The Program is for residents of New York State at any stage of graduate study or who have just been awarded a graduate degree. Fellows chosen will receive a salary of \$11,000 for the year beginning in Sept. 1977 while working as professional level staff on standing committee and other units of the Senate. Applications from students in disciplines not normally associated with political life as well as those in public administration and political science are Deadline: June 1

Contact: Graduate School Office, Rm 3-136

Club Notes

Beginner's Sailing-Instruction, Mon & Thurs, 5:15pm, MIT Sailing Pavilion.

MIT Bridge Club*—ACBL Open pairs dupli-

cate bridge. Thurs, 7pm, Stu Ctr Rm 407.

MIT/DL Bridge Club**—ACBL Duplicate Bridge. Tues, 6pm, Stu Ctr Rm 401 Shakespeare Ensemble-Backstage help for

next year's major productions, Love's Labor's Lost and Romeo and Juliet, needed: props, costumes, set, publicity. x3-4420, leave name and number.

Gays at MIT*-(formerly SHL) Coffeehouse/meeting, first Sunday each month, 5pm, Gay Lng (Walker Rm 50-306). Everyone welcome. Info or just an ear listen: x3-5440, or join us for lunch.

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

Religious Activities

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

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

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

Echoes

50 Years Ago

A National Technology Center located in New York is the dream of many members of the Technology Alumni Association. The Center is visualized by proponents of the plan as being a combination office and club building; a location in New York being favored since this is the city Tech alumni most often visit.

40 Years Ago

A 1700 kilowatt motor-generator was purchased by the Institute to provide direct current for various research projects. Among the uses found for this new power source is running the powerful magnet designed by Professor Frances Bitter for the investigation of the nature of properties of metals.

25 Years Ago

Dancers on the flagstone terrace will be able to enjoy the evening air at an outdoor garden party being planned by Baker House students. The festivities will include the music of the Techtonian tables with umbrellas on the lawn and Japanese lanterns.

Prepared by Marcia Conrov. MIT Historical Collections, x4444.

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Page 2, Tech Talk, May 25, 1977

NSF Plays No Favorites: Husband, Wife Win Awards

By SUSAN E. WALKER Staff Writer

It's not unusual for two students in the same department at MIT to win National Science Foundation graduate fellowships, but when they are married to each other—that's another story.

The unique couple are David and Judy Thompson, both aeronautics and astronautics majors in the Class of 1977. David graduated in February and Judy will receive her degree in June.

Even though Judy has not yet graduated they are both studying at Caltech this year. Both schools have been very cooperative. Judy is taking both undergraduate and graduate subjects, and MIT is applying her undergraduate credits towards her bachelor's degree. David is a first semester graduate student at Caltech. Both are working towards master's degrees in aeronautics and astronautics.

They have not always planned careers in the same field. David has been interested in aeronautics and astronautics for as long as he can remember. Judy, although interested in a career in

some aspect of engineering when she first came to MIT, didn't decide on aeronautics and astronautics until later on.

"Even though we ended up in the same department, there's really no problem of competition between us," David Thompson said. "We were in a lot of the same classes together, but probably didn't talk about course work any more than any other two students in the department. It's a small department, so everyone was friendly and discussed problem sets, etc., with each other."

It wasn't the small size of their chosen department that brought the Thompsons together, though, for they were married before entering MIT as freshmen. When they met in high school, David Thompson was a year ahead of Judy. He graduated from Dorman Senior High School in Spartanburg, S.C., in 1972, and entered MIT as a freshman in September of that year, when Judy was a senior at Dorman. After the fall term he took a leave of absence, returned to Spartanburg, and worked for a term.

They were married in June, 1973, and moved to Cambridge in September.

Even before they met, however, both were interested in going to MIT. David had applied to several colleges before deciding on MIT. With his impressions of MIT and Cambridge to reinforce her own, Judy applied to MIT early action.

The transition from high school to college, a difficult one for many students, is even more challenging for a newly married couple. In addition to having to adjust to a difficult academic load, the Thompsons had to deal with many household duties that freshmen rarely encounter. They try to divide the cooking, cleaning, laundry and other chores as evenly as possible.

The Thompsons lived in Westgate, MIT's graduate student housing and the only campus housing equipped with apartments suitable for married couples, for one and one half years. Since most of the couples living there were graduate students they met most of their friends in their classes. In the

middle of sophomore year the Thompsons moved to Winchester, Mass., a suburb of Boston, because they both missed the rural atmosphere of their home town.

Understandably, financing two college educations was no small challenge for the Thompsons. In addition to the money David earned by taking a semester off before Judy entered MIT, they both had scholarships. Judy also received financial aid from MIT.

They were also lucky in finding good summer jobs in the same cities, so they didn't have the expense of maintaining two households. Both of them worked at NASA's Langley Research Center in Virginia the summers after their first three years at MIT. They both worked on the space shuttle at the Charles Stark Draper Laboratory in Cambridge during IAP 1976. IAP is MIT's six-week Independent Activities Period between semesters. Last summer the Thompsons worked on the Viking Project at NASA's Jet Propulsion Lab in California.

Since they each won a NSF graduate fellowship this year, the Thompsons should have an easier time financing their graduate educations. The NSF competition is formidable—more than 4,380 applicants competed for the 550 fellowships, which carry a stipend of \$3,900 per year per student for full-time study. David was also awarded the coveted Fannie and John Hertz Foundation Fellowship, but can only accept one of them.

The Thompsons haven't decided yet if they will go on for PhD degrees after they earn their master's degrees in December, 1977. They would eventually like to work for a NASA facility somewhere in the south. Judy plans a career in aerodynamics, while David is primarily interested in space vehicles.

David is the son of Mr. and Mrs. Robert H. Thompson of 188 Midway Drive, Spartanburg, S.C. Judy's parents, Mr. and Mrs. Frank J. Bergmann, also live in Spartanburg.

Stevens Appointed LeBel Professor

Dr. Kenneth N. Stevens, professor of electrical and bioengineering in the Department of Electrical Engineering and Computer Science at MIT, has been appointed to the department's Charles Joseph LeBel Audio Engineering Professorship.

The announcement was made by Dr. Wilbur B. Davenport, professor of engineering and education in the Department of Electrical Engineering and Computer Science, and head of the department, who said, "We are pleased to name Dr. Stevens to this professorship, in recognition of the dedication with which he has pursued his teaching and research in his years at MIT."

and research in his years at MIT."

The Clarence Joseph LeBel Audio Engineering Professorship was created in 1967-1968 by a bequest from the late Mr. LeBel "for the purpose of establishing a professorship and an instructorship and two scholarships for the promotion of research and instruction in the field of audio engineering." Mr. LeBel, who received the SB and SM degrees from MIT in 1927, was a founder of the Audio Engineering Society, and he served as its president in 1958.

Professor Stevens is recognized for his research in speech com-

munications and acoustics. He was a staff member of the MIT Acoustics Laboratory from 1952-1954. In 1954 he was appointed assistant professor of electrical communications,



Dr. Stevens

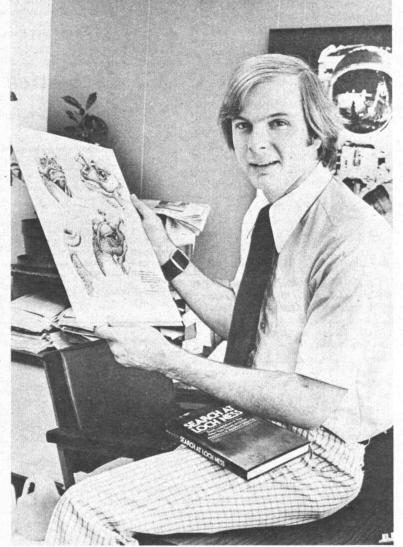
and he became associate professor in 1957. After spending a year in Sweden as a Guggenheim fellow, he was made a full professor in 1963.

A Fellow of the Acoustical Society of America, Dr. Stevens was its vice-president from 1971-72, and he is currently serving as president. He is also a Fellow of the Institute of Electrical and Electronic Engineers, and a member of the honorary societies Sigma Xi and Eta Kappa Nu. From 1969-1970, he was a visiting professor in the phonetics department of the University College in London.

Dr. Stevens received the BASc degree in 1945 and the MASc in 1948 from the University of Toronto, and the PhD from MIT in 1952.

and the PhD from MIT in 1952.

He is a resident of Cambridge,
Massachusetts.



PORTRAIT OF A MONSTER—Artist's conceptions of the Loch Ness monster are displayed by Dennis Meredith, author of Search at Loch Ness, a new book on the expeditions to photograph the legendary beast. Mr. Meredith, managing editor of Technology Review, accompanied the 1976 expedition to Loch Ness and will be part of the 1977 expedition this summer. Published by Quadrangle/The New York Times Book Co., the book tells the human and scientific story of the hunt for the controversial monster. The expeditions included MIT's Harold E. "Doc" Edgerton as well as MIT graduates Robert H. Rines, Charles Wyckoff and Martin Klein.

-Photo by Calvin Campbell

ASA's Findings On thursday

(Following is the text of the findings of the executive committee of the Association of Student Activities with respect to the newspaper, thursday, following the hearings held Wednesday, May 18, and Thursday, May 19.)

"The ASA executive committee has made the following decision after careful consideration of the complaint filed by the Dean for Student Affairs Office, acting for members of the community, against thursday.

"1. thursday is hereby censured for the excessive invasion of privacy in its "Consumer Guide to MIT Men" published in the April

The first LeBel professor was Dr. Amar G. Bose, who was appointed in 1969. The most recent appointee was Campbell L. Searle, who held the Professorship from 1971-1973.

28th issue of their paper.

"2. We commend thursday for the recent changes they have made in their publication structure and feel that these changes should be maintained as part of their procedures.

"3. It is strongly recommended that *thursday* publish a statement of letters written to the paper.

"4. We condemn those immature members of the MIT community who have been anonymously harassing persons connected with this incident.

"5. The ASA deeply regrets the invation of privacy which has occurred. We feel that an incident of this nature should never recur. Therefore, if any activity is guilty of an invasion of privacy, the ASA shall take extreme action against said activity, up to and including the removal of MIT affiliation."

MIT, University of Tokyo Plan Exchange Program

An exchange program that will permit graduate engineering students to spend one year abroad has been worked out by MIT and the University of Tokyo.

Dr. Alfred A.H. Keil, dean of the MIT School of Engineering, who announced the program, has designated Dr. Koichi Masubuchi, professor of ocean engineering and materials science, as the MIT coordinator for the program.

The program will involve initially two students from each university. The first Japanese students—as yet unselected—will enroll at MIT as special students in September 1977. The first MIT students in the program—also as yet unselected—will spend one year at the engineering school of the University of Tokyo beginning in April 1978

Each university will make the final selection of the students based on the normal admissions process. The "special student" status means the students are not degree candidates.

Students from MIT must understand the Japanese language well enough to follow the course of study. However, for those mainly interested in research under the

Erratum

A typographical error oc-

cured in the May 11, 1977 Tech

Talk story announcing a

\$250,000 grant from Arthur D.

Little, Inc., for a research and

innovation fund. The begin-

ning of the story should have

MIT announced today it has

received a \$250,000 grant from

Arthur D. Little, Inc., of Cam-

bridge, a company with a long

history of support for MIT pro-

The grant-\$50,000 a year

for five years-will be known

as the Arthur D. Little Re-

search and Innovation Fund

Its purpose will be to reflect

the commitment of the inter-

nationally-known research

and development company to

the use of technology and management skills for the

MIT Provost Walter A. Ros-

enblith, who announced the es-

tablishment of the fund, said it

would "provide the impetus

needed to advance new fields

of research, as well as

development of new research

areas at the juncture between

traditional disciplines at criti-

grams and people.

benefit of society.

supervision of an academic staff member, the language requirement may be eased.

Students may apply for a fellowship to defray expenses to either an agency in the United States or one in Japan.

MIT students interested in taking part in the program should contact Professor Masubuchi in Rm 5-223, Ext. 3-6820.

FEA Cites MIT Energy Reductions

MIT is one of seven private colleges and universities cited in a recent Federal Energy Administration report for reduction of energy use as a result of self-initiated energy management programs.

Energy Conservation on Campus: Volume II, Case Studies cites MIT for a cost avoidance of \$1,138,000 equal to 22-23 percent of the total energy budget. The report was prepared by the Energy Task Force through a Federal Energy Administration contract with the Association of Physical Plant Administrators of Universities and Colleges.

Professor August L. Hesselschwerdt, Jr., professor of mechanical engineering, emeritus, in the Department of Mechanical Engineering provided technical support for the report.

Ting on Television

Dr. Samuel C.C. Ting, Thomas Dudley Cabot Professor in the Department of Physics at MIT and co-recipient of the 1976 Nobel Prize in physics, will take part in a two-hour special report on physics and astrophysics to be shown on the Public Broadcasting Service (WGBH Channel 2 in Boston) at 8pm Saturday, May 28.

