Massachusetts Institute of Technology



October 17, 1979



Volume 24 Number 12



Breene M. Kerr, second left, chairman of the MIT Sustaining Fellows program, meets with Howard W. Johnson, chairman of the MIT Corporation, and President Jerome B. Wiesner, who will serve as honorary chairmen, and with Professor Elias P. Gyftopoulos, faculty chairman for the new program.

Government Action Needed **To Change Commercial Risks**

By ROBERT C. DI IORIO Staff Writer

Government action that would fundamentally change the nature of commercial risks faced by business firms has been urged by a group of analysts at the MIT Cen-ter for Policy Alternatives as a way of reversing what they say is the nation's declining ability to remain at the forefront of technological innovation.

Their views are contained in a book that was made public on the eve of a two-day symposium (Oct. 16-17) at MIT on Technology, Innovation and Industrial Develop-ment. Several hundred decisionmakers, planners, analysts and academics from both the public and private sectors are attending the symposium, which concludes today.

Two leading members of Congress with legislative responsibility in the areas of science and

technology, Sen. Adlai E. Stevenson of Illinois and Rep. George E. Brown, Jr., of California, are involved in the symposium. Sen. Stevenson, chairman of the Senate Subcommittee on Science, Technology and Space, was scheduled to address the banquet closing Tuesday's session. Rep. Brown, chairman of the House Subcommittee on Science, Research and Technology, is scheduled to be the luncheon speaker Wednesday.

The authors say that President Carter and the Congress should take steps to encourage innovation by "increasing the risk that a firm will fail if it does not innovate."

They also call for new government programs to retrain and relocate workers from declining industries to growth areas, government support for basic research applicable to many industries, a reduction in government efforts to commercialize new technology and consideration of legislation prohibiting corporate

mergers above a certain size to avoid the reduction of risk that businesses seek by such actions. Their recommendations, the an-

alysts say, reflect the view that "policy for technological innovation is not merely the province of pleaders for academic science, boosters of grandiose engineering

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Faculty to Meet

A regular meeting of the faculty will be held today (Wednesday, Oct. 17) at 3:15pm in Rm 9-150 (note room change). Agenda items include:

-Motion to change the name of Course XIII-B from Shipping and Shipbuilding Management to Ocean Systems Management.

-Report of the Committee on Nominations.

-Report on the Leadership Campaign.

-Discussion of the 1978-79 Report of the President and the Chancellor.

Report Inside

The Report of the President and the Chancellor for 1978-79 is included in this week's paper as a pullout supplement.

Reception

The chairman of the faculty invites all members of the faculty to a special faculty reception for Dr. Paul E. Gray, President-designate. The reception, including chamber music by members of the faculty, will be held Wednesday at 4:30pm following the faculty meeting in the Bush Building (Building 13) Lobby.

Weinberg Devised Nobel Winning Theory At MIT

Dr. Steven Weinberg, one of the three scientists who shared the 1979 Nobel Prize in Physics this week, was a member of the MIT faculty in the late 1960s when he proposed the theory for which the prize was awarded. Besides Dr. Weinberg, who is now Higgins Professor of Physics at Harvard University, winners of the prize were Dr. Abdus Salam, professor of theoretical physics at the Imperial College of Science and Technology at the University of London and director of the International Center for Theoretical physics, Trieste, Italy, and Dr. Sheldon L. Glashow, also professor of Physics at Harvard. The theory, which was offered by Dr. Weinberg and Dr. Salam in 1967, proposed that two of the basic physical forces-electromagnetism and the "weak" force or weak interaction-are facets of the same phenomenon. The hypothesis is considered by most physicists as a major advance toward determining a unifying framework for all four of the basic forces of nature. Research conducted by Dr. Glasshow helped resolve some of the apparent difficulties presented by the Weinberg-Salam theory.

Sustaining Fellows Program Establishment Announced

MIT's new Sustaining Fellows program was launched officially Thursday (Oct. 11) at the annual meeting of the Corporation Devel-opment Committee. Breene M. Kerr '51, member of the Corpora-tion and Chairman of the MIT Sustaining Fellows, said that the special program had been created to recognize the exemplary support of many outstanding individuals, as well as to realize closer ties with alumni and friends of MIT who want to share in and support the Institute's activities.'

Howard W. Johnson, Chairman of the Corporation, reported that 169 persons had already qualified and accepted invitations to become Founding Life Members of the Sustaining Fellows. Dr. Johnson said MIT has "great expectations" that the program "will not only augment the resources of the Institute but will also draw into its orbit new friends and supporters who might

not otherwise have a relationship with MIT.'

As explained by Mr. Kerr, Dr. Johnson and MIT President Jerome B. Wiesner, the Sustaining Fellows will hold a special place in the MIT community. "They are a unique and valuable resource not only for MIT but also for our nation," their statement said, "and they share with one another a concern for the continued growth of knowledge, for the betterment of society. Their new association with MIT is designed to benefit the Sustaining Fellows, the Institute, and ultimately, society-at-large.

An annual gathering of the Sustaining Fellows is planned, and the program will sponsor other activities, such as seminars and campus visits, to give the Sustaining Fellows an oportunity to learn about MIT research and teaching pro-

(Continued on page 8)

Diabetes Van Campus Visit To Highlight Charities Drive

The Diabetes Van of the Greater Boston Diabetes Society, Inc., will visit the campus Monday and two meals-in the specific Tuesday, Oct. 22 and 23, on the

persons planning to visit the diabetes van eat one of the following amounts called for-two hours in advance of the screening. Note: Known diabetics should follow the diet and/or medication prescribed by their physician and not one of the meals below.

CDC Honors Paul Keyser For Exceptional Service

Paul V. Keyser of Arizona, a 1929 graduate of MIT and former member of the MIT Corporation, received the 1979 Marshall B. Dalton Award Thursday (Oct. 11) in recognition of his exceptional service to the Institute.

Mr. Keyser, retired director and executive vice president of the Mobil Oil Corporation, was presented an appropriately inscribed Paul Revere Bowl by Howard W. Johnson, chairman of the MIT Corporation, at a luncheon in the Sala de Puerto Rico during the annual meeting of the Corporation

2.70 to Present Moments Of Truth

Are you ready for A Couple of Moments of Truth?

The nearly 200 students in Course 2.70, Introduction to Design, hope they are. That's the name of this year's design competition, a major part of 2.70.

The competition will be held Tuesday and Thursday, Oct. 23 and 25, in Rm 26-100, starting at 7pm.

Earlier in the year students were given identical bags of parts and told to make a device that will travel from the center line of a long pivoted horizontal aluminum beam and attempt to tip the beam downward while an opponent device tries to do likewise on the other side of the pivot. Mechanical engineering instructors supervise the project. They report that some "weird and ingenious devices" are taking shape for their moments of truth.

Development Committee. Dr. Johnson said that Mr. Keyser, a member of the CDC, had compiled a "truly extraordinary" record of service to the Institute and that it was particularly appropriate to recognize this on the 50th anniversary of his graduation. Mr. Keyser received the SB in chemical engineering in 1929 and the SM in 1930

The Dalton award is named for one of the most active and respected alumni leaders in MIT history. At the time of his death in 1976, Marshall B. Dalton, Class of 1915, was the senior member of the MIT Corporation, having served on the Institute's governing body for 39 years. He had served as first chairman of the MIT Development Committee when it was formed in 1951 and was senior member of the CDC when he died.

A few months before his death the CDC had singled him out for recognition in the form of a Revere Bowl. Subsequently, the bowl was established as a permanent annual award named in his memory and recognizing individuals whose service in support of the Institute's financial goals was both conspicuous and sustained over a period of many years. The CDC presented the award to Cecil H. Green in 1976, D. Reid Weedon, Jr., in 1977 and J. Kenneth Jamieson in 1978. Mr. Keyser was a member of the Corporation from 1970 to 1977. He has served on the CDC since 1965, and since 1974 has played an important role in the Leadership Campaign as a member of its (Continued on page 5)

Student Center Plaza in support of this year's combined United Way-Boston Black United Fund campaign at MIT.

On Wednesday, Oct. 24, the Diabetes Van will visit Lincoln Laboratory. Hours of the van are 10am-3pm.

Purpose of the visit is to screen members of the community for diabetes through a capillary blood sugar test. Individuals whose blood sugar levels are elevated do not necessarily have diabetes but will be advised to consult their own physician or the MIT Medical Department for further testing.

The Greater Boston Diabetes Society, Inc., is one of 162 human care agencies supported by the Massachusetts Bay United Way. The visit of the Society's Mobile Detection Unit/Van was arranged as a means of demonstrating tangibly one way United Way agencies help the community.

The diabetes screening program is free, but requires some forethought. It is recommended that

Breakfast: 1 cup orange juice; 1 cup corn flakes or oatmeal; 1 cup milk in cereal and/or beverage; 1 tablespoon sugar in cereal or beverage; two slices of toast; 1 tablespoon of jelly, with optional tea or decaffeinated coffee.

Lunch: 1 cup orange juice; 1 bowl of vegetable soup; 1 slice lunch meat or cheese; 2 slices of bread with butter, margarine or mayonnaise; 1/2 cup vegetable or salad; 1 slice or scoop of ice cream, with optional tea or decaffeinated coffee.

The meals are designed to give a carbohydrate load of approximately 100 grams two hours in advance of the screening test. After eating, do not drink, other than water, eat, smoke, chew gum or have candy or cough drops until the blood sample is taken.

Electrical Insulation Colloquium

An all-day colloquium concerning the reliability of electrical insulation for power systems will be held Thursday, Oct. 18, at MIT, in Rm 9-150. Ninety invited experts from more than a dozen countries are expected to attend

The colloquium is part of a weeklong meeting in Cambridge of an international electric power organization known by the French acronym CIGRE, which stands for Conference Internationale des

Grands Reseaux Electriques.

Dr. Chathan M. Cooke, lecturer in the Department of Electrical Engineering and Computer Science, is the MIT coordinator for the meeting.

The theme of the colloquium-insulation testing methods to insure reliable service-will be addressed in two major sessions, one concerned with basic processes in insulators, the second with equipment tests.

MIT Symphony to Present All-Tchaikovsky Program

The MIT Symphony Orchestra will present an all-Tchaikovsky program on Saturday, Oct. 20, at 8:30pm in Walker Memorial.

The concert will feature Melanie Macaronis as soloist with the orchestra in the Piano Concerto No. 1 in B flat Minor, Opus 23.

A sophomore at Wellesley College, Ms. Macaronis studies piano with Sascha Gorodnitzky at the Juilliard School of Music in New York City. Her previous teachers include Russell Sherman and Anna Scannell.

As a high school student at the Dana Hall School, Ms. Macaronis appeared as soloist several times with the Greater Boston Youth Symphony. Her solo credits have grown to include the Nashua Symphony Orchestra, the Cape Ann Symphony, and the Wellesley Symphony Orchestra.

The program for the Oct. 20 concert will also include Symphony No. 5 in E Minor, Opus 64.

David Epstein, professor of music in the Department of Humanities, conducts the MIT Symphony, leading the group in four major concerts, as well as an annual tour. He has in the past year been a guest conductor with the American Symphony Orchestra and with the Haifa Symphony Orchestra in Israel. His book, Beyond Orpheus: Studies in Musical Structure, was published this year by the MIT Press.

Members of the 95-piece orchestra are drawn from the MIT and Wellesley College communities. Commenting on the group's recordings for Vox/Turnabout, the New Haven Register called the orchestra "remarkably professional" and the Boston Globe said, "The student orchestra is



October 16-23

50 Years Ago

Professor Dugald C. Jackson, head of the Department of Electrical Engineering, has been granted a year's leave of absence from the Institute and is now attending the World Power Conference in Japan. Professor Jackson is Chairman of the American Committee of Papers. The meeting is a gathering of the world's foremost electrical engineers. Professor Jackson also intends to study educational relationships between America and Eastern countries that result from contacts made at the Institute by foreign students.

40 Years Ago

In his annual report to the Corporation President Compton commented on the attitude of educators and scientists to the world situation. Dr. Compton remarked that "Whatever they may believe about the merits of the Versailles Treaty, or proposed readjustments of the Munich Agreement, I believe that they are practically unanimous in condemning Germany's

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Melanie Macaronis will appear as soloist with the MIT Symphony Orchestra in concert at Walker Memorial Hall, on Saturday, October 20, at 8:30pm. Photo by Calvin Campbell

now right up there with some of the most distinguished orchestras of this country and Europe."

Because of the temporary closing of Kresge Auditorium, this concert will be held in Walker Memorial. The hall has a smaller capacity than Kresge Auditorium, where the orchestra usually performs, and seating will be on a first come, first served basis.

During the week of October 15, free tickets will be available in the lobby of Building 10. The event is free, open to the public and is sponsored by the Music Section at

Frank to Discuss Violence And War

Jerome Frank, one of the foremost authorities on the psychology of violence and war, will speak at MIT Thursday, Oct. 18, at 4:30pm in Rm 3-370.

Dr. Frank, professor, emeritus, of psychiatry at Johns Hopkins University and the author of Sanity and Survival: Psychological Aspects of War and Peace, will be the first speaker in this semester's continuation of a series on arms control, sponsored by the Technology and Culture Seminar.



CEP Summary

Summary of CEP Meeting on 27 September 1979

The CEP met with Professor Robert Halfman to discuss issues relating to the Experimental Study Group.

Summary of Meeting on October 4, 1979

The Committee met with Professors Jerome Lettvin and David Adler to discuss the exthe Concourse program since if was established as a regular freshman program

Seniors***-who wish to apply for graduate work in the Department of Electrical Engineering and Computer Science during 1980 should apply by November 1. Applications available in Rms 38-444 and 3-103.

MIT Furniture Exchange**-Open Tuesdays and Thursdays, 10am-2pm at 25 Windsor St. to buy or sell used furniture. Letters given for tax deductible donations. Info: x3-4293 during hours above.

Club Notes

MIT/DL Bridge Club**-ACBL Duplicate Bridge, Tuesdays 6pm, Rm W20-491.

MIT Duplicate Bridge Club*-Thursdays. 7pm, Rm 473 Student Center. All bridge players invited. Info: Adam Wildavsky, dl5-7687.

Chess Club*-Tournaments, speed chess for people of all strengths, every Saturday after noon, fourth floor, Student Center. Info: Brad, 536-9596.