The program, entitled "The Key to the Universe," is a co-production of the British Broadcasting Corporation and WTTW, Chicago. The program covers breakthroughs achieved this past year by physicists and astrophysicists toward understanding the laws of creation and unraveling the mysteries of how the universe came into being and is sustained. Noted physicists world wide are included in the program.

cal points of their development." Tech Talk regrets the error.

Tech Talk, May 25, 1977, Page 3



May 25 June 5

Seminars and Lectures

Wednesday, May 25

Surgical Treatment of the Hyperlipidemias* - Dr. Robert S. Lees, cardiovascular disease, Director of Arteriosclerosis Center. Seminar arranged by the Clinical Research Center. 9am, Rm E18-408

Return Migration to the Caribbean* -- George Myers, Center for Demographic Studies, Duke University. MIT Migration & Development Seminar. 12:30pm, Rm E53-482.

An Evening with Eleanor Raymond** - Doris Cole, MIT architect. Eleanor Raymond will attend. Committee on the Visual Arts and the Department of Architecture Lecture Series. 7:30pm, Rm 10-340. Hayden Gallery will be open following the lecture.

Thursday, May 26

Some Practical Considerations in Applying Estimation Theory to Navigation System Design* - William S. Widnall, Manager, Dept of Navigation, Guidance and Control, Intermetrics, Inc. Aero/Astro Seminar. 4pm, Rm 37-252. Coffee preceding, Rm 33-222. Note day change.

Friday, May 27

Modal Control of Flexible Sytems* - Mark Balas, Draper Laboratory. Aero/Astro Seminar. 4pm, Rm 33-206.

Wednesday, June 1

The Characterization of a Human Serum Factor that Stimulates Replication* — Dr. Charles Scher, pediatrics, Harvard Medical School. Seminar arranged by the Clinical Research Center. 9am, Rm E18-408.

Community Meetings

Wive's Group** — Group leaders: Charlotte Schwartz, sociologist & Myra Rodrigues, social worker, both from Medical Dept; Carol Hulsizer, faculty spouse in residence, Ashdown Hse. Wed, 3-5pm, Stu Ctr West Lng. Babysitting Stu Ctr Rm 473. Cheryl, x3-4911. May 25: Greg Smith, UROP Staff Member & Member of MIT Corp will present a slide show titled "Here's

through

48 Mass Ave. Bring 3 pillows and an OK from your doctor. \$15/ea class. Info: x3-4138, Mon, 9am-5pm. Last class, May 26, Resuming Sept, '77,

Low Back Problem Exercise Class* - Thurs, 1-2:30pm, Maggie Lettvin,

Summer Art Program** - Sponsored by MIT Student Art Association.

1977 Pre-Retirement Seminar — Thurs, May 26, 9:15-11:15pm. Institute

Benefits. Non-Staff: Nancy R. Woodman, Assistant to the Director of Personnel Relations, Rm A-166 Lincoln. Staff: Allan J. Urquhart, Benefits Of

ficer, Rm A-254 Lincoln. Info: Benefits Office, x658 Lincoln

ses start June 13. Registration from May 23 to June 10, 1-5pm, W20-

TOPS* - Tech Organization of Professional Secretaries. Meetings Thurs, 12n, Walker Blue Rm

The Proposition - Performance for seniors and their parents. Sun, June 5, 8pm, Kresge. Tickets are required, avail in UA Office 9am-4pm and thru Members of Class Executive Committee.

Technology Wives Exercise Class** - Marilyn deKleer, instructor. Sponsored by TWO. An hour of serious exercising. Newcomers welcome. Mon, 8pm, Exercise Room, Dupont Gym. Admission, 50¢.

Social Events

429. Info: x3-7019.

An Evening in May** — Formal Dance sponsored by the Class of 1977. Live music. Formal Dress encouraged. Fri, May 27, 9pm-2am, Morss Hall, Walker Memorial. Tickets: \$5/person, available in UA Office 9am-4pm. Price incl 2 drinks.

Senior Clambake - Sat, June 4, 1:30pm, Kresge lower plaza. Admission, \$5, Tickets available in UA Office 9am-4pm

Movie

The Magician (Bergman)* - Fri, June 3, 7:30 & 9:30pm, Rm 6-120.

Music

David Breitman, pianist* - Sonatas by Beethoven, Brahms, and Schubert. Wed, May 25, 5:15pm, Rm 14E-109.

Chamber Music Society Concert* - Wed, 5:15pm, Music Library. Info:

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

Dance

"Vis-A-Vis", City Dance Theater* - Sponsored by the MIT Student Art Association. May 26-28, 8:30pm, Kresge Little Theater. Tickets: \$3 in advance, \$3.50 at door, students, 50¢ off. Info: Art Association, x3-7019, or 354-

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

Renaissance Dance Band* - MIT SCA Dancing. Inviting players recorders or other early instruments, expertise not necessary, Wednesda nights, 8pm, Burton Dining Hall Info: Ron x3-7814.

MIT Folk Dance Club - International: Sun, 7:30-11pm, Sala, Balkan 7:30-11pm, Stu Ctr'Rm 491. Informal: Fri, 12n-2pm, Kresge Ova (Bldg 7 Lobby in bad weather). Israeli: Thurs, 7:30-11pm, Sala.

MIT Dance Workshop - Sponsoring a number of different projects for se cond term. Please check Workshop bulletin board, duPont Armory, Bldg

Exhibits

Drawings by Barbara Steen - On exhibition at the Faculty Club, three

John Messina: Photographs* - Thru Wed, May 25, Creative Photography Gallery, Bldg W31. Mon-Sat, 10am-6pm, Sun, 12n-8pm.

Sculpture by Nancy Schon - June 2-30, MIT Faculty Club

Women in American Architecture: A Historical and Contemporary - exhibition documents the role women have played in the Perspective* history and development of American architecture. Sponsored by the Committee on the Visual Arts & the MIT Department of Architecture. Thru Jun 18, Hayden Gallery, Mon thru Sat, 10am-4pm, free.

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

MIT Historical Collections* — Permanent exhibition Mon-Fri, 9am-5pm Bldg N52, 2nd floor. Bicentennial Exhibits: Katharine Dexter McCormick, '04; Vannevar Bush, '16; Karl Taylor Compton; Norbert Wiener, and 1876 Exhibit, Bldg 4 corridor. The New Technology Exhibit 2nd floor balcony of Lobby 7. Energy Exhibit Bldg E40, 1st floor. Radiation Laboratory Exhibit main corridor, Bldg 8. Astrophysics Exhibit, Center for Space Research Exhibit Main corridor, Bldg 4.

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

Canones* - Music Library, Rm 14E-109. Examples of the use of canons from 7 centuries of music.

Graphics by MIT Design Services* — On exhibit in Bldg 7 corridor.

Athletics

Home Schedule* - Saturday, June 4 - Grad Soccer. Honeywell. 2pm, Briggs Field

Maggie's Self-Designed Fitness Class - Classes 12n-1pm, du Pont fenc ing & wrestling rms; 5-6pm, du Pont T Club Lng. PE credit course, but all

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

*Open to the public

Open to the MIT community only *Open to members only

Send notices for June 1 through June 12 to the Calendar Editor, Room 5-111, Ext. 3-3270 before noon Friday, May 27.

RDA to Fund Fossil Fuel Studies

(Continued from page 1) Harvard-MIT Program in Health Sciences and Technology.

Principal investigator is Dr. William G. Thilly, a toxicologist specializing in human cell studies and associate professor in the Department of Nutrition and Food Science. Co-investigators with Dr. Thilly are Dr. Ronald A. Hites, associate professor of chemical engineering, and Dr. Jack B. Howard, professor of chemical engineering. Director of the Energy Laboratory is Dr. David C. White, Ford Professor of Engineering.

The organization of the longterm effort is a natural combination of studies in progress augmented by adjustments to the needs for meeting the interdisciplinary goals, Dr. Thilly said.

Reproducible soot samples are roduced in MIT's Energy Laboratory, where coal, conventional liquid fuels, and synthetic fuels from coal conversion processes are presently studied under various, specified conditions aiming at increasing the efficiency of energy production. Much of this research area is supervised by Professor Howard.

In MIT's Department of Chemical Engineering, the chemical components of soot will be analyzed, with special emphasis on the potentially hazardous PCAH, under the direction of Professor Hites. This is possible because of the advances achieved in Professor Hites' laboratory in the use of gas chromatographic/mass spectrometric methods for studying complex environmental mixtures. The analytical chemists also are preparing pure PCAH constituents for tests of their effects on human cells in culture.

Dr. Thilly is measuring the ef-

fects of the organic compounds and actual soot samples in a human cell mutation assay. This novel and unique assay, developed in the Toxicology Group within MIT's Department of Nutrition and Food Science, may make it possible to examine very rapidly a large quantity of pure compounds of soot samples for their ability to cause genetic damage (mutations) in human cells.

However, to identify the small number of mutant cells that are present in human cell cultures, it is necessary to screen millions of individual cells. Presently, this is performed by examining the ability of each cell to grow to a large colony on a petri dish. Dr. Thilly has proposed several alternate procedures which may simplify the assay and eventually permit the facile testing of thousands of compounds for genetic hazard to human cells

One proposed procedure involves passing a column of cells through a laser-equipped sensing device, which detects and counts the tagged mutants differentially from unmutated cells. The instruments used, fast-flow fluorometers, have been under development and improvement at ERDA's Los Alamos and Lawrence Livermore laboratories for several

If the screening proves successful, as expected, it could serve as an extremely valuable laboratory procedure for evaluating-in much less time than is now possible—the effects on health of a large number of chemical compounds on human

Contributions to planning the research were made by Dr. Gerald N. Wogan, MIT professor of toxicology, and William A. Peters, research associate in chemical engineering.

Participants in the project include John G. Deluca, Henry Hoppe, and Bruce W. Penman, research assistants in the Department of Nutrition and Food Science, George R. Dubay, research associate in the Department of Clinical Engineering, and John McGrath, research associate in the Department of Mechanical Engineering.

MIT Press Plans Major Art Books

The MIT Press has recently contracted to publish four major titles in the field of art and architecture.

A Sense of the Future: Essays in Natural Philosophy and The Visionary Eye and The Imaginative Mind: Essays in the Philosophy of Art by Jacob Bronowski will be published by The Press in October, 1977, and Spring, 1978. The late Mr. Bronowski wrote The Ascent of Man and narrated the companion television series.

The definitive biography of the famous architect Walter Gropius, written by Reginald Isaacs, Charles Dver Norton Professor of Regional Planning at Harvard, will be published in two volumes with Volume I scheduled for publication in Spring, 1978. The first volume will deal with Gropius's life and draw on personal correspondence. The second volume will concentrate more on his public life and philosophy of art and archi-

Bauhaus in America, scheduled for publication in 1981, will be the comprehensive history of the art and architecture movement in the US. Writing the book is Hans M. Wingler in cooperation with Lloyd Engelbrecht, Peter Hahn, and Peter Selz. The MIT Press published The Bauhaus: Weimar, Dessau, Berlin, Chicago by Hans Wingler in 1969.

City Dance Troupe To Perform Here

"Vis-a-Vis," a revue of choreographed-improvisational works, will be performed by City Dance Theatre (CDT) of Boston at 8:30pm on Thursday through Saturday, May 26-28, in Kresge Little Theatre at MIT.

Sponsored by the MIT Student Art Association, the revue will combine dance, words, music, and visual projections. It marks the culmination of a year's work by Carolyn Brown Termini, Tom Krusinski, and Rylin Malone, the three regular dancers with CDT. The dancers have performed choreographed work for the first time this year. Past performances have been mainly improvisation.

CDT, formed in 1970, is the longest running improvisation dance company in Boston. It performs an average of eight concerts a year at schools and colleges inthe Boston area. It made a crosscountry summer tour in 1974, giving 60 performances in 21 cities.

Tickets for the performances at MIT will cost \$3 in advance, \$3.50 at the door, with a \$.50 discount for students. For tickets and further information, call 354-7338.



CITY DANCE THEATER will present "Vis-a-Vis" at 8:30pm on May 26, 27, and 28 in MIT's Kresge Little Theatre. Members of the dance company are (clockwise, beginning from lower right) Carolyn Brown Termini, Rylin Malone, Thomas Krusinski, and Michael Harris.

-Photo by Rosalie Post

Transit Impact Seen Negligible

"Current efforts to promote transit use and carpooling will probably have only a negligible impact on urban travel patterns in the years ahead," according to MIT Professor Alan Altshuler, writing in the May issue of Technology Review, MIT's journal of science and technology

"The automobile accounts today for about 97 percent of all passenger miles of travel in American urban areas, up from 83 percent in 1950. On the basis of numerous studies of travel demand in urban areas and of consumer response to transit improvements, one may estimate that the automotive share will remain at the current level or increase slightly even if no additional highway capacity is constructed over the next several decades," writes Dr. Altshuler.