MIT Chinese Martial Arts Club-Wu-Tang*-Learn physical and mental discipline through the practice of Chinese Martial Arts, Kung-fu. Beginners welcome. New classes. Mondays and Wednesdays, 7-10pm; Saturdays, 11am-2pm, W20-491.

MIT Fish Society*-Organizational meeting, Thursday, Oct. 18, 7pm, Student Center Base-ment. New members or people just interested in fish welcome. Refreshments

Folk Dance Club*-Sundays, International, all levels, 7:30-11pm, Sala de Puerto Rico; Tuesdays, Balkan, advanced, 7:30-11pm, Rm 407, Student Center: Wednesdays, Israeli, all levels, 7-11pm, Sala de Puerto Rico. Admission: 25c donation, optional. Info: dl5-9165.

MIT Hillel**-First Annual Deli Night. Student Center Mezzanine Lounge, Sunday, Oct. 21, 6pm. Corned Beef, Salami, Vegies, and a friendly crowd.

Hobby Shop**-Complete facilities for woodworking, metalworking, and darkroom. Mon-Fri, 10am-6pm, Wed 10am-9pm, W31-031 Fees: \$10/term students, \$15/term community. Info: 3-4343.

MIT Go Club*-Meets Mondays 8pm, Rm 4-145. Instruction for novices and beginners. Players of all ranks.

MIT Outing Club*-Office open to plan hiking, canoeing, skiing, etc., trips and to rent equip ment Mondays and Thursdays 5-6pm, W20-461.

Rugby Football Club**-Practice every Tuesday and Thursday, 5:30pm, on the Pitch, Briggs Field. Matches and social every Saturday.

Beginning Sailing Instruction**-Every Monday and Thursday at 5:15pm in the Shore School of the Sailing Pavilion.

MIT Rocket Society*-Regular meeting, club business and launch information, first Tuesday of each month, 7pm, International Student Lounge (W50-210), one floor below MITRS Club Room

MIT Soaring Association*-Meeting with movie and refreshments, Thursday, Oct. 18, 7:30pm, Burton House cafeteria.

MIT Shotokan Karate Club**-Rigorous training for self defense and physical and mental development. Black belt instruction. Practice Tuesdays and Fridays, 6-8pm, Varsity Club Lounge; Thursdays, 6-8pm, Dance Room. Beginners welcome. Info: Jim x3-3283.

MIT Table Tennis Club**-Meets every Monday, 8-10pm, T-Club Lounge, duPont Gymnasium

MIT Tae Kwon-Do Club**-Korean martial arts, Wednesday, 7-9pm, Saturdays, noon-2pm, T-Club Lounge. Beginners welcome. Info: Chung Sun Kang, d15-9272.

MIT Tiddlywinks Association*-Club meetings Wednesdays, 8pm, usually West Lounge, Stu-dent Center, otherwise Rm W20-473 or 437; Saturdays, 1pm Student Center fourth floor. Beginners welcome.

Graduate Studies

Danforth Foundation Fellowships**-MIT Seniors entering first year of graduate study in

Cable TV

1-2pm

2-4pm

Channel 12:

12-2pm

2-4pm

1-2pm

2-3pm

3-4pm

8-9pm

9-10pm

12-2pm

Channel 12:

October 17-23, 1979

Wednesday, October 17 **Channel 8:** SYNTHETIC FUELS FOR TRANSPORTATION-Prof.

Jeanne Richard, x3-4869. Danforth Postbaccalaureate Fellowship Awards**-Graduate students may apply by submitting a short essay describing their graduate studies and plans for a career in university teaching in the U.S. Appplicants must be pursuing a PhD program and hold a Master's degree or have 24 graduate course credits. Info: Graduate School Office, 3-136,

x3-4869

Religious Activities

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

September 1980 may apply for Danforth

Foundation Prebaccalaureate Fellowship Awards. Submit a brief essay describing

undergraduate educational and extra-curricular activities, detailed plans for

doctoral study and career objectives in

university teaching, and letter of nomination from a faculty advisor or counselor, to Dean Jeanne Richard, Graduate School Office, Rm

3-136 before Oct. 19. Personal interviews will

be scheduled for Saturday, Nov. 3. Info: Dean

MIT Baha'i Association*-Informal fireside discussions about the Baha'i faith Thursdays, 8pm, New House Rm 4-414. Everyone welcome. Info: Ramin, 494-7758, weekdays.

MIT Catholic Community*-Sunday Masses: 9am, 12 noon, 5pm, MIT Chapel. Weekday Masses: Tuesdays and Thursdays, 5:05pm, Fridays, 1:05pm, MIT Chapel. Charismatic prayer meeting following potluck supper, Mondays, 6:30pm, Ashdown Dining Rm. Info: Marjorie, x3-7222, Karen, 266-9525. Gospel Study and Prayer, Wednesdays, 8pm, 312 Memorial Dr.

Lutheran-Episcopal Ministry*-Interdenomi-national service of Holy Communion, Wednesdays, 5:10pm, MIT chapel. Supper follows in basement of 312 Memorial Dr.

Jewish Religious Services*-Orthodox: Fridays Sundown, Kosher Kitchen (50-005); Saturdays, 9am Bush Room (10-105); daily, 8am, Rm 7-102. Conservative/Reform: Fridays, 5pm, MIT Chapel.

MIT Vedanta Society*-Meditation and discourses on the Gita by Swami Sarvagatananda of the Ramakrishna Vedanta Society of Boston. Fridays, 5pm, Chapel.

Prayer Time and Bible Class*-1-2pm. Fridays, Rm 20E-207. Guest speakers, music, refreshments. Led by Miriam R. Eccles, founder and director, Alpha and Omega Missionary Society.

Placement

The following companies will be interviewing during the time period covered by the current Institute Calendar. Those interested may sign up in the Career Planning and Placement Office, Mon-Fri, 9am-3pm, Rm 12-170, x3-4733.

Oct. 17-Air Products; Amdahl Corp.; Bendix Aerospace—Elect. Group; Cordis Dow Group; Martin Marietta; Michelin America R & D Corp.; Motorola Inc.; Philadelphia Electric Co.; Quaker Oats Co.; Rohm & Haas Co.; Standard Oil Company of Ohio.

Oct. 18-Aramco Services, Inc.; Burr-Brown Research Corp.; Johns Hopkins University-App. Phy. Lab; LTX Corp.; Spectra-Physics, Inc.; TRW Energy Systems Planning Division; Texaco, Inc.; Texas Instruments, Inc.; Wang Labs, Inc.

Oct. 19-Argonne National Laboratory; Curtiss-Wright Corp.; Perkin-Elmer Corp.; Schlumberger R & D; Wheaton Industries; General DataComm. Ind., Inc.

Oct. 22-Bechtel Power Corp.; Booz Allen & Hamilton; Comptek Research, Inc.; Comsat Labs; Dynatech R & D Co.; EG&G Idaho, Inc. Engineering Research Associates, Inc.; Gulf Oil Corp.; Northern Research and Eng'g. Corp.; Northrop Corp. - Aircraft Div.; NYU Grad School of Bus. Admin.; Rockwell International; Signatron, Inc.

Oct. 23-BASF Wyandotte Corp.; Codex Corp.; Dow Chemical USA; Harris Corp. - Comm. Press Div.; Naval Ocean Systems Center, Code 143; Northeastern Grad School of Bus. Admin.; Pillsbury Co., R & D; Sanders Associates, Inc.; Schlumberger International Coordination; Syracuse Research Corp.

> LETS-Prof. Emeritus Harold Egerton. THE USE OF VIDEO IN QUICK RECORDING OF TECHNICAL SUBJECTS-Charles Miller, Dept. of Electrical Engineering and LOUISE NEVELSON AT MIT

Oct. 24-Aluminum Co. of America; Corning Glass; E-Systems Inc./ECI Division; Hewlett-Packard Co.; Lawrence Livermore Lab.; Leviton Manufacturing Co., Inc.; Olin Corp.; Raychem Corp.

New UROP Listings

For more detailed information on UROP opportunities listed, MIT undergraduates should call or visit the Undergraduate Research Opportunities Program Office, Room 20B-141, Ext. 3-5049 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.

POLAROID CORP.

A. collaborative MIT-Polaroid program is being carried out, using MIT's computer op-erated infrared Fourier-Transform spectrometer, to develop new moisture-monitoring instrumentation. An important part of the software for this system is a program for extracting optical constants of materials from reflectivity data. A well documented algorithm is available; what is needed is to program this algorithm for an Alpha-16 minicomputer in a way that is compatible with the existing operating system. Pay available.

NUCLEAR REACTOR LABORATORY

A sophomore or junior student is invited to work on a project to determine the feasibility of using stable (nonradioactive) isotopes of zinc as tracers in biological studies. This will involve a series of simulation experiments in which graded quantities of the isotopes are added to biological materials and analyzed by neutron activation analysis. Contact Prof. N. Solomons, x3-3147.

GRAPHIC ARTS RESEARCH FOUNDATION (GARF)

GARF, a non-profit organization dedicated to the advancement of printing technology, is developing new keyboard typesetting meth for the multi-line and ideographic writing forms of Asia and Africa. Hardware and software projects require a working knowledge of Hindi, Marathi, Urdu, Bengali, Tamil, Telegu, Kanarese, Sinhalese, Thai, Korean or other Asian language. Studies are also planned that will relate literacy to the costs of books, magazines, and newspapers.

MOLECULAR STRUCTURE OF PROTEINS AND NUCLEIC ACIDS

This research project involves determina-tion of the three-dimensional structure of macromolecular proteins and nucleic acids through the use of x-ray diffraction techniques. The student will learn how to crystallize these molecules and then subject them to x-ray diffraction analysis with a view to ultimately discovering their three-dimensional structure. Contact Drs. A. Rich, A. Wang, or G. Quigley, 16-741, x3-4710.

IONOMET COMPANY (Brighton)

Two research opportunities are open: 1) High resolution electron beams combined with electron-sensitive resists are in contention as IC fabrication equipment. However, the single E beam scan is a chip-at-a-time serial process requiring high writing speeds for cost effective system throughput. A promising approach to an improved electron resist may derive from vacuum deposited gel-free silver halide con-tinuous thin films. More serious consideration of this novel resist calls for the proposed evaluation of compatibility with IC materials and of ion implantation and etch resistance. 2) The proposed work relates to improvements in the technique of thin layer chromatography (TLC), specifically the preparation of a thin film medium that will provide a rapid, economical, sensitive means to separate (from air, water and soil samples) and quantitate chemical species having possible health or environmental consequences

ON-LINE MEASUREMENT OF TRACE ELEMENT MOBILIZATION IN ARC LAMPS Research involves scanning of operating lamps which have been labelled with gamma emitters using high resolution gamma spectrometry Contact Dr. Morteza Janghorbani, x3-2995.

STEROID HORMONES

The ability of steroid hormones to alter sexual and other motoric behavior in the rat by affecting brain metabolism of monoamines is being studied. A student is sought to participate in these experiments, which include monitoring changes in behavior induced by hormone or drug treatment, as well as measuring brain levels of monoamines and their metabolites in response to treatment. Contact Prof. Michael Baum, x3-3465.

THE MASSACHUSETTS OFFICE OF ENERGY RESOURCES

The Office wishes to conduct a survey of presently available computer programs which model the performance of passive solar buildings. A student is invited to review these models for usefulness, accuracy, and cost, and, in conjunction with Office staff, select a program or programs for in-house use, then supervise the acquisition of this program and familiarize the appropriate staff members with its use.

recent indiscriminate persecution of minorities without regard to individual merit, and they are opposed to authoritarian control.'

25 Years Ago

Professor Laurens Troost, head of the Department of Naval Architecture and Marine Engineering at the Institute since 1952, has been awarded the Medal of Honor for Naval Architecture and Engineering by the Royal Netherlands Institute of Engineering in its first presentation since 1936. Professor Troost, a native of Rotterdam, won international recognition for his achievements as a naval architect in The Netherlands, and made his first visit to the United States in 1946 as a guest of the US Navy.

Prepared by Edward J. Halligan, Jr., assistant curator of MIT Historical Collections, x4444.

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Summary of Meeting on October 11, 1979 The CEP met with Professor John Waugh, Chairman of the Faculty Advisory Committee to the Corporation Committee on the Presidency, to discuss issues relating to future programs and goals of the Institute.

Agenda for CEP Meeting on October 18, 1979 Meeting with Professor Irving London to dis-cuss the programs of the Whitaker College of Health Sciences, Technology, and Management.

Announcements

Introduction to Fortran*-IPS Academic and Research Computing Services offers this non-credit course Oct. 22, 24, 26, 29, 31 and Nov. 2, 3, , 7, 9, 3pm-5pm, Rm 39-530. Course intended for students with no previous knowledge of computers or programming. Introduces basic concepts and principles, provides specific programming instruction in use of FORTRAN IV. Basic concepts to be discussed: in-put/output, decision making, looping, array processing and subroutines. Students will learn to develop algorithms, write computer programs and detect and correct errors. Text: Applied FORTRAN Programming by Mar chant. Advance registration required. Info: Janette Hyde, Rm 39-413, x3-1744 9am-2pm.

PDP/11 Users Group*-Meeting, Wednesday, Oct. 17, 2pm, Rm 39-530. Coffee and doughnuts

Longwell, Dept. of Chemical Engi-TECHNOLOGY AND WORK: WHO DECIDES?—Frank Runnels and Frank Rosen, Pres. and Vice Pres. of the All Unions Committee to Shorten the Work Week.

CLASSIC LUNCH: "SHAME" -Directed by Ingmar Bergman. Story of a young couple trying to escape a war-ridden society. CABLE VIEWER'S DE-MAND-Call x7363 and request a program or movie which has been shown. shown.

Thursday, October 18 Channel 8: DATA ARRAY MICROPROCES-SORS-James W. Herbert, Sys-tems Engineer; Jerry Kaplan, Sales Engineer, Data General. COMPUTER-AIDED MANU-FACTURING-Eugene Merchant, Cincinnati Millacron Inc.

Cincinnati Millacron, Inc. QUARKS-Prof. Francis Low, Dept of Physics PHYSICS 8.01 LECTURE-Rec. 10/17/79 TWO PHYSICS FILMS: "ENER-GY AND WORK," "ELLIPTIC ORBITS."