Dr. Altshuler is a professor in the Departments of Political Science and of Urban Studies and Planning at MIT. He served as Massachusetts Secretary of Transportation and Construction from 1971 to 1975. He played a leading role during this period in bringing about a massive reorientation of Greater Boston's transportation policies away from large highway projects and toward greater emphasis on mass transit. His Technology Review article draws upon research which he has carried out at MIT over the past two years for the US Department of Transportation.

Doubling the number of transit vehicle miles operated each day and eliminating all transit fares, Dr. Altshuler writes, would increase transit patronage by 60 to 100 percent. Even the more optimistic estimate, however, would raise the transit share of urban travel only to about 5 percent.

Much of the increased transit ridership, moreover, would consist of people who previously did not make the trips in question. Another significant proportion would consist of people who previously rode as automobile passengers rather than drivers.

Thus, the reduction in automobile traffic would amount to little more than one percent. Stated another way, it would offset several months' normal growth in automobile traffic. The cost of achieving this result in 1975, moreover, would have been roughly a tripling of public expenditure (by all levels of government combined) on mass transit-from about \$3 billion to about \$9 billion.

Two Reasons Just as the American romance with highways began to pale in the late 1960s, Altshuler believes, the romance with mass transit has recently begun to pale. The reasons are predominantly twofold. First, transit fiscal requirements have been growing rapidly even as the public mood has shifted dramatically toward support for government austerity. Second, there has been a growing recognition that transit improvements have litconsumption or air pollution emissions.

"Buses and rapid transit vehicles are energy-efficient, lowpollution conveyances if they move with high average load factors,' Dr. Altshuler writes. "Increased service, however, usually means reduced load factors. If doubling transit vehicle mileage generated in fact (as estimated) a 20 to 40 percent increase in patronage, and if half of the new patrons were making new trips or had previously travelled as automobile passengers, then the result would almost surely be an increase in energy consumption and air pollution

"In consequence of the growing sense of the limits of conventional highway and transit programs,' Dr. Altshuler argues, "there has recently been an upsurge of interest in more innovative means of solving the problems of urban transportation." These include the use of special highway lanes for buses and carpools, the provision of dial-a-ride services, regulatory measures to force the development and marketing of improved automobiles, and auto travel disincentives such as gasoline tax in-

Dr. Altshuler seeks to explain in his article why some of these have found ready acceptance, while others, with equal or greater potential as technical solutions, have been treated as "politically untouch-

"The central point to bear in mind," Dr. Altshuler writes, "is that the American political system strives to accommodate new demands without disturbing existing policies and behavior pat-This decision-making approach may be characterized as highly conservative, he notes. At the same time, however, decisionmakers recognize that their task is to manage an extraordinarily dynamic society, which generates a constant stream of new demands and opportunities."

Innovation As A Path In seeking to reconcile these two divergent orientations, Dr. Altshuler finds, "American politicians are drawn inexorably to the idea of technological innovation as a path to problem-solving with minimal disruption of existing social arrangements and behavior patterns. Where technology is unable to do the job, the system often appears woefully ineffective. In dealing with at least some of the major problems of urban transportation, however, it appears to be within a decade of achieving an unambiguous triumph.'

Change strategies tend to be less acceptable politically, Dr. Altshuler believes, to the extent (a) that they inconvenience voters, and (b) that the connection between the public action and the voter inconvenience is clear and immediate.

"With these features of the political system in mind," Dr. Alt-

tle potential for reducing energy

MEMORIAL CONTRIBUTIONS by family and friends to MIT's Anita Porell Krause Memorial Fund are being applied to the purchase of a dual chamber carbon dioxide incubator for use by MIT Professor Paul Gottlieb (above) and his staff in the Immunology Laboratory of the MIT Center for Cancer Research. The equipment is identified with a plaque inscribed "In Memory of Anita Porell Krause, Class of 1948, from her MIT Friends." The gift allows Dr. Gottlieb and has staff to culture cells from normal and leukemic mice to determine the mechanisms by which normal cells of the immune system develop, and the ways in which cancercausing agents interfere with this development. Mrs. Krause, of Great Neck, L.I., N.Y., died last December.

-Photo by Calvin Campbell

shuler writes, "we can rank alternative change strategies in urban transportation in order of political acceptability." He concludes that the most acceptable programs tend to be those that involve public exhortation and spending, because these satisfy the public demand for "action" without compelling anyone to change his or her behavior. Unfortunately, such programs tend also to be quite ineffective.

The least acceptable programs tend to be those that would directly regulate consumer behavior or that would increase the prices paid by consumers. Thus, proposals for gas tax increases, gas rationing, increased peak hour highway tolls, and commuter parking restrictions have to date been rejected out of hand by elected officials.

Regulation of the automobile industry, on the other hand, has proven to be much more acceptable. "Elected officials can reasonably hope that voters will vent any resentment they feel about price increases upon the automobile companies. Thus, the officials can get immediate credit for voting on behalf of safety, clean air, and energy conservation. The cost issue can be deferred until the standards come into effect. Then they can attack the companies for their greed in raising prices to cover the cost of the mandated equipment. (Of course, if the companies can meet the standards without raising prices, all the bet-

Increase Public Spending "We shouldn't be surprised," Dr. Altshuler concludes, "that it has proven more feasible to increase public spending programs and to stop disruptive highway projects than to manage existing highway systems more effectively or to reshape the market framework within which consumers make their travel decisions. Nor should we be surprised that the most feasible innovations in recent vears have been:

-those entailing new or improved services, to be used or not on a purely voluntary basis by consumers, and

-regulatory measures directing the auto manufacturers to produce more energy efficient, safer, less polluting cars."

The first category of innovation, Dr. Altshuler judges, is "unlikely to affect the character of the urban transportation system more than negligibly." The second, however, he finds "to be working, and at quite modest cost to consumers, especially considering that yesterday's alternative was more frequent auto style changes."

"By 1985 the average new American car will probably get twice the gas mileage of its predecessors of the early 1970s, will emit only about 5 percent of the carbon monoxide and hydrocarbons emitted by its predecessors of the mid-1960s, and will include safety features reducing the risk of auto travel to significantly under half the level of the mid-1960s.

'If achieved, these will be remarkable accomplishments. And they will constitute powerful evidence of the ability of private enterprise and modern technology to deal with important societal concerns when given clear public di-

Frailey to Head Amateur Oarsmen

Jack H. Frailey, director of the Student Financial Aid Office, has been elected president and chief executive officer of the National Association of Amateur Oarsmen (NAAO)

The NAAO is the governing body for the sport of rowing in the United States, covering more than 200 member organizations-including MITand some 10,000 participating individuals. Mr. Frailey has been a member of the NAAO board of directors for 13 years and vice president of the organization for the past six

Mr. Frailey also has been appointed to the newly formed executive board of the United States Olympic Committee to represent rowing, now the third largest sport in the Olympic Games.



CBS NEWSMAN Dan Rather (right), together with a CBS camera crew, were at MIT last week to film an interview on space colonization with Dr. Gerald K. O'Neill (left), Jerome Clarke Hunsaker Professor of Aeronautics and Astronautics (Visiting) who spent this past year at MIT on leave from Princeton University. The segment will appear as a part of the CBS program "60 Minutes" during this coming Fall TV season.

-Photo by Calvin Campbell

Evans, MacLellan Appointed Lincoln Assistant Directors

Two new assistant directors have been appointed at MIT's Lincoln Laboratory in Lexington, Mass.

Dr. John V. Evans, associate head of the Laboratory's Division 9, Aerospace, and a member of the

Mayor White Names Luscomb Grand Bostonian'

Social justice crusader Florence Luscomb, MIT '09, was one of seven persons honored by the City of Boston as Grand Bostonians at an awards presentation and dinner on May 18 at the Parkman House.

Mayor Kevin White said of the seven, "Taken together, their lives form a road map of our times and their achievements explain in individual terms the qualities that Boston is famous for. Each is different. The paths they followed were their own, but the common threads are clear: high aspirations, higher achievements, all the while governed by a constant and profound reverence for the human

Those honored with Ms. Luscomb were community activist Melnea Cass, former senator and diplomat Henry Cabot Lodge, drama critic Elliot Norton, business leader and philanthropist Sidney Rabb, former governor and senator Leverett Saltonstall, and historian Henry Muir Whitehill.

Ms. Luscomb received the SB degree in architecture in 1909 and until the outbreak of World War I worked as architect in the Cambridge firm, Lois L. Howe and Manning. During this time she also worked on behalf of women's suf-

Since World War I she has devoted her energies and talents to women's and civil rights issues. A, as a member charter member of NAACP, she has worked on issues ranging from union rights to fighting Senator Joseph McCarthy.

Today Ms. Luscomb is the last of the middle generation of civil rights workers. A resident of a Cambridge commune, she continues to lecture extensively.

Leeds Receives Fulbright-Hays Grant

Elizabeth R. Leeds of Dedham, a doctoral candidate in the Department of Political Science, has won Fulbright-Hays grant for dissertation research on migration policy in Portugal.

Ms. Leeds is one of some 350 young American students and artists selected for awards this year. The Fulbright-Hays program is part of the US State Department's educational and cultural exchange program. The pre-doctoral competition is conducted by the Institute of International Education.

Lincoln staff since 1960, has been named assistant director with responsibilities for advanced research programs in solid state, data systems, seismology and space research.

Donald C. MacLellan, head of the Laboratory's Division 6, Communications, and a Lincoln staff member since 1957, has been appointed assistant director with responsibilities for the Laboratory's satellite communications and energy programs.

Announcement of the promotions was made by Walter E. Morrow, Jr., Laboratory director.

A native of Manchester, England, and a graduate of the University of

Manchester, Dr. Evans was a research fellow at England's Jodrell Bank Experimental Station 1957-60 before joining Lincoln's Division 3, Radio

Physics, where Dr. Evans he played a key role in development of planetary radar astronomy, as well as coherent ionospheric radar observations, using Lincoln's Millstone Hill Radar in Westford. He became associate group leader at Millstone in 1970, group leader in 1972 and associate head of Division 9, Aerospace, in 1975. He became a member of the Lincoln Steering Committee in 1975. From 1966 to 1967, Dr. Evans was George A. Miller Visiting Professor of Electrical Engineering at the University of Illinois-Urbana.

A native of Boston and a graduate of Boston College, Mr.

MacLellan , joined Lincoln of the Systems Engineering Group in 1957 and from 1958 to 1963 worked on design, construction and payload testing for Project



Westford. He Mr. MacLellan became assistant leader, Space Techniques and Equipment Group, in 1963, helping plan, design and test the LES 1 through 6 communications satellites. He became group leader in 1969 with primary responsibility for LES 7. As assistant head, Division 6, Communications, 1971-72, he served as project leader for LES 8 and 9. He became associate division head in 1972 and division head in 1976. He has been a member of the Laboratory's Steering Committee since 1972.

Ads are limited to one per person per issue and may not be repeated in successive issues. All ads must be accompanied by full name and Institute extension. Only Institute extensions may be listed. Members of the community who have no extensions may submit ads by coming in person to the Tech Talk office, Room 5-111, and presenting Institute Identification. Ads may be telephoned to Ext. 3-3270 or mailed to Room 5-111. Please submit all ads before noon, Friday, May 27. They will be printed on a first come first serve basis as space permits.

For Sale, Etc.

Prtble elec typwrtr, Grad Spec, — 75 Smi Corona Coronet 12; case & instruc bklt, exc con \$160 value, ask \$110. Al, x3-3120. - 75 Smith

Mtl office dsk, \$30; uphlstrd armchr, \$5; wdn armchr, \$6; chiffonier, \$35; end tbl, \$5; shelf, \$25; armchr, \$6; chiffonier, \$35; end tbl, \$5; shelf, \$25; fan, \$10; dsk lmps, \$5/ea; dbl bed \$30. Fred, 738-4819, ext 6745. Piano, Norris, upright, full sz, gd cond, x3-4712.

VW bdy & chassis prts; 83 mm pistons/flash barrels; cam shaft; oil cooler; 20 over cases. Scott, 275

2311 (Bedford), aft 8. Sears 3.6 HP outbrd, Best. x181 Linc.

Technics RS-263AUS cassette deck, exc cond, \$95.

Kou, x5-6262 Dorm, evgs. Pr radial snows, 175x15; pr VW snows w/rims;

microwave oven, best. Don, x269 Linc.

Asst'd baby furn incl crib w/mtress & chng tbl. Andy, x8-3528 Draper.

Six 20 gal fish aquariums w/lgt fxtrs, \$12/ea; 30 2' plant or aquarium lgt fxtrs w/bulb, \$3; stainless stl GE wall oven, best. Marion, x3-5205.

English semi-china dishes (8), 6 pc place setting & 2 serving pcs, flwr pattern, \$20. Call 547-7030.

HP25 Calculator, nw, \$99. Tim, x3-4153. Outdr furn md from redwd logs: 5' round tbl w/4

bnchs, 4 armchrs, 2 chr swng, hand md by Canadian Indians. Dave, x3-4489.

DR set, tbl w/leaf & 4 chrs, wint, exc cond, \$100. Irwin, x3-6702.

Advanced scientific calculator. Jim, x3-6460.

ster, x3-2514.

Tobe-Deutschman hi voltage, lw inductance capacitors, 8 microfarads at 25KV, less than 5 microhenries inductance, \$100/unit, orig over \$800, 12 avail. Call 354-8091

Free, 2 mtl equipmnt racks. Ralph, 862-5904, evgs. Reel type pwr mwr, just reconditioned, \$60. x7809

Tent, 12'x12' w/flr & 11'x11' scrn rm, Draw-Tite, lk nw, \$110; Sears lwnmwr, 18", reel type, best; both vry gd cond. x3-3413.

Sofa bed for sum cttge, \$50. Al, x8-3546 Draper. M 3sp bike w/bskts, nd nw tires, \$25 or best. Call

Electronic organ, lft (tube) rgt 2 rnks plus pdls, \$250. Al, x3-1955.

D78-14s, 2, on rims, lk nw, \$50, nego. Wayne, x3-

Toshiba b&w 12" prtble tv w/7 mo left on nw wrnty, \$55; snows, 13", now on Chevette, almost nw, \$35. George, x3-3818.

Must sell this wk, wd frm dbl bd; 2 bureaus; K tbl. formica top, 4 chrs; 9x12 blue grey rug & pad; lg maroon twd chr; ironing bd & old iron; dishes; pots; 21" Zenith prtble tv, nds wrk, \$10; make any offer, Call 782-2373.

M 3 sp bike, \$50. Ed, x3-3770.

Wood 28' extnsn ladder, \$45; 2 ladder jacks, \$10; lwn sweeper, \$9; push lwnmwr, \$6; 5 sp bike, nds wrk, \$8; chrs \$2/ea; Roadmaster wgn, \$10; Canister vac clnr, nw mtr, \$15. Call 862-4826.

Qn sz bed, \$65; sgl bed, \$25; sofa, \$40; Lrg tbl w/drwrs, \$40; flr lamp, \$15. Call 646-2619.

M 10 sp bike, Fuji Finast, exc cond, 2 sets whls. Steve, x3-4427

Ktchn set; couch & chr; 9x12 grn rug; bureau; end tbls; shlvs; appliances, more, nego. Call 547-0758.

Pr Converse Tennis shoes, sz 81/2, nvr wrn, \$7. Phil,

Oak bkcase w/gls drs, \$55. x3-3719.

Apt sale: 6 cshn, 6' down couch, \$250 or best; wing-bckd armchr, \$55; antique DR tbl, \$55; bkcase, (36x30), \$10; mirror; lamps; chrs; misc. Suzanne, 547-7085, days.

Raleigh Supercourse Mark II 10 sp; 2 sm sz Arthur Fulmer Mtrcycl hlmts, \$50 or best. Call 267-3577. Newbury, VT, 12 acres, abandoned hse, \$12,000. Don, x5501 Linc.

Emptying hse, evrything goes, furn, drapes, rug, toys, etc. Call 532-3086, aft 6:30.

Norge prible elec clths dryer, 1 yr, gd cond, \$85. Kathy, x414 Linc

Color Organ, 4 chnl, can drv 300 w/chnl, \$35; 2 boxes w/ridged glass & Xmas tree lgts, \$25; \$50/both, great for dncng. Ken, 926-3349, aft 6.

Fender Telecaster Delux guitar, '73-'74, \$275; Realistic STA-250 amp, 50 wts/chnnl, 1 yr, exc cond, \$200. Helen, x3-4897. Dresser, 5 drwr fruitwd fnsh, \$40. Charles, x3-4726.

Raleigh Intrntnl, 221/2", all Campy, Cinelli ndb & stem, Dura Ace sidepls, exc cond, \$360. Albert,

Luggage, 28" lngth, \$10. Ruth, x3-6580.

Sony TTS-3000 tmtbl w/Shure SME tonearm, \$240 nego. Randy, x5-7170.

VW tires, 2; 3 sp m bike; K tbl & 3 chrs; sofa; sm tbls. Roger, x3-4900.

Stereo rcvr, amfm w/8 tr plyr/rcdr & spkrs, \$70; 3 bkcses, \$30, \$10; Dining set, Scandinavian style tbl & 4 chrs, \$45; Qn sz bed; easychrs; more. Call 494Suffolk Superbe 60 hand lwnmwr, \$10. x3-7704. Steinway upright piano, compl recond. x3-7179. Air cond. 8.000btu. \$125. Jay Gross, 494-0060.

Pwr supplies, + and - 15v @ 1a; 20v @ 200 ma; 12v @ 200 ma; 20v @ 45 ma; 20v @ 750 ma; 6.6v @ 200 ma: \$10/ea. Marc. x3-6313.

M 3 sp 26" bike, \$35; bumper whl-well type bike or mtrcycl car-rack, \$10; 175 SR radial for spare, \$5; mtrcycl rearvw mirror, \$4. Lance, x3-6723.

Stereo: Rcvr 13w/ch. \$120: PE trntbl (by Dual), \$60; Scott spkrs, \$130; Akai csstte deck w/dolby, Pause, etc, \$120; Total System, \$380; Outbord Dol-by for r-to-r etc 20-20 kHz, \$85; all prices nego. Mike, 661-8857, Ive mag.

Upright piano, \$300. Jim, 547-7894.

Compl solid wd BR set, 7 pc, fl sz bed, incl mttrss & bx spr. Call 969-9279.

Lvng cntry, compl hshld furn; Also console piano \$700; Yamaha guitar, \$45; 3 bikes, \$18/ea. x3-5585

Tires, 2 Fulda, 145-13, almost nw, \$20/ea; 4 Delta mtd & hi spd bal on Ford rims, \$70 all. Eva, x3-5742.

Smith-Corona elec typwrtr, \$45. x3-1303.

Lrg butcherblk sofa, brn & wht twd, gd cond, \$150.

Castro cnyrtble sofa/bed, gd cond, \$75 or best, x3-

Fuji S10S 10 sp m bike, 1 yr, exc cond, \$150; beanbag chr. \$10; stereo rcrd plyr, \$5. x3-3665.

Sgl bed w/wd frm, \$40; 3 dressers, \$30, \$15, \$8; wd desk, \$25; K storage tbl, \$10. x3-7140.

Lg sofa, \$10, 2 tel tbls, \$2.50/ea; chr, \$2. Call 494-

BSR 2260 trntbl w/Shure M91ED crtrdge, dust cvr, rcrd cleaner; GAF instmtc crma; both exc cond; Wagner's 4 hr crdng of 'Parsifal' on reels, best. x3-

Vehicles

'64 Chrysler Newport 4 dr sdn, auto, pwr st & brks, 114K, mech sound, gd tires, fair bdy, \$250. Doug Johnston, x3-3516.

'65 VW fstbk, yellow, blk upholstery, cln, gd cond, mny nw prts, runs well, lks great, \$350. Erika, 646-5928, evgs.

'66 Mustang 289 V8, hdtp, 83K, plush int, poor ext, nw exhaust, nds tune-up, \$250 or best. Call 267-2536, aft 6.

'67 Porsche, 912 Coupe, some repairable rust, othrwse exc cond, \$3,200 firm. Lou, x8-3535

'67 T-Bird, 4 dr, 390, lo mileage, \$800 firm. John,

'68 Continental, leath int, exc cond in & out, nw tires, \$1,600. Rose, x3-6124.

'68 Dodge wgn, fine mech, bdy has rust, hvy duty evrythng, best over \$400. x3-7805. '69 Ply Fury III, exc cond, 64K, exc cond, snows, strng eng, little rust, trlr htch, \$500 or better. x3-

'70 Karman Ghia, runs well, bdy nds wrk, 95K, std, \$400. Dennis, x8-4017 Draper.

'70 Mercury Cyclone GT, pwr st & brks, snows, mny nw prts, gd running cond, \$500. x355 Linc.

'70 Porsche 911T coupe, 5 sp, amfm, Ziebart, rcnt paint, clutch, htr bxs, mfflr, gd cond, \$5,500 or best. Paul, x3-7085.

'70 Saab 99E, 66K, 25mpg or better, nw brks, clutch, exh, gd tires, nds sm bdy wrk, \$900 or best. Call 665-1328, aft 4.

70 VW bug, exc mech cond, red, radio, crook lock, \$600. Call 494-8438.

'71 Dodge Coronet wgn, 8 cyl, auto, gd tires, bttry, running cond, inspctn sticker, bdy damage on l side, \$150. x277 Linc.

'71 ac Maverick, 2 dr, 6 cyl, 200 C.I.D. eng, std, top cond, red w/blk vinyl top, \$1,195. x326 Linc.

'71 Pinto Runabout, 1600cc eng, gd tires, fine running cond, bdy rusted away, \$100. Angelo, x8-4547

'72 Ford Torino wgn, 67K, vry gd, some rust, \$1,275. x3-6722.

'72 Linc Cont Mark IV, 46K, fully loaded, all pwr, ac, amfm stereo, mag whls, radials, exc cond, \$4,500. Call 484-0680, evgs.

'72 Merc Monterey wgn, ac, pwr st & brks, nw tires, brks, air shocks, 54K, ask \$1,975. Neva, x3-

'72 Saab 99E, 2 dr fuel inj, amfm, radials, bdy & eng exc cond, nw clutch, \$1,995 or best. Florence, x3-7052.

'72 Volvo 142s, auto, 66K, \$2,000. Call 489-1140.

'73 Buick LeSabre, custom, 4 dr, ac, radio, pwr brks, st, wndws, vinyl rf, A-1 cond, \$2,800. x8-1473

Draper. '73 Honda CL350 K5, blu, rebuilt eng, nw tires, bt try & chain, exc cond, \$700 or best. Sherm, x8-1489

Draper. '73 Merc Capri, radio, rear defogger, best. John McCarthy, x3-2996.

'73 VW bug, radio, tape deck, bike rack, 55K, best. Call 484-7982.

'74 Capri V6, sunrf, radials & snows, equipped for stereo, exc cond, always garaged, nw mfflr, \$1,990.

Call 254-7006, 6-8pm. '74 Chevy Malibu 4 dr sedan, 32K, ac, pwr st & \$2,500 or best. Kenro Suzu '74 Maverick, 4 dr, gd cond, \$2,000. Joe, x3-2710.

'74 Mazda RX2, 4 dr sedan, 31K, & 50K wrnty, auto, amfm, ac, 4 nw radials, 2 nw snows, \$2,500 or best. Call 776-0349 aft 5.

'74 Vega, lux, 28K, auto, radio & acces, silver vinyl top, nw tires & brks, \$1,650 or best. Call 547 '75 Honda, 400cc, 4 cyl, 7K, \$900. Gary, x8-3216 Lost and Found

'75 Yamaha 250 road, lk nw cond, under 2K, w/chn & hlmts, \$600. x3-5950.

'75 GL100 mtrcycl, wndjmmr & lowers, mint cond,

Housing

Allston, 3BR, K, LR, mod B, prkng, \$250. Call 783-0731, aft 5. Arl Hgts, 4BR hse, sub Jul & Aug, \$350, 4 mi to Harv, 6 mi to MIT, quiet. Grace, x3-5821.

Belmont, sum rntl, 3BR hse, furn, avail 6/15-8/30,

Bos, So end, twnhse, wlkng dist to Pru & Copley, furn or unfurn, 5 story hse, 2K, 7/1/77-8/1/78, \$550

w/yd. Call 266-5277 evgs. Bos, Comm Ave, 20 min to MIT, BR apt, LR, K, B, furn, sub Jun & Jul. x3-3601, lve msg.

Bos suburban area, sub 6/77-9/78, compl furn 3BR hse, nw bldg, 30 min drv to unvrsties, ww, ac, mod K, 1½B, wshr, dryr, dw, Call 969-7100, ext 386.

Bos, Back Bay, Drtmth St, sub 7/1-9/1, compl furn, sunny & sec, \$300. x3-5747.

Camb, Mass Ave at Orson Welles, 6/8-8/31, spac, furn, 2BR apt, 8 lrg sunny wndws, cross vntlation, marv vw, \$245, willing to sub BR's sep. Call 354-

Camb, nr Harv Sq on Brdwy, BR, lg LR, eat-in K, porch, \$188 incl ht, avail 6/4. Niti, x3-3625.

Camb, Westgate effic, unfurn, avail 6/10 w/opt for sch trm, \$161 incl util. Call 494-8886.

Camb, Cntrl Sq area, 3 rm furn apt, priv B, htd, all util, on T, 3rd fl. x3-7138.

Camb, Harv Sq. July sub, BR, LR, K, B, furn, \$215 incl util. Call 661-4143, evgs.