CLASSIC LUNCH: "M"-Directed by Fritz Lang. Peter Lorre plays a psychopathic killer in this sus-pense thriller. CABLE VIEWER'S DEMAND

Friday, October 19

2-4pm Channel 8: 1-2pm

PHOTOGRAPHY OF BIRDS, BATS, BUGS, AND BUL-

Channel 12: 12-2pm

CLASSIC LUNCH: "M"-See Thursday's listing

Sunday, October 21 Channel 8:

2-3pm

3-4pm

8-9pm

1-3pm

3-4pm

2-4pm

2-4pm

8-9pm

12-2pm

12:15-2pm

J.P

PHYSICS 8.01 LECTURE-Rec. 10/19/79

Monday, October 22 Channel 8:

POLITICS. POLICY, AND CARTOONS-Paul Szep, Pultizer Prize-winning cartoonist for the Boston Globe. THE INSTITUTION: MIT PERSPECTIVE AND STYLE

Channel 12: 12-2pm

CLASSIC LUNCH: "COLLEGE" CABLE VIEWER'S DEMAND

Tuesday, October 23 Channel 8:

ATMOSPHERIC OZONE: FACT ATMOSPHERIC OZONE: FACT AND FRICTION-Harvard Sci-ence Center Lecture Series. NEW WEAPONS AND THE DIS-PERSAL OF MILITARY POW-ER-James Digby, Executive Director, California Seminar on Arms Control and Foreign Policy. PHYSICS 8.01 HELP SES-SION-Call x7212 and tutor Lawrence Krauss will assist you.

Channel 12:

CLASSIC LUNCH: "TRIUMPH OF THE WILL"-Nazi propagan-dist Leni Riefenstahl's vision of first National Socialist convention after Hitler was in power. The film after Hitler was in power. The film was produced by the German Propaganda Ministry headed by Joseph Goebbels. CABLE VIEWER'S DEMAND

TECH TALK Volume 24, Number 12 October 17, 1979

Tech Talk is published 39 times a year by the News Office, Massachusetts Institute of Technology. Director: Robert M. Byers: Assistant Directors: Charles H. Ball, Robert C. Di Iorio, Paula Ruth Korn, Joanne Miller, William T. Struble and Calvin D. Campbell, photojournal-ist; Reporters: Elizabeth C. Huntington (Institute Notices) and Marsha G. Mc-Mahon, (Institute Calendar, Classified Ads).

Address news and editorial comment to MIT News Office, Room 5-113, MIT, Cambridge, MA 02139. Telephone (617) 253-2701.

Mail subscriptions are \$12 per year. Checks should be made payable to MIT and mailed to Business Manager, Room 5-113, MIT, Cambridge, MA 02139.

2-4pm



Goodyear Tire and Rubber Company officials John H. Gerstenmaier, right, and Joseph F. Hutchinson, second left, join Sloan School Dean William F. Pounds and Associate Dean Peter Gil, left, at dedication of new 70-seat Sloan classroom. The Goodyear firm provided the funds for the classroom, one of three now available for the expanding Sloan student body in the former National Research Corporation building. The building, at 70 Memorial Drive (E51), is being renovated to provide additional space for Sloan and to house the new Program in Science, Technology and Society. Mr. Gerstenmaier, Goodyear's vice chairman of the board and chief operating officer, was a Sloan Fellow in 1952 and Mr. Hutchinson, vice president, in 1950.

Ford Foundation Endows Minority Grants

Members of four specific minority groups will benefit from the new Ford Foundation Postdoctoral Fellowships for Minorities to be awarded for the first time in September 1980.

Approximately 25 fellowships will be awarded annually to Black Americans, Mexican Americans, Puerto Ricans and Native Americans who have doctoral degrees in science, engineering or the humanities. Applicants must be United States citizens or nationals and must have completed the formal requirements for a doctoral degree, or have had equivalent research training and experience, by the application deadline of February 1, 1980.

The purpose of the Fellowship program is to help members of the designated minority groups develop as scholars for academic careers. Participants will gain national recognition and will help to increase the number of highly competent minority group members now serving on college and university faculties.

Fellows will be chosen through a nationwide competition administered by the National Research Council, which will award the fellowships to scholars who show

Abramowitz Lecture

Max Dimont, author of three books on Jewish history, will present the Abramowitz Memorial Lecture, cosponsored by the MIT Hillel Foundation, on Sunday, Oct. 21, at 8pm in Rm 9-150. Mr. Dimont is the author of Jews, God and History, The Indestructible Jews, and The Jews in America. His lecture will be entitled "Jews, God and History.

the greatest promise of future achievement in academic research and scholarship in higher education. Tenure of a fellowship provides postdoctoral research experience at an appropriate non-profit institution of the Fellow's choice

Three classifications of Fellowships have been made. Applicants who have held the doctorate for no more than three years by February 1, 1980, will be in the new postdoctoral category with a 12 month stipend of \$13,000. Those who have held the degree for three to seven years will be classified intermediate, with an annual stipend of \$18,000, and those who have held their doctorates for more than seven years will be classified as senior, at a yearly stipend of \$25,000. Stipends for tenures of less than 12 months will be prorated. Fellows receive a travel and relocation allowance for actual cost up to a maximum of \$1,500. No

provision is made for dependency allowance. Host institutions receive a cost of research allowance of \$1,500 per Fellow in residence, also prorated for tenures of less than a year.

Applicants must develop and describe a plan of study and research which will further their careers in higher education, with a clear explanation of how this will be accomplished in the application. The Fellowships are limited to the fields of the biological sciences, physical sciences, mathematics, engineering sci-ences, social sciences and the humanities. No awards will be made in the professions, such as law, medicine, or social work, nor in such areas as educational administration, curriculum supervision and personnel and guidance. Application materials are available now at the National **Research** Council.

Lockheed Award Given to Keil

Dr. Alfred A.H. Keil, Ford Professor of Engineering at MIT and former dean of the School of Engineering, has been presented the 1979 Lockheed Award for Ocean Science and Engineering by the Marine Technology Society.

The award was presented Oct. 12 at the society's annual meeting, held this year in New Orleans, by Dr. William J. Hargis, Jr., society president. The citation read:

"Alfred A.H. Keil, professor of ocean engineering and Ford Professor of Engineering at MIT, is hereby recognized for his outstanding contributions in teaching and research in naval architecture and marine engineering. His research, presented in more than

IFC, UA Announce Freshman Symposium

80 technical reports, papers and monographs, is fundamental to modern ship design and is required by current Navy design criteria. He is largely responsible for the development and high quality of the ocean engineering program at MIT.'

The Marine Technology Society, founded in 1963, is an interdisciplnary professional organization concerned with the application of science and technology to exploration and utilization of the oceans.

In 1978, the Lockheed Award was made to Dr. Harold E. Edgerton, Institute Professor Emeritus at MIT

William Rastetter Appointed First Firmenich Professor

Dr. William H. Rastetter, assistant professor of chemistry at MIT and a specialist in the synthesis of biologically active compounds, has been appointed as the first Roger and Georges Firmenich Career Development Assistant Professor of Natural Products Chemistry.

The appointment of Dr. Rastetter to

established chair was announced by Dr. James L. Kinsey, head of the MIT Department of Chemistry. 'Professor

Rastetter is generally considered one

of the most promising young synthetic organic chemists in the country, and he is an excellent teacher," Dr. Kinsey said. "The Chemistry Department is delighted to have this opportunity of recognizing his outstanding contributions through the Firmenich Career Development Chair.'

The Firmenich Professorship was established at MIT by Firmenich & Co., Princeton, NJ, a privately owned US corporation associated with Firmenich SA, of Geneva, Switzerland, a major international manufacturer of flavor and aroma chemicals. The chair honors two members

of the Firmenich family-Dr. Roger Firmenich, who is retiring this year has a director of Firmenich SA, and his cousin, Dr. Georges Firmenich, who is retiring this year as executive head of the Corporate Flavor Division. The professorship is for the support of young faculty members who are in the early phases of developing careers in the chemistry of natural products.

Professor Rastetter was born in 1948 and received the SB degree from MIT in 1971. He received master's and doctoral degrees in chemistry in 1972 and 1975 respectively from Harvard, where he studied under the direction of the late Professor R.B. Woodward. He joined the MIT faculty in 1975.

Professor Rastetter is a member of the American Chemical Society, the Chemical Society of London, and Phi Beta Kappa.

the Department of Civil Engineer-

ing, will be one of the child actors.

the talents of faculty members,

including Daniel Kemp, professor

of chemistry, and William Siebert,

professor of electrical engineering

Other members of the cast will

be MIT and Wellesley College

undergraduates, with the addition

Arthur Friedman, theater critic

for The Real Paper, said of the

Shakespeare Ensemble, "This is a

company to watch and support"

The Winter's Tale will be

directed by Murray Biggs, who has

also composed music for the pro-

duction. Costume design is by Ann

Cudworth; choreography is by

Tickets may be purchased Mon-

of one recent MIT graduate.

and computer science.

The Ensemble will also draw on

Shakespeare Ensemble To Perform 'Winter's Tale'

The MIT Shakespeare Ensemble will present its fall production, The Winter's Tale, October 18-23, at 7:45pm in the Sala de Puerto Rico, MIT Student Center.

Murray Biggs, Ensemble director, said The Winter's Tale, is one of the greatest of all Shakespeare's plays, and also one of the most challenging.

"To prepare for it," Mr. Biggs continued, "the Ensemble formed a workshop over the summer, doing all the scenes with various casts. Since then, every actor has played at least one role in a scene from the play which is different from his or her role in the main production. In that way all the actors have gained a multiple perspective on the play."

The Winter's Tale is about sexual paranoia. A king believes that his wife has committed adultery with his best friend. There is also a strong sub-plot around comic country characters.

For this production, the Ensemble has invited two children to share the role of the king's young son. Andrew Dixon, son of Patricia Dixon, administrative assistant in

day-Friday in the Building 10 lobby or at the door. They may be reserved by calling x3-2903. Admis-

Reeva Gibley.

(May, 1979).

sion for Friday and Saturday performances is \$4.50; students, \$3.50. Admission for all other performances is \$2.50.

Alexandria Quartet to Play in Chapel

The Alexandria Quartet will open this fall's free Chapel Concert Series on Thursday, Oct. 18, at noon, in the MIT Chapel.

The program will feature Beethoven's Quartet in C Major, Opus 59, No. 3 and Ives' Quartet No. 1.

Formed in 1976, the string quartet took its name from Lawrence Durrell's tetralogy set

performed throughout Massachusetts, Maine and New York. including the Isabella Stewart Gardner Museum, the Fitchburg Library Series and the State University of New York at Albany.

For more information on the Thursday afternoon chapel concerts, call the Music Section, x3-2906.



An opportunity for freshmen to increase their involvement with campus-wide activities and student government and to enrich their undergraduate experience will be given at the Freshman Symposium, Saturday, Oct. 20, in Building 66.

The meetings will begin with coffee and doughnuts at 10:30am, followed by introductory remarks at 11am. Five formal seminar/discussions will be presented at 11:30am and at 1:30pm. Freshmen can choose which two of the presentations they wish to attend. After each session, informal discussion groups of from 10 to 15 students can explore the subjects further in an informal atmosphere, and lunch will be provided during the first of the informal meetings. The organizers, The Interfraternity Conference and the Undergraduate Association, feel that the small groups will stimulate participation and questions from the freshmen attending.

Claude Brenner, President of the

Alumni Association, will lead a discussion/workshop entitled Leadership, dealing with leadership situations, skills, group dynamics, goal setting and social interaction. James Bidigare, president of the Class of 1978, and regional director mid-Atlantic states for the Alumni Association, will present a workshop, "Working with People," concerned with ways of developing good relations between factions, and with personal interaction in general. Constantine B. Simonides, MIT vice president, will present views of the MIT organization, financing, administration, and the changing roles of student living groups. Glenn Strehle, MIT treasurer, will give an overview of MIT traditions and their bases. Chuck Markham, Undergraduate Association vice president, will lead a workshop on effective means of student government and present opportunities for student involvement in extracurricular activities and government at MIT. The 200 freshmen who attended

the Freshman Symposium last year responded very positively to the presentations. The organizers hope for an even bigger turnout this year.

C.C. Lin Receives Award from APS

Chia Chiao Lin, Institute Professor and professor of applied mathematics at MIT has been chosen as the first recipient of the American Physical Society's Fluid Dynamics Prize, sponsored by the Office of Naval Research.

The prize, established to recognize "outstanding achievement in fluid dynamics research," consists of \$3,000 and a certificate. Dr. Lin was chosen for "his contributions to the theory of turbulence and the understanding of fluid flow in astronomical media."

The prize will be given to Professor Lin at a meeting of the Division of Fluid Dynamics of the American Physical Society in Notre Dame, Indiana, in November, 1979.

in Alexandria, Egypt.

The members of the group, Sandra Kott, violin, Monica Kensta, violin, Susan Gottschalk, viola, and Susan Randazzo, cello, are also members of the Portland Symphony Orchestra and on the faculty of the Groton Center for the Arts.

The Boston-based ensemble has

Concert Cancelled

Because of the closing of Kresge Auditorium, the MIT **Guest Artist Concert featuring** organist Patricia Junger on Monday, Oct. 22, at 8pm, has been cancelled.

Economy Panel To Meet Friday

The 50th anniversary of the Great Stock Market Crash of October, 1929, will be the backdrop for the annual State of the Economy panel discussion sponsored by the Department of Economics and the Graduate Economics Association. It will be held this Friday (Oct. 19) at 3:30pm in Rm 54-100, and is open to the public.

The panel will consider how well economists today can understand, control and predict the ups and downs of the economy, and what the prospects are for the US economy in the next few years.

The moderator will be Franco Modigliani, Institute Professor and professor of economics and finance. The panel members are Yale University economists James Tobin and Ray Fair; MIT economist Robert S. Pindyck, professor of management in the Sloan School of Management; and New York Times columnist Leonard Silk. There will be a question and answer period following the discussion.

Tech Talk, October 17, 1979, Page 3



October 17 through October 28

Events of Special Interest

Parents Meeting with Cambridge School Committee Candidates^{*} — David Blackman to speak. Sponsored by the Black Graduate Student Association. Thurs, Oct 18, 8-9pm, West Lounge, Student Center.

Outing Club's Annual "Presidential Circus" Hiking Trip** — Choice of numerous day hikes in White Mts, staying at cabin, Fri, Oct 19 and Sat, Oct 20. Wellesley, Smith, BU & other Outing Clubs also invited. For information write: MIT Rm W20-461 or Rm 3-113 by Mon, Oct 15th, 6pm.

Freshman Symposium^{*} — Sponsored by the UA and IFC, open to all freshmen. Seminar topics: Inside MIT, activities, leadership, MIT traditions and working with people. Speakers: Claude Brenner, Alumni Association President; Constantine Simonides, Vice President of MIT; Glenn Streble, Treasurer of MIT; Jim Bidigare, Class President of 1978; and Chuck Markham, UAVP, Sat, Oct 20, 11am-3:15pm, Bldg 66. Coffee and doughnuts at 10:30am in Bldg 66 Lobby. Lunch provided by the Alumni Association.

Community Relations Workshop* — Sponsored by the IFC. Walter Milne, Urban Relations Advisor to the President; Bob Sherwood, Associate Dean for Student Affairs; Jim Olivieri, Chief of Campus Police; representatives of various community organizations. Sat, Oct 20, 11am-3pm, Compton Lounge, Rm 26-110. Lunch provided by the IFC.

Treasurer's Conference* — Sponsored by the IFC. Bookkeeping and auditing, tax laws and forms and long range planning; Steve Immerman, business advisor to Fraternities, Sat, Oct 20, 11am-3pm, Rm 4-149. Lunch provided by IFC.

Seminars & Lectures

Wednesday, Oct 17

Future Opportunities in TPN Research * — George Blackburn, MD, director, Nutritional Support Service, New England Deaconess Hospital. Clinical Research Center Seminar, 9am, Rm E17-415.

Eddy Terms in the Mean Ocean Circulation-Some Scale Analysis Estimates* — Ed Harrison, Oceanography Sack Lunch Seminar, 12:10pm, Rm 54-915. Coffee and tea provided.

From Faust to Frankenstein* — Dr. A. George Schillinger, Dean of Management, Polytechnic Institute of New York. Macro-Engineering Research Group Seminar, 3-5pm, Rm 13-4101.

Interneuronal Regulatory Process of the Two Nigrostriatal Dopaminergic Pathways * - Dr. J. Glowinski, College de France, Paris. Neural and Endocrine Regulation Seminar, 4pm, Rm 6-120.

Polymer Processing* — **Prof N.P. Suh,** mechanical engineering. Polymer Seminars Series, 4pm, Rm 66-110.

Quasi-Neuton Methods for Unconstrained Minimization: Motivation, Scaling and Conditioning^{*} — Prof Emilio Spedicato, Instituto Universitario di Bergamo. Laboratory for Information and Decision Systems Colloquium, 4pm, Rm 39-500.

Seminars in Nuclear Engineering; Reactor Engineering Section* – Don Dube, Advanced Numerical Methods for Two Fluid, Two-Phase Flow Calculations, 4pm; John Kelly, Two Fluid, Two-Phase Subchannel Analysis, 4:45pm, Rm NW12-222.

x-Ray Pulsars* — Prof Saul Rappaport, Undergraduate Physics Colloquium, 4:15pm, Rm 4-339. Social hour follows.

Policy Analysis in the Human Services Area[•] – **Dr. David Mundel**, assistant director for Human Resources and Community Development at the Congressional Budget Office, 5pm, Rm 7-335.

Thursday, Oct 18

Western New England Law School* - Prof Dorian Bowman, Preprofessional Advising and Education Office Seminar, 11am, Rm 8-205.

The Relative Economics and Proliferation Risks of Advanced Reactor Technologies* — Dr. Carolyn Heising-Goodman, research, Department

Stocking Policies for Multiechelon Inventory Systems with Lead Times and Random Demands^{*} — Prof Linus Schrage, Graduate School of Business, University of Chicago. Operations Research Center Seminar, 4pm, Rm 24-121. Coffee and cookies will be served after the seminar.

A What of the Local Loop?* — James Alleman, General Telephone & Electronics; Jeffrey Adams, Commonwealth Telephone Company; William Combs, Xerox Corporation, Xten; Brian McCallum Canadian Telecommunications Carriers Assn. & Communications Department; an John Ward, MIT. Research Program on Communications Policy Seminar, 4-6pm, Rm 37-252.

X-Ray Line Spectra of Cosmic Sources: A Probe of Hot Matter in the Universe* — C.R. Canizares, Physics Colloquium, 4pm, Rm 26-100. Tea served at 3:30, Rm 26-100.

Nuclear Weapons and Pre-Nuclear Man* — Jerome Frank, Johns Jopkins University psychiatrist. Technology and Culture Seminar, 4:30pm, Rm 3-370.

Christian Fundamentalism - A Scrutinizing Look at that "Old-time Religion"^{*} — Steve Henderson, director, Baptist Student Fellowship. Sponsored by the Baptist Student Fellowship, 8pm, Ashdown House, 3rd floor Lobby. Question/answer discussion following seminar.

Friday, Oct 19

Theory and Measurement of Shape Change During Profile Extrusion-Drawing* — Dr. James T. Tsai, research division, General Tire and Rubber Company. Polymeric Materials Seminar, 2pm, Rm 8-314.

Chemical Engineering Seminars* — Calvin Chew, Surface Characterization of Molybdenum Disulfide, 2pm; Byuk Sung, A Study of CO Oxidation,, 3pm, Rm 66-110.

Confinement in Reactor Prospects of a Toroidal Configuration with Flux Services but Without Ohmic Heating Current* — T.K. Cheu, Princeton Plasma Physics Laboratory. Plasma Fusion Seminar, 3pm, Rm NW16-212.

Nuclear Engineering Department Seminar in Applied Radiation Physics* — H. Wyle, Movement Detection by Fluoroscopy, B. DeCelis, Boundary Conditions in Computer Simulation, 3-4pm, Rm 24-115.

Set-Theoretic Control Synthesis and Applications* - Patrick B. Usoro, Doctoral Thesis Presentation, mechanical engineering, 3:15pm, Rm 3-446.

State of the Economy: 1979* — Moderator: Franco Modigliani; panel members: Leonard Silk, NY Times, Robert Pindyck, Ray Fair and James Tobin, professors of economics, Yale. Graduate Economics Association & Graduate Student Council. Panel Discussion 3:30pm, Rm 54-100.

Magnetoresistance of Quasi-1 d Structures and the Problem of Localization* – Dr. Mark Ya. Azbel, Tel Aviv University. Colloquium sponsored jointly by Center for Materials Science and Engineering and the National Magnet Laboratory, 4pm, Rm 9-150. Coffee at 3:30pm.

Do Things Really Taste the Same to Everyone?^{*} — **Prof Linda Bar-toshuk**, John B. Pierce Foundation Laboratory, New Haven, Connecticut. Psychology Colloquium, 4:30pm, Rm E10-013. Coffee at 4:15pm.

Sunday, Oct 21

Jews, God and History* — Max Dimont, author will speak. Sponsored by the MIT Hillel, 8pm, Rm 9-150.

Monday, Oct 22

Attention: Class of 1982* — Meeting for all who are interested in medicine, 4pm, Rm 4-149. Information: x3-4158.

The Organization of Actin in the Sea Urchin Egg Cortex: Implication for the Mechanism of Cytokinesis* — Dr. David Begg, Harvard Medical Applied Mathematics Colloquium, 4pm, Rm 2-338. Refreshments at 3:30pm, Rm 2-349.

Rainfall-Runoff Event Modelling on Rural and Urban Catchments* — Prof E.M. Laurenson, civil engineering. Water Resources and Environmental Engineering Seminar, 4-5pm, Rm 48-316. Coffee at 3:45pm, Rm 48-410.

Tuesday, Oct 23

Free Electron Lasers* — John E. Walsh, Dartmouth College. Spectroscopy Laboratory and Research Laboratory of Electronics Joint Seminar with Physical Chemistry, 11-noon, Rm 37-252. Coffee served at 10:30am.

High-speed Guided Wave Electro-optic Analog to Digital Convertors* — Fredrick J. Leonberger, Lincoln Laboratories. Electrical Engineering and Computer Science Optics Seminar, 3pm, Rm 36-428.

A Framework for Distributed Decision Making or How to Make Control Theory and Organization Theory Mix* - Prof Tenney, electrical engineering. L.I.D.S. Colloquium, 4pm, Rm 39-500.

Free Radicals in the Stratosphere: Their Measurement and Interpretation* — Prof James Anderson, chemistry and Center for Earth and Planetary Physics, Harvard University Seminar in Physical Chemistry, 4pm,Rm 4.270. Coffee at 3:45pm, Rm 6-321. Prenatal and Parent Education Group Meetings* — Charles F. Eades, MD, chief at the Obstetrics and Gynecology Service, will speak, noon, 3rd floor, Conference Room, Infirmary, Bldg W5. Information:x3-1316.

Simplest Theory of the Equatorial Undercurrent in a Homogeneous Ocean[•] — Ed Sarachik, Harvard. Oceanography Sack Lunch Seminar, 12:10pm, Rm 54-915. Coffee and tea provided.

Internal Blankets and Gas Cooled Fast Breeder Reactors* — Dale Lancaster, Reactor Physics Nuclear Engineering Seminar, 3-4pm, Rm NW12-222.

The High Reynolds Number Boundary Layer Separation Problem^{*} – Dr. Michael J. Werle, United Technologies Research Center. Aeronautics and Astronautics General Seminar, 3pm, Rm 37-212.

MITRE'S Experience with Macro-Technology* — Robert Everett, president, MITRE Corporation. Macro-Engineering Research Group Seminar, 3-5pm, Rm 13-4101.

Biochemical and Behavioral Effects of Tryptophan, Typrosine, and Phenylalanine in Mice* — Dr. C. Gibson, McGill University, Montreal. Nutrition and Food Science Seminar, 4pm, Rm 66-168.

Numerical Mathematics Study Group* — Discussion of the condition estimator for linear systems of equations and draft chapters of the new book by G.W. Stewart, 4pm, Rm 37-186. For further information call Virginia Klema 253-2166.

Nuclear Engineering Reactor Engineering Section Seminars* — Robert W. Sawdye, Test Cell Design for Examination of Three-Dimensional Turbulent Flows, 4pm; Joe Sefcik, Improved Ore Utilization in PWR Via Advanced Core Design, 4:45pm, Rm NW12-222.

Polymer Science as Viewed from NSF* — **Dr. N. Bikales**, National Science Foundation, Washington, DC. Polymers Seminar Series, 4pm, Rm 66-110.

Two Dimensional Experimental Physics in Three Dimensions* - Prof J. David Litster, Undergraduate Physics Colloquium, 4:15pm, Rm 4-339. Social hour follows.

Contemporary Directions in West Coast Photography* — Leland Rice will give a free, public lecture., Creative Photography Gallery, 120 Mass Ave, 3rd floor, Cambridge, Mass. 7:30pm.

Thursday, Oct 25

Current Problems Confronting the Air Transport Industry* — James Landry, senior vice president, Air Transfort Association of America. Flight Transportation Laboratory Seminar Series, 4-5pm, Rm 35-225,

The Impact on Users of Office Automation Systems to Date* - Dr. James Bair, BNR Inc. Industrial Relations Section and Center for Information Systems Research Sloan School of Management Seminar, 4-6pm, Rm E52-461.

Speech Production Physiology: Linguistic and Motor Control Considerations* — Dr. Joseph S. Perkell, research associate, RLE. Committee on Biomedication Egnineering Seminar, 4-5:30pm, Rm 37-212. Refreshments served.

A Two-Dimensional Model of Negatively Buoyant Vapor Cloud Dispersion* — Yi Chung Doo, Fluid Mechanics Seminar Series, 4pm, Rm 5-233. Refreshments served at 3:50pm.

Friday, Oct 26

Aspects of Nonlinear Dynamics^{*} — A. Combs, Nuclear Engineering Department Seminar in Applied Radiation Physics, 3-4pm, Rm 24-115.

Chemical Engineering Seminars* — Howard Franklin, Mineral Matter Effects in Coat Pyrolysis, 2pm; Prof Robert C. Reid, chemical engineering, Superheated Liquids, 3pm, Rm 66-110.

The Role of the Superior Colliculus in the Initiation of Saccadic Eye Movements* — Prof David L. Sparks, Neurosciences Program, University of Alabama Medical Center. Psychology Colloquium, 4:30pm, Rm E10-013. Coffee at 4:15pm

The Case for the Real Renaissance City: Matua from Alberti to Julio Romano* — Kurt Forster, professor, History of Art, Stanford. Lectures in the History of Cities, Department of Architecture, 5:15pm, Rm 3-133.

Community Meetings

Wives' Group** — Wed, Oct 17, Helen Bristowe will speak on "Yorkshire" 3-5pm, West Lounge, Student Center. Babysitting provided Rm 473, Studen Center. All women in the MIT community cordially invited.

Parent-Toddler Art Ages 2-3* — Sponsored by the Student Art Association. Eight, one hour sessions, interacting with your toddler in a variety of art media, several choices such as paint, plasticene pasting will be provided. Registration: \$30 for students; \$40 for others. Starting early Oct, Wed. 10am, Rm 425 Student Center. For information call x3-7019.

24 Hour Access to Darkroom Available at Student Art Association** – Chemicals provided also room in special projects in photography for people who know basics. Call 253-7019 between 1-5pm, Student Center, Rm W20-429.

of Nuclear Engineering. Nuclear Engineering Energy Assessment Group Seminar, 1-2:30pm, Rm 24-112.

Preprofessional Advising and Education Seminar^{*} – Prof Thomas Place, Dickinson School of Law, 2-4pm, Rm 10-186. Information: x3-4158.

Bermuda II: Its Negotiation and Effect on World Air Transport* — Alan S. Boyd, president, Amtrack; first US Secretary of Transportation; chairman, US Delegation for Bermuda II. Flight Transportation Laboratory Seminar Series, 4-5pm, Rm 35-225.

Evolution of Office Automation System* – Dr. Michael Zisman, Integrated Technologies, Inc. Industrial Relations Section Center for Information Systems Research Seminar, 4-6pm, Rm E52-461.

External Cardiac Assist - Studies Using a Mock Circulatory System* --Richard Lueptow, Fluid Mechanics Seminar, 4pm, Rm 5-233. Refreshments at 3:50pm.

Laminar Burning Velocity of Mixtures of Air with Indolene, Isooctane, Methanol and Propane^{*} — Mohamad Metghalchi, doctoral thesis presentation, Department of Mechanical Engineering, 4pm, Rm 31-161.

Methods for the Study of Interaction of Aflatoxin B-1 with Nuclear Macromolecules* — Dr. John Groopman, nutrition and food sciences. Analytical Chemistry Seminar, 4pm, Rm 8-205.