Camb, nr Porter Sq. fully furn, 2BR in 2 fam hse, sub 6/15-9/15, dw, dryer, ac, avail 6/15-9/15, \$300.

Camb, 872 Mass Ave, lrg BR apt, ac, dw, avail 7/1, 14 mo lease, \$325 incl heat. x3-7112.

Camb, nr Harv Sq, sub w/opt, BR apt w/mod tile B, sunny, MIT affil only, avail 7/1, \$212 incl ht, off st prkng avail, 2 installed ac nego. Call 492-3098 aft

Camb, nr Harv Law Sch, lux BR apt, 14 mo lease,

Camb, Cntrl Sq, 6 rms, lge, bright, 2 frpl, pianogrdn, prkng, avail 7/1, \$195 unhtd. Call 876-8855.

Camb, Tang Hall, sum sub, compl furn apt w/nice vw, 6/1-9/1, \$95. Sherman, x3-4668.

Camb, lrg sunny BR apt, mod K, disp, sliding gls

drs open to priv patio, beaut encl yd, ww, summer or longer. Call 354-4157.

Christwn, 5 rms, 3rd fl, brk twnhse, nr monumnt, 2 mi to MIT, \$190. Call 241-8275, bef 1pm.

Danvers, 3BR hse w/gar, wlk to ctr, prks & schls, \$39,900. Dave, x495 Linc.

Lex, Harv Bus line, sub Jul & Aug, 3BR Cape, fncd in yd, dog, non-smoker pref, \$400 + util. Call 862-2498.

Medford, 5 big rms, 1st flr, near T, \$250 + util.

Newtonville sum sub, furn BR apt, nr T, gar, \$240 incl util, nego. x5385 Linc.

Reading, 2BR, all mod appliance, crptng, prkng, nr train to Bos, heat, ac, \$275. Carol, x3-4675.

Som, nr Inman, 2BR, sub 6/1-9/1 w/opt, mod bldg

Som, 5 min by bike to MIT, 2BR, LR, K, B, ww

dw & oth K equip, ac, prkng, 6/1-9/1 w/opt, \$260 incl heat. Call 625-3787, aft 4.

Som, 4 rm apt in 3 fam hse, 3rd fl, avail 6/1, nwly renovated, nr Porter & Davis Sq, on T, \$165 incl ht.

Wtrtwn, mod 5 rms, 1st flr of 2 fam hse, 2BR, gar, no pets, quiet safe nghbrhd, avail 6/1, adults, sec dep, \$285 unhtd. Call 924-7124, aft 6.

Wellesley, wtrfrnt, cozy hse avail Sept, 1-2 yrs, furn, 2+BR, 2B, den, wrkshp, mod K & Indry, frpl, lrg balcny, \$480+ util, wl consider exch for Los Angeles area housing. x8-1584 Draper.

Hyannis, 3BR, 5 min wlk to beach & shopes, \$30,000. Barbara, x3-3318.

Fryeburg, ME, 3BR chalet, secl loc, 500 yds to Saco Riv, 20 min to No. Conway, NH, \$110/wk.

ME, nr Rangeley, lux contemp 3BR hse on huge lk,

superb vw, ovrlkng lk, mt rng, wldrnss, swim, hike, fish, canoe incl w/rent. x8-2577 Draper.

Rangeley Lk, ME, 14 rm estate on lk, vy priv 6 acres in game preserve, 6BR, 3B, piano, dshwshr, canoe, frpl, furn, near tennis, golf, horses. \$600/2 wks. Rachel, x3-5612.

ME, lk frnt cabins on 1 acre nr Bethel, \$17,500.

Barrington, NH, Swans Lk, 2BR, LR, K, D area, lrg fam rm, bsmnt, elec heat, 3B, 1¼ hrs to Bos, 20 min to UNH Campus, \$35,000. x3-4661.

Highland Lk. Stoddard, NH, lk frnt cttge, all facil, frpl, screened prch, rowboat, dock, slps 6 cmfrtbly, 2 hrs from Bos, fmlies only, \$185/wk. x8-1130

Madison, NH, Conway Eidelweiss 3BR chalet, 3

priv lakes, tennis, all mod fac, Sailfish boat incl, avail by mo or wk. Frankel, x3-6824.

New London, NH, vac hm, 4BR, 2B, wlk to beach tennis & golf incl, \$150/wk Jun, \$800/mo or \$420/2 wks Jul. B. Watt, x3-7742.

Rumney, NH, Aug rntl, fully equipped 4BR vac hse on 25 acres in Wht Mts w/own idyllic swim

NH, Wht Mts b/w Benton & No. Haverhill, sm yr rnd hse, K, D area, LR w/frpl, 3BR, B, 1½ acres,

VT, rnt Jul, 4BR, fully equipped K, lg LR, swmng pond, beaut setting, 18 acres nr Jay Peak. x3-3128.

Glencoe, Nova Scotia, vac retreat, loc vry priv, 12 acre hlsd site, ovrklng East Riv Val, 2BR & loft for

4 more, swim nr by riv, wtrfl pool, prime spot for brdwtchng, hiking, rock hunting, \$125/wk. Alex

Lake frnt cttge w/lg sandy beach, tennis & golf avail, locally, \$125/wk. Tom, x8-2794 Draper.

Tiger angora cat, 4 yrs, plates, food, nds home. J.

Gd home needed for Alfie, cocker-poo who won the Lobsters' "Name the Team Contest," lvng cntry in late Jun, can't take Alfie. Call x7373 Linc.

Free kittens, avail approx 7/1. John, x5764 Linc.

Chclate Pt Siamese, 10 mos old, quiet disp, free

Nd gd hm for f dog, spayed, all shots, gd w/chldrn & as wtchdg, collie & shepherd mix, 4 yrs. Ross, Draper, x8-1465.

Whoever picked up my MIT spiral binder in Graphic Arts, Bldg 10, call Annis, x5-6676.

Fnd, watch in Walker aft 6.041 quiz on 5/18, dscrb

hole, sailbt avail. x3-7759.

\$25,000. Ed, x3-5763.

Parker, x7453 Linc

Animals

ss, x3-6815

owned, dw, ac, off st prkg avail, \$200. Call

avail 6/15, \$271 incl ht. Eric, x3-1380

x8-3362 Draper.

Call 395-8174.

547-0949.

Call 628-6466.

Steve, x5584 Linc.

Draper.

Grad tckts, wl pay \$5/ea. George, 782-2087.

Need 3 people, m or f, to share sum cttge in Marshfield from 5/27-10/15/77, 1 has back from wtr, 3BR, 6 beds & mod B, \$300/person for season. John, x3-4489.

Visiting prof sks 3BR furn has or apt from 9/1 for 1 full or acad yr, nr gd elemtry sch & easy commute to MIT. Charles Thorn, x3-6265.

Sm office-sz refrig in gd cond, reasonable. Lu-Ann,

Used bass guitar & amp, wrkng cond. Mike, x262

Nw or used stand up dctr's scale. Ann, x3-4905.

Stus to wrk on Tokamak at Nat Mag Lab. flex hrs w/pay, wrk can dev into thesis topic. Alan, x3-5

Used canoe, pref alum or fbrgls, wl pay. Helen, x3-

Sm upright piano, gd cond, \$120. Roger, x3-5270.

Roommates

Arl, on Mass Ave T, f rmmte wntd, own lrg BR in mod ac apt, conv, near sprmrkt, avail Jun-Aug w/opt. Call 646-2485.

Belmont, 2nd prsn, 30-35, for lrg apt nr Fresh Pond, T to Harv Sq. avail now. Martin, x8-1159

w/frpl, DR, 2 prchs, prkng sp, beaut st, avail 8/1 or 7/15, \$128 + util. x7218 Linc.

Brkln, nr T, spac bed/sitting rm, shared K, B, prkng, quiet for study. Call 734-2168.

Camb, Tang, rm in 3BR f apt, beg of Jun w opt. Call 494-0464.

Camb, sunny Cntrl Sq apt, conv loc, 10 min wlk to MIT, avail 6/1, \$69 + elec. Issac, 864-0105, evgs.

Lynn, f to shr 6 rm apt off Lynn Shore Dr, on T, 30 min to Bos. \$162.50 htd. Paula, x3-4701.

smkrs rsnble. Cheri, x3-3929.

So Acton, hee to shr, m, f, or cpl for 5BR hee, acre lot, grdn, avail 6/1. Call 263-1540. Winchester, m or f, to shr lrg 5BR hse, mod K,

apt, avail 6/1, ½ blk to T, 15 min bike ride to MIT, \$73.75 incl heat. Kim Stelson, x3-6050.

Carpools

Draper to Beverly area, nd 1 more to round off carpl. Lew, x8-3584.

Nd ride Wakefield-MIT daily, 7:30-4:30 or 8-5.

Miscellaneous

Fmly Day Care providers in Eastgate to provide care for infnts & tdlrs in yr own hme. Info,

Gen contracting work, sm grp of competent stu w/skills in crpntry, plmbng roofing, painting, let us renovate your hse at frac of prof fee. Mark, x5-6676

Heating, air cond, ventilation, insultn wrk to be done. A. DuBois, 891-7499, aft 4:30.

Charlotte, x3-2589.

Wl type theses, manu, tech, fast & acc, IBM Correcting Selec. Debbie, x3-1848.

Painter wshs to find & shr studio space, ne who wl use wkdys until 6pm. x3-2916. Nd prsn to shr exp & ride on U-Haul to San Francisco, lvng 8/20 approx. Joel, 876-6555, lv msg.

Any kind of typing done. x3-4701. Lndscpng wrk wntd, hire comp stus exp in lwn care, shrubbery & stone wrk, to do yr outdr

impromnts, many wholsle catcas, gratee wrk at frac of prof catrctr's fees. Alex, 1-562-6401. Resumes, applications & letters repetitively typed w/Mag II. Susan M., x3-1356.

Beg & intrmdiate weaving lessons on indiv flr

POSITIONS AVAILABLE

This list includes all non-academic jobs currently available on the MIT campus. Duplicate lists are posted on the Women's Kiosk in Building 7, auticle the offices of the Special Assistants for Women and Work (16-215) and Minority Affairs (10-211), and in the Personnel Office (E19-239). Personnel Interviewers will refer any qualified applicants on all biweekly jobs as soon as possible after their receipt in Personnel.

Persons who are NOT MIT employees should call the Personnel Office on extension 3-4251.

tact their Personnel Officers to apply for positions for which they feel they qualify.

3-4266 3-4267

3-4275

3-4269

Academic Staff, Technical Asst, in Biology to maintain tissue cultures and mouse strains for propagation of cell lines; perform experiments in cell biology; prepare media; transfer cell stocks and reagent preparation. A Bachelors or Masters degree in biology or chemistry required. Course work in chemistry through organic chemistry, and biochemistry and biology helpful. C77-24 (5/25).

Academic Staff, Staff Assistant, Collection Academic Staff, Staff Assistant, Collection Analyses Project, (temp.) in the Libraries Collections Development Department. Will handle several duties to support a project to study materials selection, acquisition, retention and preservation policies of research libraries. Duties will include collecting statistics; reviewing literature; analyzing data and preparing reports; handle special assignments in Collections Department as required. An MLS from an accredited library school plus academic background or experience working with statistics required. Position begins 7/1/77 and is for a six month period. C77-25 (5/25).

developed instruments and components. May develop general purpose peripherals for microprocessor systems and write appropriate program modules for evaluation and use of these program modules for evaluation and use of these peripherals. Additional duties may include prototype productional engineering, printed circuit design, and design and development of prototype apparatus. R77-98 (5/25).

Information Processing Services to produce and maintain documentation and other communication for academic and research computer-using community: supervise a technical writer, the production of a newsletter and other related functions of the production of the production of a newsletter and other related functions. ions; maintain documentation standards. Position involves some direct user consultation. A Bachelors degree, demonstrated ability to apply initiative and to do technical and expository writing, and familiarity with current computerized documentation systems and techniques required. A minimum of five years related experience is required. Programming experience desirable. A77-30 (5/25).

Sponsored Research Staff, Chemical Engineer, in Sponsored Research Staff, Chemical Engineer, the Energy Lab to assist in gathering the various component models developed by group members and integrating them into the fluidized bed combustor system model. A Masters degree in Chemical Engineering, experience in computer programming, mathematical model development, fluid dynamics, heat and mass transfer, combustion kinetics, solid gas reactions and there tion kinetics, solid gas reactions and thermodynamics required. Applicants should also be familiar with fluidized bed. R77-97 (5/25).

development of management information systems and support to the Environmental Medical Service and Division of Laboratory Animal Medicine. A Bachelor's degree is required. MBA preferred. Experience in a health care environment is desirable C77-23 (5/18). Admin. Staff, Assistant Labor Relations Manager in the Office of Personnel Relations. Will work under the general direction of Labor Relations Manager and with board initiative to work independently: assist Manager in all phases of work involving the relationships between the Institute and the various unions representing MIT employees. Emphasis will be on interpretation of Institute-union agreements: grievance handling:

Academic Staff, Laboratory Coordinator, in the Biology Department for a large laboratory course.
Will be responsible for smooth operation of laboratory: material purchase and preparation testing of experimental procedures; assisting in

Sponsored Research Staff, Biophysicist, to conduct research in biophysics using high resolution nuclear magnetic resonance spectrometer. Will utilize theoretical background and experimental results to determine conformation and biochemica roles of large biomolecules; provide consultation roles of large homolecules; provide consultation and instruction to other users of the nuclear magnetic resonance facility. A Ph.D. in biophysics or a related field as well as theoretical and experimental training and experience with nuclear magnetic resonance techniques required. R77-95

Sponsored Research Staff, Biophysicist or Medical Physicist, in the National Magnet Laboratory to Physicist, in the National Magnet Laboratory to perform measurements of magnetic fields over human body and biological preparations. Equipment used includes a superconducting detector in a magnetically shielded room. A Ph.D. in experimental physics, biophysics or electrophysiology required. Some "wet biology" experience experience desirable. R77-93 (5/18).

Sponsored Research Staff, Design Engineer in the National Magnet Laboratory to design supercon-ducting magnets for magnetohydrodynamic power generation including field and force calculations. generation including field and force calculations, cryogenic design, outline and detailed mechanical design, electro-magnetic and thermal design. A Bachelor's or Masters degree in Mechanical (or equivalent education and experience) plus experience in electrical and mechanical design of large electrical machines and in the use of computers to solve engineering design problems required. R77-94 (5/18).

Accounting Asst. V in the Comptrollers Acctg. Of fice. Sponsored Accounting section, to perform in ternal cost audits on research programs; prepar monthly invoices and fiscal reports; assist in cash General busines llow and forecast functions. General ousniess background with 2-3 years of applied accounting experience and 2 years college or business school education required. Applicants must be able to communicate effectively with department administration. B77-188 (5/18).

payroll reports; monitoring of research accounts; preparation of budgets. Will also type correspondence, develop and maintain various files and records. Applicants should be experienced in preparation of payroll and other accounting records, as well as familiar with purchasing and presonnel procedures. Spoken and written compersonnel procedures. Spoken and written con unication skills necessary. B77-202 (5/25).

Secretary V in the Educational Council, an organization of alumni involved in contacting and recruiting prospective students. Will handle a variety of duties including composing correspondence; arrange travel and appointments; arrange luncheons, dinners and other social events without supervision; answer inquiries on procedure to assist alumni and students; assist in developing

Wanted

to claim. Chris, x3-3603.

Used whlbarrow, spade, ptchfrk, rake, etc in gd cond. Joyce, x497 Linc. Students wntd to paint hee in Lex this sum. Tony,

x8-3051 Draper Grad tckts, wl pay big money. John Sallay, 494-

Leica Crores Lee, x5-9838 Dorm, evgs. Bake/broil oven. Sue, x5-7169. Vega rims. 2. Ed. x3-5778.

Grad stu seeks rm in apt nr Cntrl Sq, \$100-\$125, from approx 6/3 on. Bob, 494-8880.

Elec guitar, to buy or trade for nw Soprano sax. Call Larry, x7500 Line.

Tires, 6.00x12", x3-6814.

Brkine, shr 3BR apt w/2 f, own lrg front BR, LR

Camb, off Mass Ave, huge sunny rm in 5 rm, 3BR apt, 6/1-9/1 w/opt, 5 min to MIT, \$100 incl util. Brian, 3-5220.

Camb, rm in 3BR apt b/w Harv & Cntrl Sq, Jun & Jul, \$122. Eric, x3-5938.

Medford, 4 people for lake sd mansion, coop lvng, from 7/1, sunny, spac hse, lrg yd, cpl or sgl, kids ok, to join 1m, 2f, 26+, baby-to-be, cat, semi-veg, non-

lndry, yd, gar, \$100-\$135. x3-5239. M or F to live w/3 m grad stu in rec renovated 4BR

Start or join carpool to Northboro, Ma. Bill x3-

lvng care for intitis & tune Child Care Office, x3-1592.

For grad wk, rms to rent in priv hm. Call 547-3336.

Flute & guitar tchr, all ages, all levels, reas rts.

Pt time sitter wntd for 2 boys in our home in Camb, Jun & Jul. Rosemarie, x3-3152.

Employees at the Institute should continue to con-

Apt to sub, 7/1-8/15, 1BR, pref on or near MIT cmps, up to \$250. Carolyn, (203) 387-1949, call collect. 3-1594 Carolyn Scheer (Secretary - Ann Perkins)

Ken Hewitt (Secretary -Paulette Chiles) Sally Hansen Lewis Redding Richard Cerrato (Secretary - Jenni Leibman)

Virginia Bishop Mike Parr

Sponsored Research Staff, Electrical Engineer, in the Harvard — M.I.T. Program in Health Sciences and Technology to oversee maintenance inventory and documentation of commercial and externally

Admin. Staff, Supervisor, Publications Service, in

Academic Staff, Manager of Financial Services, in Academic Staff, Manager of Financial Services, the Medical Department to be responsible for financial planning, budgeting and departmental accounting activities for the Medical Department and the MIT Health Plan. Responsibilities also include student health insurance, negotiation with

third party carriers and fiscal agencies; continuing

employees. Emphasis will be on interpretation of Institute-union agreements; grievance handling; preparation of arbitration cases; advising supervisory and managerial personnel on labor relations matters; conducting studies and analyses of collective bargining trends and related matters. A strong background in administration of collective bargaining agreements. knowledge of applicable bargaining agreements, knowledge of applicable laws and precedents as well as written and spoken communication skill required. Five years of ap-plicable experience and a degree in law or labor relations preferred. A77-29 (5/18).

scheduling a large teaching assistant group; will act as senior teaching assistant. A Bachelor's or Master's degree in Biology or Biochemistry re-Master's degree in B quired. C77-22 (5/18).

flow and forecast functions. Admin. Asst. V to assist Nuclear Engineering Ad-

x3-6405, lv msg.

Air cond, 5000btu; drssr; shlvs; toaster; desk; etc.

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filing and comunications systems. Excellent secretarial skills, A minimum of 2 years secretarial experience also necessary. B77-194 (5/25).

Secretary IV to two-three Chemistry faculty members to type correspondence, technical manuscripts, course and other material; arrange appointments and travel; monitor accounts. A minimum of two years secretarial experience and technical typing skill preferred. Applicants must be able to set priorities and work with a variety of people. B77-200 (5/25).

Secretary IV to Director of Alumni Records to handle general secretarial duties; type correspondence and reports; answer phone inquiries; maintain die general secretarial duties; type correspondence and reports; answer phone inquiries; maintain files; arrange meetings; handle all other office procedures. Secretarial experience, good typing skill, ability to organize and maintain accurate records required. Candidates should be familiar with MT/ST or willing to learn operation of this equipment. M.I.T. experience helpful. B77-201 (5/25).

Secretary IV, Placement Information Assistant, in the Career Planning and Placement Office, to maintain a library and act as information resource; maintain a library and act as information resource; catalogue employer literature; maintain current Civil Service information; compile statistics on graduating classes; prepare recruiting posters; assist students in locating information; assist in special programs as required. Initiative, good typing skill required. Applicants should enjoy working with people. B77-203 (5/25).

Secretary IV in the Office of the Dean for Student Affairs to assist in the administration of oncampus housing: answer students' inquiries on campus nousing: answer students inquiries on housing policy, procedure; handle typing and ap-pointment schedule for two deans; handle other secretarial duties to support general administra-tion of the Dean's Office. Excellent organization and general secretarial skills required, as well as the ability to interact effectively with students. Position can be structured for a four day work week 1877-175 (5/18) week. B77-175 (5/18).

Secretary IV to 3 Sloan School faculty members who are working in the fields of finance and invest-ment securities. Will type correspondence, manuscripts (including technical material) from handwritten and other drafts; maintain complex files; arrange appointments and travel; handle as-signments. General secretarial skill including ex-cellent typing required. Familiarity with invest-ment securities and options helpful. B77-183 securities and options helpful. B77-183

Secretary IV to two Biology faculty members to handle general secretarial duties including com-posing of letters; typing from handwritten draft and machine dictation. Will also monitor grants; forecast financial commitments; handle duties forecast financial commitments; handle duties related to purchasing of supplies; gather data for preparation of proposals. Ability to set priorities and work independently as well as a command of English are required. Excellent typing, familiarity with accounting procedures and with the use of districtions of the command of the country of the command of the country of the command of the country of the countr dictation equipment also necessary. B77-180

Secretary IV to a Biology Department Faculty member to type correspondence and grant proposals mainly from dictation equipment; answer phone; order office supplies; administer petty cash. Will also perform secretarial duties related to the operation of a research lab which includes monitoring several research accounts Secretarial experience required; excellent typing and aptitude for figures also necessary. B77-179

Editorial Asst. IV in the MIT Press Editorial Department to initiate correspondence; handle some editing duties and copyright registration; assist editors with manuscripts and proofs as necessary; handle other special projects as required. College degree and experience in editing and handling proof required. Good typing and English grammar skills also necessary. B77-187 (5/18).

Secretary IV in the Harvard-MIT Program in Health Sciences and Technology to perform general secretarial duties for faculty member: prepare class materials; arrange travel, meetings and seminars; maintain files and petty cash. May perform some duties under direction of senior secretary. Excellent secretarial skills including shorthand/speedwriting and machine transcription abilities required. Applicants should have secretarial school training or at least 2 years secretarial experience and be able to work under pressure. Non-smoking office. B77-139 (4/27).

Secretary IV to Advisory Services Officer, MIT Sea Grant Program, to type reports; maintain complex appointment calendar; arrange travel and seminars; process requests for Sea Grant Publica-tions; maintain invoice and inventory records; take minutes of meetings. Will also perform general secretarial duties for 2 other staff members. 3 years secretarial experience, shorthand and organizational skills required. Familiarity with scientific terminology and MIT experience prefer-red. B77-102 (3/16).

Secretary III-IV in the Office of the President and Chancellor Analytical Studies and Planning Group to provide secretarial support to Group staff members involved in various projects for MIT's central administration and faculty committees. Will perform receptionist duties; provide information on committee procedures to students; type correspondence, reports; schedule meetings; main-tain files; perform related duties including oc-casional secretarial assistance to another MIT of-fice as required. Position requires occasional overtime. Excellent general secretarial skills required. Formal secretarial training as well as experience preferred. College training helpful. Non-smoking office. 37½ hrs./wk. B77-191 (5/18).

Secretary III-IV to Chemical Engineering Ad-Secretary III-IV to Chemical Engineering Administrative Officer to handle general secretarial duties in headquarters office. Will also maintain departmental contract/grant records; assist in various arrangements for visiting personnel. Ability to organize own work load, general secretarial skills required. Secretarial school training preferred. Shorthand and/or machine transcription skills (or willingness to learn) also preferred. Shorthand and/or machine iscription skills (or willingness to learn) also MIT faculty and students as well as represen tatives from industry and other universities. B77-176 (5/18).

Secretary-Clerk Typist III, temp., (academic year) in the Career Planning and Placement Office to handle a variety of typing related to fall and spring recruiting season; arrange interviewing schedules; set up coffee for recruiting sessions; interact with students and company representatives. Typing skill, ability to work independently and with a variety of people required. Hours 8AM-4PM. Position is for the period 9/19/77-4/1/78. B77-178 (5/18).

Secretary III in Information Processing Services Computer Operations section will type cor-respondence and computer related reports; mainain office files and time records; answer phones distribute reports. A minimum of one year's office experience including some secretarial experience required. Excellent typing and English grammar skills also necessary. B77-190 (5/18).

Secretary III in Mathematics headquarters to hande receptionist duties; answer phones; assist stu-dents and others with inquiries; prepare student payroll report; handle general secretarial duties for headquarters staff. Excellent typing skill required, as well as ability to handle detailed work. Applicants should be willing to learn mathematical typing. B77-208 (5/25).

Secretary III in Meteorology Department Polymode Office to type correspondence, reports and other material; order supplies; maintain files; operate telecopier (will be trained); handle other operate telecopier (will be trained); handle other general secretarial duties as necessary. Excellent typing skill, familiarity with office procedures; plus 2 years secretarial experience or secretarial school training required. Non-smoking office. B77-204 (5/25).

Section Head V in the Processing Office of Barker Engineering Library to have responsibility for the

Office's daily work flow: train and supervise stu-dent assistants; process all serial items (multi-media formats); claim overdue materials; review and direct preparation of augmented catalogue entries; assist in special processing projects as necessary. Applicants must have extensive experience in the cataloguing, processing or collections unit of a library as well as the ability to supervise others. Typing skill is also necessary and knowledge of a foreign language is helpful. B77-182

Library General Asst. IV, Microform and Technical Reports Asst, in the Humanities Library to process and distribute technical reports; main-tain microform collection; assist users in use of microform reader and checklist and in locating materials; coordinate activities of student employees; assist at Catalogue Information Desk. Excellent organization skill and capacity for detail required. College training and library experience desirable. B77-199 (5/25).