A New Positron Imaging Device: the Mesh Chamber^{*} — Prof Louis S. Osborne, physics. Committee on BiomedicalEngineering Seminar, 4-5:30pm, Rm 37-212. Refreshments served.

Materials Requirements for Fusion Reactors* — Klaus Zwilsky, chief, materials and radiation Effects Branch, Office of Fusion Energy, US Department of Energy. Materials Science and Engineering Seminar, 4pm, Rm 9-150. Coffee served at 3:30pm.

Recursive Partitioning Schemes for Classification and Regression* – Prof Richard Olshen, University of California at San Diego, currently visiting MIT and the Sidney Fraber Cancer Institute. Statistics Seminar, 4pm, Rm 2-338. Refreshments at 3:30pm, Rm 2-349.

Techniques for Measurement and Analysis of Human Movement * – Erik Antonsson, graduate student, and David Hardt, assistant professor, mechanical engineering. Seminar on Rehabilitation Engineering Research and Practice, 4-5:30pm, Rm 1-114.

Towards Structured Chip Design* — J. Craig Mudge, Digital Equipment Corporation. I.C.Seminar, 4pm, Rm 16-310.

How I Spent My Summer Vacation (Development of a Three Dimensional Viscous Flow Calculation)* — Prof W.T. Thompkins, aeronautics and astronautics. Aeronautics and Astronautics Seminar, 4:15pm, Rm 31-161. Refreshments served at 4pm.

Imagining Observations of X-Ray Sources inNormal Galaxies with the Einstein Observatory* — Dr. Knox Long, Columbia University. Astrophysics Colloquium, 4:15pm, Rm 37-252. Coffee at 3:45pm.

Wednesday, Oct 24

Nutrition Education* - Charles S. Davidson, MD, senior lecturer, nutrition. Clinical Research Center Seminar, 9am, Rm E17-415.

Lobby 7 Events

Live Chess Game* — Sponsored by the Chess Club. Come watch the festivities of human beings used as chess pieces in a live chess game. Fri, Oct 26, noon-1pm. Information: Brad 536-9596.

Children* - Fri, Oct 19, noon-1pm.

Laduvani* - Fri, Nov 9, noon-1pm.

Mandalay* - Fri, Nov 16, noon-1pm, improvisational jazz.

Color photos of Jupiter Fly-by* - On view daily, Oct 2' through Nov 26.

Photographs from the Student Art Association* — On view in Bldg 7 display cases through Oct 22.

Social Events

Tea at the President's House*** — Sponsored by the Women's League. Wed, Oct 17, 3-5:30pm. Meet new members and visit with old friends. Parking available in the Parking Garages on Vassar Street.

Fall Party to Celebrate Prof Arthur Mattuck's Years of Service to Students (Past & Future)* — Thurs, Oct 18, past students welcome, 4pm, Rm 2-102.

REPORT OF THE PRESIDENT AND THE CHANCELLOR

FOR THE ACADEMIC YEAR

1978-79

MASSACHUSETTS INSTITUTE OF TECHNOLOGY



MIT's June 1979 Commencement exercises returned to Killian Court for the first time since 1927.

The year just completed was one of considerable movement and excitement on many fronts. As the Leadership Campaign nears its completion, its effects are evident in many ways: the traditional departmental and disciplinary activities are receiving added support in the form of new professorships, more adequate space, new equipment, and additional academic and research funds; the maturing Energy Laboratory, the Harvard-M.I.T. Division of Health Sciences and Technology, and many other programs are providing widespread support for faculty and students throughout the Institute; there is the rapid development of programs (and in many cases, facilities) for the Whitaker College, the Plasma Fusion Center, the Program in Science, Technology, and Society, and the Energy Laboratory; and we are in the active planning stages for several new interdisciplinary centers or programs. This sense of movement comes as well from imminent construction of sorely needed and longplanned new dormitory and athletic facilities.

The ferment and dynamic nature of the Institute were reflected on the student front this year as we reviewed the organization of student services and, in the process, asked questions about our institutional responsibilities which extend beyond the formal curricular offerings to the provision of a supportive environment for all of our students.

The year marks as well a special milestone in the educational life of the Institute — the tenth anniversary of the Undergraduate Research Opportunities Program, the remarkably successful innovation in the learning encounter between teacher and student.

We have been pleased too by considerable progress in our relationships with funding agencies, as evidenced by a number of actions during the past year. Signs of this improving relationship can be seen in the responsiveness of various Federal agencies and the committees of Congress to the difficulties posed by policy changes regarding fiscal responsibility in Federal relationships. More importantly, we sense a growing appreciation of the structure, needs, and serious problems of the research universities by these groups, whose sympathetic understanding and support is so essential to the well-being and vitality of the research universities in general, and of M.I.T. in particular.

In April we completed the fourth year of the Leadership Campaign. At the close of the 1978–79 academic year on June 30, the Campaign total was \$215 million. As we write this report the total has exceeded \$220 million, very near the Campaign goal of \$225 million. It is clear that we shall make our target, thanks to M.I.T.'s friends and supporters, especially those in the M.I.T. Corporation and the Corporation Development Committee. Unfortunately, the relentless pace of inflation makes it impossible to meet all of the objectives which this sum originally encompassed, and even at the start it represented an estimate of our fund-raising capacity, not the Institute's true need. Finding additional support for faculty members, students, and desired facilities must remain one of our major efforts.

In 1975, at the beginning of the Leadership Campaign, we said that our purpose was to provide facilities, talent, and support that would "make it possible for M.I.T. to address more effectively through teaching and research, and sociotechnological dilemmas now confronting the nation and the world — to scale its contributions to the needs and opportunities appropriate for today and tomorrow." The degree to which this has actually occurred can be seen in many specific programs, but it is even more apparent if one examines, as we shall do here, the contributions of the Leadership Campaign to the continuing evolution of the intellectual map of M.I.T. and its congruence with the vital problems of American society.

THE EVOLVING INTELLECTUAL MAP OF M.I.T.

As we write this report at the close of the 1970s, it seems that a brief look at the Institute over the past 50 years would provide an appropriate introduction to our discussion of M.I.T. today.

today, and to highlight certain events along the way. In selecting dimensions for comparison, we chose certain indicators relevant to M.I.T.'s purposes and goals — milestones in the natural sciences and engineering fields which, while not reflecting all of M.I.T.'s endeavors, are close to the heart of the institution.

In the natural sciences, an enumeration of some of the Nobel Prizes that were awarded during the early 1930s will give some idea of the major trends at that time. Quantum mechanics had just come onto the scene and it was thus no accident that the Nobel Prize for Physics in 1932 was given to Heisenberg and in 1933 to Dirac and Schrödinger. The Nobel Prize for Physics in 1935 recognized the discovery of the neutron by Chadwick, a landmark in the history of atomic structue. In Chemistry, Harold Urey was awarded the Prize in 1934 for the discovery of heavy hydrogen, and the Curies received it in 1935 for the synthesis of new radioactive elements. In Physiology and Medicine, the 1930 Prize went to Landsteiner for discovery of blood groups; the 1932 Prize went to Sherrington and Adrian for discoveries of the function of the neuron; and the 1933 Prize went to Thomas Morgan for his work on the hereditary function of the chromosome. These prizes reflect much of what came to be the classical textbook material of our youth.

While the Nobel Prizes give us some limited idea of the major intellectual thrusts in the natural sciences, they fail to present a picture of the remarkable exploits of engineering of that period: the great bridges, the airplanes, the advent of air conditioning, the electrical machines, and the great dams that characterized that epoch. The various fields of engineering reflected rather closely relevant industrial practice of the time, and in their relation to the physical sciences, they differed strikingly from the contemporary technologies.

One illustration of the perception of engineering education in relation to basic science can be found in Karl Compton's own description of a conversation he had when he received the invitation to become President of M.I.T.:



Karl Taylor Compton, whose emphasis on fundamental science and research influenced the direction and shape of MIT today, served as President of the Institute from 1930 to 1949.

was not too sure I wanted to be President of M.I.T I wanted to think it over and talk it over with Frank B. Jewett, President of Bell Laboratories, and made an appointment to see him. As I left the house that morning, I told my wife that I was pretty sure I would turn the job down, and in fact Dr. Jewett did nothing positive to try to influence me. He said that he had observed some things about engineering schools in the United States; they had performed a useful function several decades ago and had done a marvelous job in his opinion but were far behind in their usefulness in the present and particularly in any future. They were too much on the pattern of technical trade schools. The only solution was to try to inject into the politics of these institutions a greater interest in fundamental science and research if someone could be found to do it. So I thought it was up to me to try to help.

In Compton's inaugural address he formulated the purpose of the Institute as "the development of science and its useful applications." And time and time again he stressed the necessity of greater emphasis upon the fundamental sciences both in their own right and as the bases of the various branches of engineering. To undertake the necessary research, Compton stated the need for an endowed research fund of \$5 million, the income of which would support faculty research. He could not conceive of a more appropriate or urgent program for the Institute than to continue its work of developing both principles and people for applying science to the problems of human welfare. It was this vision that enabled M.I.T. to become a leading force in the development of the natural sciences and the related technologies.

The emergence of M.I.T.'s leaders as science advisors at the national level started during that period: in the early 1930s President Roosevelt formed a Science Advisory Board, with Compton as chairman, with the task of recommending a more effective general governmental policy with respect to scientific work. During the Second World War, Karl Compton, Vannevar Bush, and many other members of the Institute were to play extraordinarily important roles in Washington as members of the National Defense Research Committee, the Office of Scientific Research and Development, and other war-related agencies; and M.I.T. undertook to build a "national" laboratory - the Radiation Laboratory - where 4,000 staff members were concerned with the development of radar in the broadest sense of the word, from the basic physics of magnetrons and electromagnetic theory to the testing of various radars on the battlefront.

With its size, its scope, and its style, the Laboratory created a new way of doing scientific and technical research for the public welfare. It also changed M.I.T. in the sense that interdisciplinary and interdepartmental cooperative efforts oriented toward the solution of major national and societal problems became a hallmark of the Institute. Under the leadership of Julius Stratton, Albert Hill, John Slater, and others, the Radiation Laboratory was transformed into the Research Laboratory of Electronics, oriented toward certain areas of physics and the problems of communication in synthetic and living systems.

Soon after the end of World War II, there came a book that presented a new synthesis and changed the way in which many came to view the second "industrial revolution." The book, written by M.I.T.'s famous mathematician, Norbert Weiner, was called Cybernetics, after the Greek word meaning "steersman" in the sense of governor. Subtitled "Communication and Control in the Animal and in the Machine," the book tried to bring together statistical communication theory, servomechanisms and feedback, and advanced views on the potential of computers. Cybernetics became something akin to an intellectual endowment for the early years of the Research Laboratory of Electronics, and from this stimulus grew most of M.I.T.'s contemporary work in human communication, including the neurosciences, psychology, and linguistics, as well as much of the computation activities.

The world after the Second World War saw a blossoming of new technologies. Building especially on new knowledge in solid-state physics, electronics began to pervade our lives: from television to copying machines, from transistorized hearing aids to magnetic computer memories, from air defense and air navigation to tape recorders. Electronics became the lead technology and Boston's Route 128 exhibited the many uses, practical and analytical, to which electronics and information processing could be put.

But electronics was not the only technology to intervene forcefully into our lives. The post-World War II period saw also the first flowering of the biomedical technology of drugs and vaccines. Thanks to sulfonamides, the penicillins, (it was the M.I.T. chemist John Sheehan who achieved the first synthesis of penicillin), the streptomycins, and so forth, the

The depression that began in 1929 was the most severe this country has seen, and the half century that has elapsed since then has been marked by political cataclysms. At the same time, this period has been both a golden era in the natural sciences and related technologies, and one in which these areas have become matters of serious public concern. These years also coincide with the emergence and the maturing of M.I.T. as a leading international university with a scope that mirrors the nature of contemporary society, and with special emphasis upon science and technology. This evolution dates back to the assumption of the M.I.T. presidency by Karl T. Compton in 1930: his vision made what followed possible.

It is clearly not possible in this report to detail the changes that have taken place in science and engineering or, indeed, the changes in M.I.T. that this half century has seen. The most we can do is to contrast in a few broad brushstrokes this landscape as it appeared in 1930 and as it is These words contain in outline the challenge which M.I.T. held for Compton. To the School of Engineering and the School of Architecture, he added the School of Science and the Graduate School, and in asking Vannevar Bush to become Dean of Engineering he ensured a strong infusion of applied science into the engineering programs. The new emphasis upon graduate study created the orientation needed to make M.I.T. not only a source of trained people for industry but a force in creating new industries, new technologically based systems, and, ultimately, new social realities.

infectious disease patterns and the death rates of the industrialized world were irreversibly changed.

At M.I.T. toward the mid-century, the issues that science, technological development, and especially the bomb, had started to pose were reflected in the Report of the Lewis Commission, which had been established to review the state of education at the Institute. Central to that report was the view that we should be able not only to create new science and to innovate technology, but also to relate them to human values and aspirations; that we should have a certain responsibility for forecasting the impact of scientific and technical developments on society; and that we should learn how to manage the new technologies in a humane fashion.

These concerns were expressed at M.I.T. in the foundation in the early 1950s of the School of Humanities and Social Science (originally called Humanities and Social Studies) and the Sloan School of Management (originally called the School of Industrial Management).

In reviewing this half century, therefore, we can see enormous changes in the Institute and in the fields represented here. In the natural sciences, for example, the physical sciences clearly occupied most of the "map" in the 1930s. It was not until the post-World War period, when the tools

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of physics, chemistry, and modern engineering became increasingly used to study the structures and phenomena of life that the biological sciences started to occupy an ever increasing fraction of the map. This quest to understand the physical chemistry of living structures was expressed as early as 1944 by Schrödinger's little book entitled *What is Life*. By 1953, numerous experiments on the hereditary substance DNA and Pauling's discovery of the helical structure of protein led Watson and Crick to formulate their model of DNA: a double helix which thus provided a mechanism for the copying of genetic material. There followed numerous discoveries relating to the genetic code, to the functional regulation of genes, to immunology, as well as many others which contributed to our understanding of complex biological functions at the molecular level.

But far from standing still during that same period, the physical sciences moved on many fronts. In the wake of the pre-World War II cyclotron, nuclear accelerators became more and more powerful and the traditional "ultimate" building blocks of the atom were smashed into more and more fragments. The catalogue of nuclear particles now has more than 100 entries, many with rather colorful names. It is only, literally, in the past few weeks that Murray Gell-Mann's quark model and the theory of quantum chromodynamics have found strong support in an experiment conducted in Hamburg under the leadership of Samuel C.C. Ting, holder of M.I.T.'s Thomas Dudley Cabot Institute Chair. The Ting team, composed of 57 scientists and engineers from seven countries (including the People's Republic of China), was able to detect through inference a gluon, whose existence is crucial to our understanding of the fundamental binding forces in nature. The excitement created by this discovery in the year of the Einstein centennial is attributable, at least in part, to the possibility that it may permit us to unify into a single theory the four forces of nature that have been identified to date.

Almost the same excitement is perceived in astrophysics, where the 1930s appear now to be the distant Middle Ages of the field. Satellites, data processing, computers, radio and X-ray astronomy have transformed the disciplines. With these new technologies astrophysicists are delving further into ancient questions as well as mysteries previously unimagined: pulsars, quasars, black holes, the origin of the universe, the evolution of stars, life on Mars and in the cosmos. At M.I.T., the key data processing devices for the radio telescope were developed at the Research Laboratory of Electronics and our astrophysicists have played a leading role in many key experiments, such as the quite recent discovery of the double quasar.

Again, comparable progress has been made in the earth sciences where chemistry, oceanography, and the signal processing approach to the study of seismic waves, together with the unifying model of plate tectonics, have brought about new understandings, ranging from the nature of earthquakes to the exploration and utilization of the earth's resources.

The past 50 years have been a time of extraordinary accomplishment in mathematics as well. Benefiting, as have the other sciences, from an enriching stream of refugee scholars and researchers from central Europe in the 1930s and 1940s, American mathematics took a leap forward, and our nation has become, as medals and prizes now testify, the foremost center of world mathematical research. The great currents and discoveries of mathematics in the past several decades — among them the deeper understanding of the higher dimensional spaces in which much of science and technology builds its models, a new overview of algebraic and combinatorial aspects of mathematics and its applications, significant progress on such difficult and complex areas of analysis as partial differential equations, and discovery of deep and unexpected connections among various previously distant fields of pure and applied mathematics all of these have been enriched in major ways by work done at M.1.T.

There is not enough space to document — be it ever so briefly — progress in the other natural sciences, in economics, in linguistics, in the neurosciences, and in the many fields of engineering that build on progress in basic science. All that we have attempted is to sketch how Karl Compton's vision has shaped the Institute and served human welfare.

There has been no attempt to document here the equally important complementary influences of technological progress upon other branches of human knowledge and action. New technologies enhance the potential of the natural sciences and medicine, they shape the theoretical concepts of the social sciences and the practices of management. Not only do new instruments, tools and software enable us to make previously "impossible" measurements, but most profoundly they raise new scientific, human, and societal problems. Progress in technology often forces us to admit that we don't really understand what we thought we did and thereby leads us to inquire much more deeply into new areas of basic science. By its ability to affect crucial human events such as birth and death, contemporary technology confronts humanity with questions of value and choice that transcend and challenge our established mores.

Today M.I.T. is a university *sui generis*. It is unique because there is no other institution of higher education so deeply involved with research. It is unique because of its international character, which does justice to the fact that the natural sciences are invariant under different skies. And it is unique in its concern not only with the sciences and engineering but with their human and societal eonsequences.

When one talks about research at M.I.T. one needs to realize that about half of this community of roughly 18,000 people are students. And practically all of the graduate students, more than half of the undergraduates, and all of the more than 500 postdoctoral fellows are involved in research. So are the nearly 1,000 members of the faculty, and so too, of course, are the members of the research staff. Today, the sponsored research budget represents roughly half of M.I.T.'s campus expenditures. In other words, M.I.T.'s activities — in education and in public service — have research as the most explicit motivating force.

The people who make up M.I.T. are obviously attracted to the Institute as a research university of a special kind. Over the years, these people have changed. They now come from all states and from all over the globe. Their backgrounds, interests, and ages are now more diverse. Increasingly, they are women as well as men. And while we have not yet met our goals for equal opportunity for minorities and women among our faculty, students, and staff, M.I.T. today is, in these terms, a much different place from M.I.T. in 1930.

This multi-faceted, multi-cultural community has developed a lifestyle which is probably unequalled in tempo and intensity of atmosphere. People live and work at the Institute almost 24 hours a day and 12 months a year. And they do not confine their activities to research and teaching on the



campus. They are bridge builders: between the university and industry or government — seeking, in the tradition set by M.I.T.'s founder, to put knowledge to work for social purpose.

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THE DEVELOPMENT OF ACADEMIC PROGRAMS

One pleasant surprise of the Leadership Campaign was that it stimulated extensive conceptualization and development of emerging academic programs — those new activities that departments, faculty members, and laboratory groups were just beginning, and whose success depended upon the availability of support and, often, new facilities. The preparation of the goals for the Campaign required an extensive dialogue between the central administration and the many academic groups of the Institute. The development of specific proposals for programs and facilities continued that dialogue and brought the projects and programs into sharp focus. In the process, we have found that the need for seeking outside support has accelerated the conceptualization of many nascent programs.

In the casebook for the Campaign, we discussed the many faces of communications, information, and computation at M.I.T. and the central and growing role of these processes in the society at large. Today, the concepts of computation and information pervade almost every activity at M.I.T. to some degree, sometimes unknowingly, sometimes as a central purpose.

Two programs that came into focus as part of the Leadership Campaign during the past year present exciting illustrations of this influence. They are: the bringing together of activities in the Department of Psychology, the Department of Nutrition and Food Science, the Department of Linguistics and Philosophy, and elsewhere in the Institute to form centers for the study of cognitive science and the brain sciences; and the plan to bring together M.I.T.'s many teaching, research activities, and public exhibition programs in the areas of the visual arts and of media technology. Activities in the arts and related media are burgeoning at M.I.T. Each year more than 1,000 students enroll in visual arts courses and the Institute's galleries attract thousands of visitors. Media research includes such developments as computer-based video and graphic information systems, computer-controlled electronic music, and innovative work in film, video photography, graphics, and various other forms of image processing. A diverse faculty group has been designing the initial stages of a new environment for the Visual Arts and Media Technology, in which the first phase would contain primarily areas for exhibitions and archival storage together with a media gallery, a "listening gallery," and work space for resident artists.

Several other academic programs have emerged during the year to the point where they require support from our fund-raising effort. Among these are: 1) the development of a major program in the field of microstructures and largescale integrated circuits; 2) an enhanced teaching and research program in the field of polymers; 3) a new center for study and research in materials processing; and 4) a broadbased program relating to chemicals, human health, and the environment.

Funds are needed as well to help meet the needs for additional and improved space for programs in the Alfred P. Sloan School of Management. Since its establishment in 1950, the Sloan School has grown both in size and stature. Its alumni occupy numerous positions of leadership both in the United States and abroad. Its student applications, enrollment, faculty research activities, and instructional programs (including those for mid-career and senior executives) have increased so dramatically that the School's facilities can no longer meet its varied needs. The School plays an increasingly key role in M.I.T.'s interdisciplinary efforts involving complex technological and societal problems, such as energy, health, and management of the environment. There is thus an urgent need to improve both the quantity and the quality of the School's space including the construction of new classrooms and the renovation of offices and seminar rooms, and to increase the size of the School's faculty.

Cognitive Science and the Brain Sciences: Two Centers in Formation

Earlier in this report we noted that under the influence of Norbert Wiener, the Research Laboratory of Electronics interpreted its mission in communication quite broadly, so as to include both the nervous system and linguistics. Since then, research and teaching related to these two areas have grown substantially at the Institute, as new experimental tools in the neurosciences and new models of language become available.

Understanding brain function, perception, and cognition is clearly central to M.I.T.'s Department of Psychology,

Advances in the earth sciences have been accomplished with the aid of the signal processing approach to the study of seismic waves. Here, two graduate students in Earth and

Planetary Sciences use a seismograph in their research on New England earthquakes.

but these interests have spread throughout the Institute. For example, faculty members in the Department of Nutrition and Food Science offer a graduate program in neural and endocrine regulation and do frontier research ranging from neurotransmitters to the influence of nutrition on behavior; members of the Department of Linguistics and Philosophy are deeply involved in studying the relation of language and mind. Furthermore, interest in the brain and/or cognition extends to most departments in the School of Engineering, to the Departments of Chemistry and Biology, and to such interdisciplinary units as the Division for Study and Research in Education, the Research Laboratory of Electronics, the Laboratory for Computer Science, the Artificial Intelligence Laboratory, the Harvard-M.I.T. Division of Health Sciences and Technology, and the Whitaker College.

In the last two years, scientists from several of the above mentioned academic units have held, under the sponsorship of the Sloan Foundation, a series of critical discussions and workshops from which emerged a certain consensus regarding the nature and the objectives of cognitive science. The participants from M.I.T. (and several other academic institutions and industrial laboratories) were able to formulate certain common approaches to the study of mental representation and computation. Initially they are attempting to construct theories capable of accounting for the knowledge that underlies one's ability to use one's native language, to represent objects in three-dimensional space, or to engage in logical thinking, temporal planning, or memory. This is obviously an ambitious undertaking, but so strong was the desire of these colleagues from several M.I.T. departments to cooperate in a center that would provide a focus for individual and collaborative research that during the spring a Center for Cognitive Science was formed with partial support from the Sloan Foundation. This Center is not only undertaking theoretical research but is also taking responsibility for outlining educational programs for predoctoral students and postdoctoral fellows. With regard to facilities for such a center, there is little need to build or combine intricate laboratory facilities, although the Institute has tried to provide a modest amount of additional contiguous space for the program.

In the brain sciences, there has been a comparable explosion of interest and excitement in gaining a better understanding of how the brain functions - from the role of minute quantities of highly specific chemicals to the behavior of humans. Faculty from throughout the Institute have expressed an interest in collaborating in this field, in both teaching and research programs, and their activities and enthusiasm have encouraged us to attempt to draw the relevant programs together in a Center for the Brain Sciences. We are seeking support for the space and sophisticated laboratory facilities needed to provide a suitable working environment in this field. In the meantime, we asked a group of faculty members from several departments to examine opportunities and the need for a coherent educational program. Out of their efforts have come not only a heightened awareness but also a better utilization of existing courses and facilities as well as better academic counseling for our students.

Recognizing that it will take time to obtain funds for an entire building for such a center, which would house the Psychology Department as well as faculty and staff from other departments or laboratories who would participate in the center's programs, we plan to add a floor to the building being constructed for the Whitaker College. In the meanwhile, we are actively seeking support for the Center's longrange program.

It seems highly appropriate that an institution dedicated to the progress of science and technology should also be in the forefront of trying to understand the functioning of the human brain, this prime generator of knowledge and learning. the circuits as it was the problem of resolving materials defects associated with their fabrication. During the past decade, the primary question became one of which functions to incorporate in integrated circuits, that is, which functions would be general enough to allow for large-scale production. (This was the period which saw the development of microprocessors capable of incorporating in one or a few integrated circuits all the elements of a programmable general purpose computer.) Today, except for circuits with repetitive structures (such as memories), industrial ability to manufacture integrated circuits outstrips the ability to design them. We are now faced with the need for the enormous difficulty of designing circuits containing several hundreds of thousands of components.

The program under development includes study of the traditional problem of improving fabrication techniques and reducing the size of components so that larger, more dense, circuits can be made with fewer defects. However, it goes beyond these issues to consider design aids that are necessary if complex geometrical designs embodying random logic are to be fabricated, and to consider questions of computer architecture. The two-dimensional physical structure of integrated circuits allows parallelism in structure and organization which we now do not know how to use effectively, but which could lead to fundamental changes in the organization of computers and computation.

Another area in which education and research will have an influence on industrial development is the field of polymeric materials. For more than three decades, members of the M.I.T. faculty have made important contributions to our understanding of the properties and uses of polymers, and have trained successful contributors to the field. Nevertheless, in spite of the size, quality, and diversity of these efforts, the Institute is not recognized as a world leader in this field. We believe that this lack of recognition is a reflection of the lack of internal organization in polymers research and education, as well as insufficient interaction with industry where much of the creative work in polymers is done.

The School of Engineering, in collaboration with the Center for Materials Science and Engineering, is developing a new interdepartmental research and graduate educational program which will involve faculty from Chemistry, Chemical Engineering, Materials Science and Engineering, and Mechanical Engineering.

The new program will help establish an internal sense of community, greater external visibility, and a means by which continued evolution and improvement can occur. The program will provide a forum for educational activities in polymers at the graduate level, for strengthened interaction with the industrial community in the area of polymers, and for several new research initiatives.

The School of Engineering is establishing as well a Materials Processing Center, which will be concerned with process fundamentals and applications, materials systems engineering, and the societal issues which arise in the processing of raw and semifinished materials and in the impact of new materials processing technologies.

Advances in the usefulness and reliability of materials depend on a combination of modern scientific understanding and the art of the traditional artisan. An important concept is that performance of materials can be controlled through control of internal structure, from the macroscopic to the atomic level. Without this concept, the performance and reliability we have come to expect from modern aircraft and computers, for example, could never be achieved. A second important concept underlying the center is that economic and low energy processing of materials in a competitive world depends on assimilation of new technologies such as robotization and adaptation of processes to utilize these technologies.

The new center will provide a way for staff and faculty to contribute effectively to broad materials processing problems and to interact with industry and government in finding solutions to these problems. Research activities in the center will include work on lighter-weight materials for energy-efficient automobiles, primary-materials production processes which have lower economic and social costs, computer-aided and adaptive materials processing, and processing by supercooling and ultra-rapid solidification. knowledge and to the education of the large number of toxicologists, epidemiologists, and so forth, who are needed.

During the last year the faculty members and academic administrators from Harvard and M.I.T. met repeatedly to explore how a joint program on the impact of chemicals on human health and the environment could come into being. We at M.I.T. have been helped by the experience with our Center for the Study of Health Effects of Combustion. This center combines the efforts of the Harvard-M.I.T. Division of Health Sciences and Technology and of the Energy Laboratory in exploring the health effects of present and potential fossil fuels. Key objectives include the assessment of potentially mutagenic and/or carcinogenic species from combustion of fossil fuels and the identification of possible alternative combustion methods and fuel utilization strategies that could reduce or eliminate health hazards. The utilization of fossil fuel resources in an environmentally and economically acceptable manner depends upon our acquiring critical knowledge that relates to both technology and public health.