Sr. Library Asst. IV in the Institute Archives. Duties include processing of theses; routine accessioning, sorting and processing of archival and manuscript collections; assisting users in locating materials; supervision of student assistants; shelved. ing materials; answering phones. A Bachelor's degree, or equivalent experience, ability to handle detailed work accurately required. Library or archival experience, and familiarity with MIT desirable. B77-181 (5/18).

Library General Asst. III in the Libraries Catalogue Department to type entries on the OCLC 100 computer terminal for preparation or catalogue cards; perform clerical aspects of reclassification and cataloguing; type reference cards; file; perform other clerical assignments as necessary. Some college or business school training, excellent typing skill, and ability to interpret complex directions required. Library experience helpful. 12n-8pm. B77-195 (5/25).

Keypunch Operator III, Data Entry Operator, in Administrative Computing Services to enter a variety of routine data; punch cards from previously coded data or from data requiring application of routine codes; operate a verifier in checking operations. Applicants should be high school graduates, or equivalent, and have ability to operate keypunch equipment (IBM 129), B77-189 (5/18).

Sr. Clerk IV in the Alumni Assn. to type and operate keypunch and computer terminal to process address changes, new entries and other in formation on computerized records; answer telephone inquiries; operate adding machine. Fast, accurate typing skill or 1 year keypunching experience required, as well as the ability to work under pressure. B77-196 (5/25).

Sr. Clerk IV. Assistant Corporations Analyst, in Resource Planning, Development Office to assist Corporations Analyst in providing data from various sources on donors and prospective donors; evaluate and summarize incoming correspondence for action; assemble data on companies for use by senior officers; maintain various files and records Ability to interpret and carry out directions, to deal tactfully with people, and to work under pressure required. Applicants must be able to set and follow priorities. B77-207 (5/25).

Sr. Clerk IV in the Community Housing Service to handle various duties: arrange for maintanence and scheduling of special housing; type correspondence, forms and other material; advise students, employees and other on housing resources. A minimum of three years experience in a public service related area, preferably housing or hotel services oriented setting, is required. Applicants must have strong general administrative and clerical skills and the ability to work under pressure. B77-205 (5/25).

Sr. Clerk III in the Medical Record Room to be responsible for pulling and filing medical records from phone and written requests; dispatching records to proper station; filing updated medical material (x-ray, lab results, etc.) into patient material (x-ray, lab results, etc.) into patient in-records; assisting with maintenance of patient in-dex file. Previous office experience, ability to work under pressure and to handle a wide variety of clerical tasks required. Speed and accuracy in handling a complicated file system also necessary. Position requires standing on feet all day. B77-177 (5/18)

Hourly, Campus Patrol Officer, to have responsibility for protection of life and property including traffic control; policing of parking lots; foot patrols of grounds and buildings; first aid including ambulance service; participation in emergency procedures. Will also conduct investigations and write reports. Applicants must have a minimum of 3 years experience in all phases of law enforcement (to include criminal law, knowledge of court to include criminal law, knowledge of cour procedures, criminal investigation, case preparation, investigation of complaints and report writing) and qualify with use of firearms. A valid driver's license and Honorable Discharge for any earlier police service, as well as ability to pass Institute physical examination also necessary. Applicants will be required to obtain Emergency Medical Technician Certification and may be required to successfully complete additional policiacademy training. Position requires long hours, on occasion; rotating shifts. H77-79, H77-80 (5/18).

The following positions were still available at Tech Talk deadline. The date following each position is the date of the most recent Tech Talk issue in which the position was described.

ADMINISTRATIVE STAFF

A77-3, Systems Prog., Info. Processing Serv. (2/16)
A77-15, Director, MIT Alumni Fund (4/13)

A77-19, Director, MIT Authin Fund (4/15) A77-19, Prog., Analyst, Info. Proc. Serv. (5/4) A77-20, Prog., Analyst, Info. Proc. Serv. (5/4) A77-21, Systems Prog., Info. Proc. Serv. (5/4) A77-22, Asst. Dir., VP, Resource Devel. (5/4) A77-23, Prog. Analyst, Info. Proc. Serv. (5/11) A77-25, Legal Asst., Off. of Spons. Prog. (5/18) A77-26, Syst. Prog., Info. Proc. Serv. (5/18)

BIWEEKLY

6-613, Sec. IV, Ctr. for Policy

(12/1)
B77-70, Sec. III-IV, Chemical Engineering (3/16)
B77-114, Sec. IV, Medical Dept. (4/6) B77-126, Sec. IV, Ctr. for Policy Alternatives

5/4)
B77-132, Sec. IV, Sloan School (4/27)
B77-132, Sec. III-IV, MIT Assoc. Prog. (5/4)
B77-138, Sec. III-IV, MIT Assoc. Prog. (5/4)
B77-144, Sec. IV, Medical Dept. (5/4)
B77-147, Sec. V, Treasurer's Office (5/4)
B77-147, Sec. IV, Off. of Res. Devel. (5/4)
B77-151, Sec. IV, Aero/Astro Dept. (5/4)
B77-152, Sec. IV, Industrial Liaison Prog. (5/4)
B77-155, Sec. IV, Industrial Liaison Prog. (5/11)
B77-159, Sec. IV, Energy Lab. (5/11)
B77-161, Sec. III, Mech. Eng. (5/11)
B77-161, Sec. III, Mech. Eng. (5/11)
B77-164, Copy Machine Asst. III, Libraries 5/18)

B77-165, Tech. Asst. V, Haystack Observatory,

B77-165, Tech. Asst. V, Haystack Observatory, Westford (5/18)
B77-169, Sec. IV, Libraries (5/18)
B77-170, Sec. IV, Ctr. for Trans. Stdy. (5/18)
B77-171, Sec. IV, Sloan School (5/18)
B77-172, Sec. IV, Nutrition & Food Sci. (5/18)
B77-173, Edit. Asst. IV, MIT Press (5/18)

ACADEMIC STAFF: C77-4, Tech. Asst., Biology (4/6) C77-7, Asst. Librarian, Dewey Lib. (4/27) C77-8, Aero/Astro Librarian, Libraries (4/27) C77-19, Humanities Librarian, Libraries (4/27) C77-17, Asst. Librarian, Broke Lib (5/4)

C77-17, Asst. Librarian, Rotch Lib. (5/4) C77-18, Asst. Radiation Protection Off., Medical Dept. (5/4) C77-20, Asst. Dean, School of Arch. & Planning

SPONS. RES. STAFF: D76-17, Biochemist, Res. Lab. of Elec. (2/25) D76-121, Res. Engineer, Energy Lab. (7/28)

Feeling Creative? Check Out Summer Art Course Listings

Drawing, photography, stained glass, clay, and woodworking classes open to all members of the MIT community will be offered by the MIT Student Art Association (SAA) during the summer.

Classes will meet weekly for ten weeks from June 13 through August 19. Registration has started and will continue through June 10, Monday through Friday, 1pm to 5pm, in the SAA office, Rm W20-429.

Payment should be made when registering. Full refunds will be given for classes that do not reach minimum enrollment; prorated refunds will be given for classes dropped by July 1. The lower of the two fees listed applies to students and their spouses; the higher fee applies to all other MIT community members.

For further information, call the SAA, Ext. 3-7019.

SAA summer courses are:

Drawing from Still Life and the Model, Monday, 7:30-9:30pm, \$25/30, taught by Malka Kutnick and Maria Vitagliano. Course will provide strong, practical knowledge of drawing fundamentals with emphasis on space, line, volume, shape, and composition.

Tuesday Night Open Life, Tuesday, 7:30-9:30pm, \$15/20, no instructor. Model will be available for drawing or painting in medium of your choice.

Basic Photography, Wednesday,

D76-123, Staff Biophysicist or Biochemist, National Magnet Lab. (7/28)
D76-126, Immunologyist, Clinical Res. Ctr.

D76-187, Postdoc. Sci., Ctr. for Space Res. D76-188, Postdoc. Sci., Ctr. for Space Res

D76-225, Sci. Applications Prog., Lab. for Nuclear Sci. (5/4)
D76-232, High Energy Physics Res., Bates
Linear Accelerator (1/5)
D76-233, High Energy Physics Res., Bates
Linear Accelerator (1/5)
D76-243, Metallurgist, National Magnet Lab.

D76-244, Manager, Combustion Facility, Energy

Lag. (1/12)
D76-246, High Magnetic Field Res., National Magnet Lab. (2/9)
R77-16, Prog. Mngr., Energy Lab. (2/9)
R77-17, Systems Theory Res., Elec. Syst. Lab. (201) R77-22, Astro Physics Res., Ctr. for Space Res.

R77-26, Planetary Radar Data Analysis, Earth & Planetary Sci. (3/2) R77-33, postdoc. res., Physics, Ctr. for heoretical Physics (3/9)

Theoretical Physics (3/9)
R77-34, postdoc. res., Physics, Ctr. for Theoretical Physics (3/9)
R77-35, postdoc. res., Physics, Ctr. for Theoretical Physics (3/9)
R77-36, postdoc. R77-36, postdoc. res., Physics, Ctr. for Theoretical Physics (3/9)

R77-37, High Energy Physics res., Bates Linear Accelerator (3/9) R77-43, Sr. Elec. Eng., Plasma Fusion Ctr.

(3/23) R77-49, Res. Eng., Energy Lab. (3/23) R77-51, Sr. Res. Eng., Energy Lab. (3/23) R77-53, postdoc. res., Physics, Res. Lab. of Elec. R77-67, Sr. Design Eng., National Magnet Lab.

R77-72, Instrumentation Physicist/Eng., Energy R77-73, Plasma Physicist, National Magnet Lab. (4/27) R77-74, Plasma Physicist, National Magnet

Lab. (4/27) Nuclear Magnetic Resonance Res.,

National Magnet Lab. (4/27) R77-79, Postdoc. Res., Physics, Lab. for Nuclear Sci. (5/4) R77-80, Postdoc. Res., Physics, Lab. for Nuclear

R77-81. Biochemist. Ctr. for Cancer Res. (5/4)

R77-83, Applications Analyst, Energy Lab. (5/4) R77-83, Legal Research, Energy Lab. (5/11) R77-85, Comp. Specialist, Energy Lab. (5/11) R77-86, Admin. Officer, Sea Grant Prog. (5/11) R77-91, Sr. Accelerator Physicist, Lab. for Nuclear Sci. (5/18)

R77-92, Elec. Eng., National Magnet Lab. (5/18)

E76-41, Principal Oper., Physical Plant (12/1) E77-5, Real Time Diganostic Syst., Prog. Haystack Observatory (2/2) E77-11, Resident House Mngr., Housing & Food Serv. (4/13) E77-13, Eng. Asst., Energy Lab. (4/13)

Tech. Asst., Environmental Medical E77-14. Serv. (4/13) 7-16, Admin. Asst., Libraries Microreprod.

E77-19, Circulation Mngr., Alumni Assoc. (5/4) E77-21, Admin. Asst., Stud. Fin. Aid (5/11)

HOURLY H77-29, 2nd. Class Engineer, Physical Plant (3/9) H77-71, Cook, Endicott House, Dedham (5/4)

The following positions have be the last issue of TECH TALK. been FILLED since Admin. Staff A76-44 A76-52 Admin. Staff Clerk III-IV Nurse Spons. Res. B77-50 D76-212 Spons. Res Lib. Asst. IV Sec. V B77-168 B77-150 Spons. Res. CANCEL Acad. Staff Acad. Staff R77-39 Admin. Staff Admin Staff A77-13 Admin. Asst. Histology Tr. Lib. IV Sec. III E77-15 B77-163

The following positions are on HOLD pending final Admin. Asst. V Tech. Writer



PAINT BRUSHES and clay await members of the MIT community who register for SAA summer classes.

7:30-9:30pm, \$25/35, taught by Linda Wasko. Camera and darkroom use and analysis of photographs will be covered in this introduction to the tools and techniques of picture making. Lectures, demonstrations, discussions, and darkroom use included.

Special Projects in Photography, Thursday, 7:30-9:30pm, \$30/40, taught by Linda Wasko. Special darkroom techniques, photocollage, analysis of photographs, studio photography, and photographics are possible areas of study in this course designed to encourage individual experiments in photography. Course will be tailored to student needs. Working knowledge of photographic and darkroom basics is assumed.

Non-Class Photography, \$20/30. Use of SAA darkroom facilities, including chemicals. Mandatory orientation will be held at 6pm, Monday, June 13.

Stained Glass, July 28-31, 6-9pm, \$25/30, taught by Mark Van Note. Design and make a stained-glass

Basic Claywork, Thursday, 7:30-9:30pm, \$40/50, taught by Erika Hartwieg. Development of handbuilding techniques, wheel throwing, and glaze firing, with studio use, are covered in this introduction to the basic working properties of clay.