In our exploratory discussions with our Harvard colleagues we have focused on four basic areas: health sciences, environmental sciences and engineering, analytical methods and instrumentation, and policy analysis and regulation. Such a program would range from basic biology, chemistry, and chemical technology to economics, public policy, management, and law. It would need to be able to identify and diagnose problems, working in conjunction with both industry and regulatory agencies. There is the hope that it might help in creating a climate for the rational discussion of a variety of viewpoints on these issues and that such discussions might result in materials for information and education of the public.

This summer we ran a small educational pilot operation: about 50 young professionals took a 10-week program dealing with toxicology, analytical chemical methodology, epidemiology, occupational health, the regulatory framework, and environmental decision making. The program was taught by M.I.T. faculty members, augmented by Harvard colleagues and lecturers from industry and government.

The forthcoming year is one in which we intend to develop rather specific plans for cooperation between our two institutions, to clarify an appropriate organizational structure, and to explore funding possibilities from a variety of sources at a level that will make such an ambitious program possible.

Computational Environment and Challenges

Many of the previous programs illustrate pioneering areas of research related to information and communications. As noted above, the uses of information processing throughout the Institute's educational, research, and administrative programs have become so pervasive that we decided to take a critical look at the adequacy of M.I.T.'s computational resources and its needs for the future.

During the year, the Committee on Future Computational Needs and Resources, which was appointed in the spring of 1978 by the Chancellor and the Provost, reported on its conclusions and recommendations. The committee concluded that we do not make full use of computers in education and research, that our present path is not leading in the right direction, and that, except in specific situations, the Institute's overall use of information processing cannot be characterized as pioneering. In sum, the committee felt that, although the Institute is preeminent in research in the computer sciences and in the applications of information processing, we are, with respect to our *use* of information processing, particularly in instruction, not unlike the shoemaker's children.

In contrast to the present state, the vision of the near future proposed by the committee includes widespread use of interconnected personal computers or terminals for use by

Engineering and Industrial Innovation

A number of new programs in the School of Engineering reflect the Institute's continuing concern with the problems of industry and industrial society.

The Department of Electrical Engineering and Computer Science, for example, is developing, in collaboration with several interdepartmental laboratories and faculty from other departments, a major new educational and research thrust in the fabrication, design, and architecture of very large-scale integrated electronic circuits. The program reflects the needs of industry for people with theoretical and design capabilities that are far beyond the current state of the art.

During the past 20 years we have seen an astonishing development in the complexity of integrated electronics circuits capable of performing sophisticated logic functions. In the early development of integrated circuits, the problem was not so much the selection of logic functions or the design of

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Chemicals, Human Health, and the Environment

During recent years the public has become increasingly aware of the problems of the control of chemical hazards. The resolution of these issues is often left to adversary proceedings in which industry, governmental agencies, and public interest groups are often far apart in their approaches. M.I.T. and Harvard have faculty members of outstanding competence in toxicology, epidemiology, and other disciplines necessary to a thorough understanding of these complex issues. Thus it is not surprising that both industry and government have encouraged the two institutions to undertake a major joint program that would contribute to the development of the requisite scientific and technical students and faculty, for such diverse purposes as assisting in research, new modes of teaching and learning, preparing or solving homework problems, maintaining schedules, report writing and editing, and communicating with fellow students or instructors.

As a first step in moving toward this computational environment, the committee recommended the establishment of an "M.I.T. Network" for tying together various information resources, and the creation of regional computing centers within the Institute. Further, they recommended that a number of experiments be conducted in education, office automation, graphics, personal computers, computerized classrooms, mixed media, and library uses of computers, as well as far-reaching reorganization of Institute resources relating to information processing and communication. The Committee recommended as well that responsibility for all information processing and communication technology at M.I.T. be centralized under a single senior individual, and that a standing faculty committee be created to maintain oversight in these areas.

There has been extensive discussion of this report during the year, and of the educational and institutional climate which it portends. While decisions have yet to be made con-



The Institute's pervasive use of information processing in research programs is illustrated by a microprocessor system developed at MIT's Biomedical Engineering Center for

cerning implementation of the recommendations, the general directions outlined in the report have been accepted in principle and several departments within the School of Engineering are moving toward the establishment of significant decentralized computing resources — an indication that the committee's view of the future is founded in already perceived needs.

UNDERGRADUATE RESEARCH: OPPORTUNITIES AND ACHIEVEMENTS

This year marked the tenth anniversary of the founding of the Undergraduate Research Opportunities Program. This unique program — known as UROP to all — has had a significant effect on the educational climate of the Institute as it is perceived by both students and faculty, and is, we believe, the most important single development in education at M.I.T. in the past several decades. It provides the opportunity for undergraduates to join with faculty members in an inquiry of mutual fascination.

Through UROP the Institute has sought, as early as possible in the undergraduate experience, to: 1) teach students by example the process of seeking answers and assimilating knowledge; 2) foster meaningful student-faculty relationships on several levels, with inquiry into a topic of intellectual interest providing a framework for advising, tutoring, and related needs of the students; and 3) develop student maturity and self-confidence in both personal and professional dimensions.

Perhaps UROP's most valuable contribution is that it provides ways for our undergraduate students to achieve a sense of individual accomplishment and to generate for themselves the excitement of intellectual discovery.

At M.I.T., undergraduates have the opportunity to inhabit a very special moral and intellectual universe, a world that is both demanding and rigorous, but also sympathetic. It is the responsibility of our faculty to guide these young people, to encourage their earnestness and drive, but especially to firmly require that they fulfill the promise that got them into M.I.T. in the first place. Simply offering such students a modern campus and a plentiful menu of good courses does not distinguish the foremost universities of the world from one another. But in the providing of a researchbased undergraduate educational experience, M.I.T. offers a special challenge and opportunity to students who want to take an active role in their own education. Clinical Instrumentation. The system is being used to edit tapes for a library of annotated electrocardiograms.

on, a sense of intellectual excitement and individual accomplishment.

The Undergraduate Research Opportunities Program began in September 1969 with nearly 300 participants (more than twice our estimate of initial interest), and grew to 600 in the second semester. It began without fanfare, without a bureaucratic master plan, without staff or clerical support, and without formal administrative housing in any particular office. It also began at a time of unprecedented ferment and deep discontent at M.I.T. and on campuses throughout the nation. In the midst of this, M.I.T. invited its undergraduates to come into campus research pursuits as full, contributory citizens. It was a bold move against a swift current of development that had followed the massive World. War II research efforts - a development which converted several leading universities into world class research institutions at the price of orienting faculties toward graduate and postdoctoral education with such intensity that undergraduates were effectively disenfranchised from the mainstream of intellectual action.

Ten years and several thousand undergraduate researchers later, UROP has come of age at M.I.T. For the past several years about 2,500 students each year have been engaged in undergraduate research. The program now spans all 23 academic departments, including those which do not award undergraduate degrees. And while UROP is the principal vehicle for undergraduate research, this kind of activity is also available through senior thesis, project laboratories, special topics in engineering, special problems in physics, political science internships, or the cooperative programs in several engineering departments, to name a few. The total atmosphere is what counts. The genesis of this atmosphere lies in the origins and tradition of M.I.T.; UROP's contributions have been primarily the provision of scale, interdisciplinary links, articulation, and overview.

The scope and complexity of UROP has consistently enlarged and deepened: from the original program of research for credit during the academic year, UROP has grown to include summer research (which usually carries stipend support), and ties with off-campus professional organizations (including a special emphasis in the medical and health-related fields). Students can begin or end a research effort whenever they wish at any point during the year, without being bound by the formal academic calendar; the "average" UROP student spends 8 to 15 hours per week (over a period of one and one-half years) on his or her research project. And by engaging research staff as well as faculty in this type of educational encounter, the UROP experience heightens the sense of shared purpose which is a special feature of M.I.T. The success of the program is demonstrated by the increasing sophistication of students' work and the routine expectation of many faculty that high-quality research contributions will come from undergraduates. A significant number of entering freshmen state that the opportunity to participate in research is the determining factor in their decision to enter the Institute. For a student to undertake a UROP project today means to become engaged with the full range and complexity of the research experience: defining a problem, writing proposals, securing funding, communicating with colleagues, dealing with recalcitrant equipment, interpreting results, making formal presentations, and reaping rewards (such as they may be).

Read what some of the students have said about their experience:

Again I must acclaim UROP for the opportunity it has given me to see how the field of experimental physics really is; the experience has been a great help to me in choosing possible career goals, in addition to being one of the finest methods for learning a subject I've ever come across. UROP is still the one major reason that M.I.T. is worth suffering through over and above any other undergraduate institution.

Aside from the obvious increase in practical lab experience which I gained through my summer UROP work, there were two more important lessons. The first was learning when to quit. That is, when should a project be abandoned as simply not being possible or profitable. In a standard lab course this problem is never faced. Even when things don't work, there is the knowledge that somebody else in the lab got the product and you better get it too. The second important lesson was in learning to work with people in the development and carrying out of a research project.

Frankly, my only regrets are that I didn't do UROP sooner. When you are responsible to an individual or group for the knowledge in an area, you apply yourself to it more thoroughly. Sometimes it is easy to just get by with a B in a course if you aren't called upon to recite on the subject. But when you're a UROP-er, you kind of set your standards higher. In other words, I didn't dare not know some things once I undertook the project. I've had to really learn (and am still learning) because of this project. Without UROP, I may have just let it slip by.

Faculty take supervision of undergraduate research seriously. Just as students come to M.I.T. to learn from and with M.I.T.'s faculty, so too do first-rate professionals join M.I.T.'s faculty to work with these fresh, spirited colleagues.

There is a personal return to the faculty member in such collaboration. Beyond the pride in seeing one's protege develop, there is professional pride in conveying the knowledge, culture, and traditions of a field. In the UROP partnership there is relaxing of the tension between the demands, sometimes distracting, of conventional teaching formats and the unrelenting pressures of research management.

There is also tangible professional benefit to the faculty member, not unlike the returns of working with other research colleagues, but perhaps with greater humor and less formality. The influence of a particular collaboration on a faculty member outlasts the individual undergraduate and affects the professional life of the faculty member, perhaps by letting him or her start a new field or approach, perhaps by accomplishing the feasibility study that finally elicits major moral and financial support, perhaps by questioning a longheld tenet or theory, perhaps by adding a measure of humanity to a lonely pursuit.

Thus, faculty development is a major aspect of UROP's overall contribution to M.I.T., especially in the junior faculty ranks, where assistant professors scramble to get research programs supported and under way, to attract research students, and to establish themselves professionally. These enterprises are greatly aided by the presence of undergraduate research colleagues, who in exchange, want greater access to precisely these faculty members because of their verve, rapport, up-to-date knowledge, and youth. As these faculty enter the senior ranks, they know no norm other than that of undergraduates as bona fide research partners. An increasing number of these faculty are passing through the tenure threshold, permanently building undergraduate research into M.I.T.'s future. This is as we believe it should be.

THE LEARNING ENVIRONMENT BEYOND THE CLASSROOM

In our annual report last year we mentioned our intention to review the organization of student support services at the Institute, with particular focus on the Office of the Dean for Student Affairs and the various services it provides.

This review led to changes aimed principally at improv-

The program had its intellectual genesis in a lecture delivered at the Institute in 1957 by Dr. Edwin H. Land, president and founder of the Polaroid Corporation. The lecture, entitled "The Generation of Greatness," had a profound impact on M.I.T. Dr. Land said of undergraduates:

One feels, when among our young students, that they are honest and honorable and full of ideals; that they come to the door of our universities with the dream of being our colleagues; that if we could provide them intimate leadership there would be no discipline to which they would not subject themselves and no task so arduous in the pursuit of knowledge and science that they would not devote themselves to it.

Dr. Land elaborated his view that if students were provided with "intellectual ushers" — senior colleagues who would guide them through the university and start them on personal research projects — they would gain first-hand, and earlying services for graduate students; strengthening institutional support to undergraduate students and particularly to the departmental and the general freshman advising programs; and rationalizing the services for women students, international students, and the student residence programs, both on and off campus. As of the writing of this report the reorganization of the Dean's Office suggested by the study has been completed and a national search is under way for the new Dean. A broader review of the organization of various student-related responsibilities which are found in offices and departments throughout the Institute has yet to be completed.

In addition to clarifying the service and management issues of organization, the review of student services has raised again some important questions of educational and institutional policy, and we wish to reflect on these questions here.

First is the question of how to meet the Institute's responsibility to support and to complement the academic program. Besides the formal offerings in the classroom and

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The Undergraduate Research Opportunities Program, begun in September 1969, now involves all 23 academic departments. Margaret MacVicar, director of UROP, observes the work of a UROP Student in the Department of Psychology.

the laboratory, American universities have traditionally provided advising and other support activities - including a variety of residential, social, and cultural programs on campus - which are not a part of the formal curriculum, but which add significantly to the education and to the opportunities for personal growth and development of students. At M.I.T. these support activities have been provided by faculty members and administrative staff members both within the departmental framework and Institute-wide. A growing concern in recent years, highlighted by the review, is how to meet students' wish for more support and advice from faculty members outside of the formal classroom setting. It is understandable that faculty may have limited involvement in educational support activities, given the many other demands on their time in this period, the restricted departmental budgets, and the pressure on younger faculty to compete for research support and for professional recognition. The continued personal interest and involvement of our faculty members in the professional and the personal growth of students, however, is a cardinal ingredient in an M.I.T. education. We have heard this time and time again from alumni and students; and the success of the UROP experience is a testimony to the value of such one-toone interactions. The dramatic increase of student and faculty participation in UROP during the past decade is a positive sign in this respect. But growing student criticism and concern over the quality and availability of advising suggest that we need to pay more attention to the supportive roles that M.I.T. faculty play outside, as well as within, the context of their own research. We are particularly struck by the growing interest among undergraduates to receive more, better, and earlier help in making their career choices. They see a need for career counseling, reaching down to their early academic decisions about a major, and they see a need for more help in exploring possible shifts or combinations of departmental majors in their upperclass years. Quite often they feel uncomfortable in discussing these topics with their departmental advisors who appear to them to be knowledgeable about and committed to a specific profession or field. It is not very clear to what extent this malaise about advising is occasioned by changing expectations of students or even by the changing and complex configurations in the fields of knowledge, rather than by a lack of faculty involvement. All of these factors are probably influential to some extent. But whatever the cause, there is an important need for the faculty, collectively and individually, to respond to these student needs. And there is a need for the administration to plan the institutional responses, so as to encourage and facilitate faculty involvement, rather than substitute for it with professional counseling. Several universities have chosen to provide professional academic counseling outside their departmental structure. But we believe that would tend to change the character and dilute the quality of our education. A major section within the Dean's Office, devoted to Undergraduate Academic Support, was created this summer to operate as an academic information center for students and for their advisors and for departments in order to strengthen (rather than substitute) the student-faculty bonds, and encourage the integration of career counseling and academic advising to the extent possible. The Committee on Educational Policy is studying how to improve advising, and we have had several discussions about this problem with department heads. We hope that the heightened awareness about the needs as perceived by the students will bring about a needed improvement, and we plan to reassess the situation next year.