Clay Sculpture, Monday, 7-9pm, \$40/50, taught by Sheela Gladwell. Explore techniques of handbuilding by using slab, pinch, and/or coil methods. Discover form, texture, and colorants applied directly into the clay.

Glaze Chemistry, Wednesday, 7:30-9:30pm, \$40/50, taught by Ellen Saslaw. Learn about glaze chemicals, make up glazes, and continue experiments to get good colors.

Non-Class Clay, \$30/40. Use of ceramics studio including clay, glazes, firing. Mandatory orientation will be held on Monday, June 13, at 6pm.

Woodworking, Tuesday, 7-9pm, \$30/35, taught by Sheela Gladwell. Make a small table, box bowl, or other object in course covering design, use of hand tools, wood identification, jointery, lamination, and finishing.

Other Non-Class Use, \$10. Use studio for painting, stained glass, etching, jewelry, or other work, except as above.

Scrimshaw Named Atwater Lecturer

Dr. Nevin S. Scrimshaw, Institute Professor and head of the Department of Nutrition and Food Science at MIT, has been chosen by the US Department of Agriculture (USDA) to deliver the ninth W.O. Atwater Memorial Lecture.

Professor Scrimshaw studies world public health problems, and he is a recognized authority on the physiology of development and the determination of nutritional requirements. He is the director of the International Nutrition Planning Program at MIT, and senior adviser to the rector of the United Nations University for the World Hunger Programme.

The lecture, which will be presented at the Western Hemisphere Nutrition Congress V, August 15, in Quebec, Canada, honors Dr. Wilbur Olin Atwater (1844-1907), the USDA's first chief of nutrition investigations.



In a quiet moment at a reception for Edward Capon, author of Art and Archaeology in China, Helen Osborne, managing editor of the MIT Press and George N. Cates of Cambridge examine Capon's book which will be distributed by the MIT Press. Cates is author of The Years That Were Fat which has been recently reissued by the Press in hardcover. Mr. Capon, who is Deputy Keeper in Oriental Studies at London's Victoria and Albert Museum, could not attend because of a skiing accident.

-MIT Photo by Calvin Campbell

Sloan School Issues Study On Arbitration

By CHARLES H. BALL

Staff Writer
An MIT study has concluded that the state's controversial "final-offer" arbitration law governing police and firefighter salary negotiations has had no impact on salaries in the three years it has been in effect.

The state Legislature presently is considering whether to extend the law, which took effect on July 1, 1974, and is due to expire on June 30.

The law has been the subject of intense debate. Police and firefighter unions generally favor an extension, while municipal officials oppose it on the grounds that the new arbitration provisions have had a significant inflationary effect on salaries.

The MIT researchers have yet to complete a full analysis of their five-month study, but have issued an abbreviated report because of "the immediacy of the situation." The report covers the findings most closely related to the issues under debate in the Legislature.

"We have found that the dispute settlement provisions of the law have had no effect at all on rates of salary change," said Professors David B. Lipsky and Thomas A. Barocci of MIT's Alfred P. Sloan School of Management. "Our best estimate," they added, "is that salaries would be almost the same if there had never been an addition to the law."

Other major findings, they said, were these:

—The number of police and fire contract negotiation impasses increased significantly after the passage of the final-offer statute.

—Salary changes resulting from arbitration awards were not significantly different from salary changes achieved through other processes such as collective bargaining, mediation or fact-finding.

—The rates of salary increases for police and firefighters in Massachusetts have not differed significantly under the new law from those in other northeast states that use different methods to solve police and firefighter salary disputes.

—Economic, social and environmental factors that might have been expected to be related to police and fire salary changes had no influence

Tennis Lessons

MIT tennis team members Peter Moss and Reid Sheftall will give group tennis lessons, sponsored by the MIT Department of Athletics, for beginning and intermediate players this summer.

Manny Weiss, women's tennis coach, will give private and semi-private instruction.

Classes, limited to ten students, meet for eight one-hour sessions and cost \$15. Members of the MIT community with current Athletic Cards and their immediate family over 13 years old are eligible.

Registration forms are available at the duPont Tennis Courts, Athletic Office, and duPont Equipment Desk. Forms and checks payable to MIT should be returned to the Department of Athletics, Rm W32-109, as soon as possible. Enrollment is on a first-come, first-served basis.

Starting times and dates for group lessons are:

Beginners: noon, 4:15, 5:15, and 6:15pm, Mondays and Wednesdays, starting June 6, July 6, and August 1.

Intermediates: noon, 4:15, 5:15, and 6:15pm, Tuesdays and Thursdays, starting June 7, July 5, and August 2.

Classes will meet at the du-Pont Tennis Courts or, should it rain, at the Carr Indoor Tennis Center. Students must provide flat-soled tennis shoes, rackets, and bring a can of new tennis balls to the first class.

To arrange for private or semi-private lessons costing \$6/half hour and \$12/hour, call Mr. Weiss on Ext. 3-4919. or only a weak influence. These factors included state aid to communities, population growth and unemployment.

"The new law, in short, did not alter the fundamental processes that affect salary change," said Professors Lipsky and Barocci, who headed the research effort. "A very important influence on salary changes was what we call a 'catch-up' effect. That is, the salary increases were higher in towns and cities that were ranked low to begin with. There probably was a compression of salary differentials across the state-the differences tended to diminish. This has been going on elsewhere, too, which would account for the fact that the rates of salary increases have been similar in a number of states.

"We have seen traditional economic and political processes at work since the new law went into effect, rather than a new form of bargaining," they said.

Before the law went into effect, police and firefighters had several options in settling contracts with towns and cities. They could do so on their own through the collective bargaining process, or could declare an impasse and obtain the services of first a mediator and then a fact-finder. The new law retained the mediation and fact-finding services—which are not binding—but provided also that the dispute could go to final-offer arbitration.

Under this form of arbitration, an unusual technique used only in a handful of states, both sides submit their best offers to an arbitrator, who must choose one or the other. This in theory leads the parties to submit final offers that are more realistic than might be the case if they expected the arbitrator to try to arrive at a compromise or split-the-difference solution. If they seek too much, they run the risk of losing the arbitration case to their bargaining opponent.

Another theory is that final-offer arbitration provides incentives for the parties to reach settlements—to negotiate their differences and make concessions—without resorting to arbitration at all.

However, this didn't prove to be the case. According to the study team's report, there were 168 police and fire negotiation impasses in the three-year period preceding passage of the law, and 355 impasses in the first two and one-half years following passage.

"To what extent these changes in the process can be attributed to a 'chilling effect' created by the law itself, to the parties' desire to experiment with a new technique of dispute settlement, or to the tougher economic climate that prevailed after 1974 is problematical," the report

The MIT researchers added that the use of final-offer arbitration has declined in each of the years since the law took effect.

"The parties had a new toy at first and weren't sure how it would work," they said. "Some wanted to see how it would work, and tried and went all the way, particularly in the first year. But fewer used it in the second year and even fewer in the third year. They had satisfied their curiosity in the subsequent years and

Thursday

Saturday

Friday

9-6

9-5

closed

9-5

9-5

closed

12-5

12-5

went back to bargaining along timeworn paths."

The researchers examined data for the period 1973-76, which roughly took into account the two years before the law was passed and the two years since. This data then was used for statistical computations involving the rates of salary increases for police and firefighters in cities and towns throughout the state and the processes through which settlements were reached through collective bargaining, mediation, fact-finding or arbitration.

"We found that the process made no difference, and that there was no significant difference in the rates of salary change for any of four employee groups—firefighters, patrolmen, police sergeants and fire lieutenants," they said.

A "minor exception," they said, was that arbitration did seem to have an impact on the salary changes of fire lieutenants in 1975-76. "Their settlements were higher than one might have expected. The reason probably is that fire lieutanants by number constitute only a small proportion of the work force in a fire department."

Dr. Lipsky is a visiting associate professor at the Sloan School. Dr. Barocci is assistant professor of industrial relations. They were assisted by William Suoanen, an assistant professor at Northeastern University, who is a PhD candidate at the Sloan School.

Record Number Of Sophomores Enroll in VI-A

A record number of 73 students will enter the cooperative program in the Department of Electrical Engineering and Computer Science (Course VI-A), according to John A. Tucker, program director.

Participation in the VI-A program, Mr. Tucker said, now stands at more than 12 percent of the student population in the department. Current total enrollment in Course VI-A was 174 students this year.

Course VI-A provides industrial and research experience concurrent with academic work through organized work assignments interwoven with regular studies. Most students enter the program in their sophomore year and receive the SB and SM degrees following their fifth year

The new class of VI-A students was selected from 165 applicants by the 18 companies affiliated with the program. Representatives of the companies conducted nearly 800 interviews with the applicants during a two-day visit in March. From the interviews, the companies rank ordered 102 of the applicants. Final selections were decided through 415 individual conferences with Mr. Tucker.

Enrollment in Course VI-A has risen rapidly since 1970 when Mr. Tucker became its director. That year 39 sophomores applied and 29 were placed. The success of the VI-A program has led to establishment of similar programs in several other departments in the School of Engineering.

Experimental Farm to Test Photovoltaic Crop Irrigation

(Continued from page 1) season has come to an end, the solar-cell unit will be tested as a power source to drive large fans used for drying grain in storage bins. Two bins, each equipped with a five-horsepower fan, will be used to store and dry the 12,000 bushels of corn expected to be harvested from the 80-acre experimental field.

The importance of developing alternative energy sources for irrigation was indicated by Ronald W. Matlin, assistant manager of the MIT Lincoln Laboratory Photovoltaic Project. He stated that, "Over 35 million acres are irrigated in the United States at an annual cost for fuel in excess of \$500,000,000. Fossil fuel supplies for this irrigation are becoming inadequate in some locations as well as becoming ever more expen-

He further stated, "At the present average ERDA purchase price of \$15.50 per peak watt, solar cells are much too expensive for use in irrigation and other agricultural applications except on an experimental basis, but systems of this type should become economically viable on a much wider scale when the 1986 ERDA goal of solar cells at 50 cents per watt is

achieved."

This irrigation experiment is the first in a series of field tests to be carried out for ERDA in several different application areas, according to Marvin D. Pope, manager of the Lincoln Laboratory Photovoltaic Project.

"Our objective is to test photovoltaic power systems on a scale large enough to permit a realistic assessment of their technical, institutional, and economic potential," he said. "The results will simplify and expedite the practical use of such systems as suitable solar cells become available."

Obituary

James E. Andrews

James E. Andrews, 51, a carpenter at Lincoln Laboratory died Monday, May 16, in Clearwater, Florida.

Mr. Andrews joined Lincoln Laboratory in 1967 and had been on long-term disability since 1972. He is survived by his wife and several children.



HIGH AND DRY are these employees of Boston Chimney and Tower Co., Salem, working in Tuesday's heat atop the 180-foot chimney at the MIT Central Utilities Plant, Building 42. They won't be dry for long, however, because the insulated jug being hoisted aloft on the rope to the left of the chimney is full of Kool Aid. The workmen are replacing the metal cone on the top of the chimney and repairing the brickwork on the face of the structure. The cone, part of the stack's anti-pollution equipment, was damaged in a recent windstorm.

—Photo by Calvin Campbell

24 Hours

24 Hours

24 Hours

8:30-9

8:30-6

8:30-4:30

8:30-4:30

closed

MIT Libraries Summer Term Hours

Wednesday, 5:00pm May 25, 1977 through Sunday, September 11, 1977 Chemistry Aero & Humanities MRL Astro Archives Dewey Lindgren Sunday closed closed 1-6 closed closed 1-6 closed closed 9-9 9:30-4:30 8:30-6 8:30-9 9-5 9-5 Tuesday 9-5 9-5 9-9 9:30-4:30 8:30-6 8:30-9 9-5 9-5 8:30-9 9:30-4:30 8:30-9 9-5 Wednesday 9-5 9-5 9-9 9-5 9-5 Thursday 9-5 9-5 9:30-4:30 8:30-6 8:30-9 9-5 Friday 9-5 9-5 9-6 9:30-4:30 8:30-6 8:30-6 9-5 9-5 12-5 closed closed closed Saturday closed 12-6 9-5 closed Rotch Von Hippel Reserve Visual Student Materials Collection Science NASIC Rotch Center Music **Book Room** Center closed closed closed closed 1-6 24 Hours closed Sunday closed 8:30-4:30 8:30-9 9-5 24 Hours Monday 9-6 9-5 12-5 9-5 8:30-4:30 9-5 12-5 9-5 24 Hours Tuesday 9-6 12-5 9-5 8:30-9 8:30-4:30 9-5 9-9 24 Hours

> Memorial Day Weekend: Saturday, May 28 through Monday, May 30, 1977 Student Center open; ALL OTHER LIBRARIES CLOSED

9-5

9-5

closed

9-5

9-5