A second concern highlighted by the review has to do with a need to make more support services available to our students who do not have major problems of adjustment, but whose education and experience at M.I.T. would be enhanced if they had more opportunities for engagement in academic, intellectual, cultural, or social activities. Many of these opportunities can be provided in the context of the campus residential environment. In principle there is a great variety and choice in the residential program for undergraduate students both in the dormitory system on campus and off campus in fraternities and independent living groups. A combination of circumstances, however, including the lack of resources for adequate development of both facilities and programs under the Housemaster-Graduate Resident system, have led to the conclusion that our residential system is not developed to its full potential, and that we should take better advantage of the living environment as a focus for programs which can support and complement our academic offerings. We are taking some steps this year, including the addition of a full-time business advisor for fraternities and independent living groups, a modest increase in program support to Housemasters and Tutors, and a major study and review of all dining programs and facilities on campus.

Perhaps the most significant gain on the residential front was our decision in June to proceed with the building of a new dormitory for 300 undergraduates, made possible by an anonymous gift of \$2 million. Serious crowding during the past five years had exacerbated the housing problems and, although the cost of the new house will require significant debt financing (if no additional gift capital is found), we felt that going forward with the building at this time will alleviate the serious crowding and will limit the rapid escalation of the cost of this necessary facility.

Unfortunately we cannot report progress on the problem of housing for graduate students. Campus facilities cannot begin to meet the demand here, and the housing in the Greater Boston area becomes scarcer and more expensive each year.

We are very happy, on the other hand, to report that we are moving ahead with the construction of a much expanded athletic facility, whose funding from generous gifts of alumni and friends is almost complete.

In the past 30 years universities have gone through major transformations as far as their relations to students are concerned. Following World War II universities were viewed as intensive suppliers of trained professionals for industry and government; in the 1950s and early 1960s they were expected to fill a parental role for a fast growing college population; in the late 1960s they became the battleground for youth independence and for social and political activism; and in the 1970s they have been characterized by privatism and a utilitarian emphasis.

We cannot make a prediction about student attitudes in the 1980s any more than we could have predicted today's state 10 years ago. But we can say that our students seem to be making more out of what is available to them at the Institute today than they did during the previous decade. And we can also speak of the value of a periodic stock taking, such as we did last year, with ample time to listen and to reflect before taking institutional steps which should provide the best possible climate for the growth of our students.

RESEARCH AND RELATIONS WITH THE GOVERNMENT

standings of the nature and role of university-based research in the nation.

At the beginning of the year, the emphasis on fiscal accountability by the Federal government and the apprehensions of the universities were focused on proposed revisions of the cost principles governing Federal reimbursement of research costs at colleges and universities. The university community feared that the proposed revisions represented an abandonment of the partnership concept and a point of transition to a different relationship between them and the Federal government — a relationship in which universities would be regarded as vendors essentially indistinguishable from commercial organizations.

M.I.T. joined the debate and took strong exception to those proposed revisions which would have seriously impaired the financial viability of the Institute's specialized research facilities, and would treat students, however deeply involved in research, solely as course-taking students in calculations of reimbursable indirect costs. We particularly stressed the concept that research and instruction, especially at the graduate level, are interactive, mutually supportive activities which cannot be separated one from the other except in the most artificial and mechanical ways, and with great cost to both.

The Office of Management and Budget responded to the expressions of alarm by providing an opportunity for further comment and discussion and by giving serious consideration to the views of both Federal and university representatives. When finally issued last spring, the revised principles required some significant changes in university procedures, but had been sufficiently modified from the earlier proposals that M.I.T. can accommodate itself to them without sacrificing its ability to conduct research effectively.

The mood and attitude of Congress toward the universities had also been reflected in the 1978-79 National Science Foundation appropriations bill, which included a limitation on the level of faculty salaries which could be charged to NSF grants. The implications of this in terms of Federal involvement in the internal compensation and other policies of universities were enormous and disturbing. Our discussions of these concerns with Congressional sponsors of the requirement and their staffs appear to have been successful, for the limitation did not recur in the NSF appropriations bill for the 1979-80 year.

These and other examples of interaction with the Congress and Federal agencies have provided both encouragement and hope. They suggest that problems with the relationship are in large part the result of misunderstanding, inadvertence, and inattention of the kind that can result in any relationship taken too much for granted. While the Congress and the executive agencies have perceptions of the universities with which we might take issue, they are held without malice, and those who hold them are both accessible and willing to change their views if the arguments are well articulated on the basis of fact rather than rhetoric. Where the perceptions are not in our favor, but nonetheless accurate, the universities must listen more closely to criticism.

Encouraged by the fair hearing we received in connection with the revised cost principles, we have since communicated to OMB our concern that technological innovation in the country has been impaired by the increasing difficulty which major research universities are finding in their efforts to preserve their dynamism and freedom of inquiry. One reason for this difficulty is the fact that there are few discretionary funds, independent of specific research grants and contracts, which universities can use to maintain the vitality of their research efforts by seeding the exploration of new ideas, supporting talented young investigators, acquiring equipment not otherwise available for critical on-going experiments, and smoothing out the discontinuities inherent in project-by-project annual funding. We have suggested that regular provision of funds for the support of independent research, which is already available to non-university contractors, would provide a partial remedy. We also have urged that modifications be made in the cost principles relating to interest cost in order to permit universities to acquire the capital funding necessary to acquire new research facilities and equipment.

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In our report last year we noted the growing impact of governmental action on the Institute and suggested that it was necessary for the research universities to strive to improve communications with both the Executive Branch and the Congress. We were particularly apprehensive about the apparent deterioration of the spirit of collaborative partnership between the universities and the Federal government. Forged in World War II and reinforced in the years following Sputnik, that partnership encouraged and sustained university research and, in turn, brought the nation to world preeminence in science and technology and contributed to the welfare and prosperity of society.

Underlying that partnership was a consensus regarding the inherent importance and contribution of basic research. In recent years, however, in absence of proof that such work will produce immediate practical results, basic research had come to be measured primarily in terms of fiscal accountability. In the last few years this had become a pervasive theme.

This year we can report a considerable improvement in the university-government relationship — an improvement based on continuing efforts to achieve mutual understanding of complex and diverse problems and to rectify misunderIf we are to build effectively on the dialogue which has already been initiated, however, we must go beyond the discussion of cost principles and engage in a meaningful exchange as to the role and purposes of the research universities and the nature of the relationship which they and the Federal government should preserve.

In most major US universities, research is so deeply woven into the fabric of the general university that it no longer stands clearly outlined; the fact that it is an essential part of the national basic research effort is therefore obscured. In contrast, most other nations separate their scientific and technical research from their teaching efforts. They support governmentally financed research institutes separate from their teaching institutions to the serious detriment of both. We must explain this difference and the dynamics of our research universities more effectively if we expect the Federal government to truly understand our special probems and needs.

During the past year a more meaningful dialogue was conducted between the universities and the Federal government than at any prior time in this decade. Both have developed a far deeper understanding of the attitudes and problems of the other.

We look forward now with the hope that this dialogue will provide the foundation upon which we can build once more a relationship which strengthens the universities as institutions and thereby their capacity to help the nation sustain its position of scientific and technological preeminence.

IN SPECIAL RECOGNITION

The individual efforts and distinctions on the part of our faculty have been many during this past year. Two members of the faculty were elected to the National Academy of Engineering, bringing to 50 the total number of M.I.T. faculty in the Academy. The new members this year, both members of the Department of Electrical Engineering and Computer Science, are Professor Peter Elias and Professor Robert G. Gallager. In April, the National Academy of Sciences elected three M.I.T. faculty members, and another who will join our faculty in September 1979, to its ranks. thus bringing the total number of M.I.T. officers and faculty members in the Academy to 76. The new members are Professor Keiiti Aki and Professor Gordon H. Pettengill, both of the Department of Earth and Planetary Sciences, and Dr. Norman C. Rasmussen, head of the Department of Nuclear Engineering. Also elected was Dr. Thomas S. Kuhn of Princeton University who will join our faculty this fall as a professor in the Department of Linguistics and Philosophy and in the Program in Science, Technology, and Society.

In May, three members of the M.I.T. faculty were elected fellows of the American Academy of Arts and Sciences. They are: Professor Daniel G. Quillen of the Department of Mathematics; Professor Carl Wunsch, head of the Department of Earth and Planetary Sciences; and Professor Gene M. Brown, head of the Department of Biology.

Within the Institute, special honor was given this year to Professor David J. Rose of the Department of Nuclear Engineering, who was selected as the recipient of the 1979-80 James R. Killian, Jr., Faculty Achievement Award. The Award is given each year to a member of the faculty in recognition of extraordinary professional accomplishment and service to the Institute. Known for his work in fusion technology, nuclear waste disposal, and his concern for the ethical problems arising from advances in science and technology, Professor Rose was cited by the Faculty selection committee as having had three distinguished careers: "that of scientist and engineer, that of the technology/policy analyst, and that of the bridge builder between the scientific and theological communities."

This past year saw several new appointments to senior posts in the academic administration. They include Dr. Herbert S. Bridge, director of the Center for Space Research; Dr. Ronald C. Davidson, director of the Plasma Fusion Center; Dr. Kent F. Hansen, associate dean of the School of Engineering; Dr. James L. Elliot, director of the George R. Wallace Astrophysical Observatory; Dr. John F. Elliott, director of the Mining and Minerals Resources Research Institute established at M.I.T. by the Department of the Interior; Dr. Daniel J. Kleitman, head of the Department of Mathematics (effective July 1, 1979); Dr. Francis E. Low, director of the Laboratory for Nuclear Science; and Dr. Gerald N. Wogan, head of the Department of Nutrition and Food Science.

Several new appointments to senior administrative positions also should receive special mention. Professor James D. Bruce was appointed director of the Industrial Liaison Program, to succeed Professor Samuel A. Goldblith, who was appointed in September as Vice President for Resource Development at the Institute. In November, Dr. James A. Hester was selected Executive Vice President of the M.I.T. Alumni Association, succeeding Mr. James A. Champy, who left the Institute to enter private business. to the stature and character of M.I.T. are long-lived and gratefully remembered.

Professor Frederick J. Adams, an internationally known city planner and first head of the Department of City and Regional Planning (as it was called in 1944), died in March 1979, at the age of 77. He guided the department in its development as a foremost center in the field and was a valued member of the M.I.T. faculty for 38 years.

Dr. Henry A. Hill, an M.I.T. alumnus and distinguished member of the Corporation, died suddenly in March 1979, at the age of 63. An organic chemist himself, Dr. Hill strongly encouraged the expansion of educational opportunities for members of minority groups in science and engineering at the Institute, and was especially interested in fostering closer working relationships between science and industry.

Professor Daniel B. Ray of the Department of Mathematics died in February 1979, following a heart attack. A member of the M.I.T. faculty since 1957, Professor Ray was an international authority on many aspects of mathematical analysis and for many years took an active and valued role in the administration of the department.

Dr. Louis S. Scaturro, an assistant professor of nuclear engineering, died in May 1979, following a heart attack. At the age of 28 he was considered a pioneer in the study of power loss from plasmas, and his untimely death cut short a life of promise.

Dr. Donald S. Tucker, professor of economics at 'M.I.T. from 1919 until his retirement in 1955, died in February 1979, at the age of 94. His enthusiasm for teaching was legendary and his spirit of good cheer infected his colleagues and classrooms alike.

Mr. George R. Wallace, Jr., donor of M.I.T.'s Wallace Astrophysical Observatory and the Wallace Geophysical Observatory, died in September 1978, at the age of 88. An M.I.T. alumnus and noted philanthropist, his generosity and vision contributed greatly to the development of the earth and planetary sciences at the Institute.

STATISTICS FOR THE YEAR

The following paragraphs report briefly on the various aspects of the Institute's activities and operations during 1978-79.

REGISTRATION

In 1978-79 student enrollment was 8,881, an increase of 169 over the 8,712 in 1977-78. This total was comprised of 4,594 undergraduates and 4,287 graduate students. Graduate students who entered M.I.T. last year held degrees from 388 colleges and universities, 239 American and 149 foreign. The foreign student population was 1,633, representing 18 percent of the total population. The foreign students were citizens of 93 countries.

Degrees awarded by the Institute in 1978-79 included 1,187 bachelor's degrees, 972 master's degrees, 65 engineer's degrees, 381 doctoral degrees — a total of 2,605.

The number of women at M.I.T., both graduate and undergraduate, has increased continually. In 1978-79, there were 1,466 women students at the Institute, compared with 1,382 in 1977-78. In September 1978, 231 first-year women entered M.I.T., representing 22 percent of the entering class.

Minority* students at M.I.T. have increased in numbers as well. In 1978-79 there were 685 minority students (graduate and undergraduate) at the Institute, compared with 635 in 1977-78. The first-year class entering in Septem23 percent). Scholarship assistance from M.I.T.'s own operating funds was provided to the extent of \$1,385,000 (a 16 percent increase). The special program of scholarship aid to minority group students represented an additional \$136,925 from specially designated funds. An additional 242 students received direct grants from outside agencies, irrespective of need. The undergraduate scholarship endowment was aided by the addition of new funds which represented an increase of about \$500,000 and which raised the principal of the endowment to \$26,173,000.

Loans totaling \$2,139,511 were made to needy undergraduates. Of this amount, \$365,351 came from the Technology Loan Fund, and \$1,774,160 from the National Direct Student Loan Program. An additional \$1,929,203 (a 60 percent increase) was obtained by undergraduates from state-administered Guaranteed Loan Programs and other outside sources.

Graduate students obtained \$538,434 from the Technology Loan Fund and \$429,286 from the National Direct Student Loan Program. The total, \$967,720, represents a 31 percent reduction compared with last year's level, reflecting the wider availability of state-guaranteed student loans. Of this total, \$209,794 was loaned under the Guaranteed Loan Program and qualified for Federal interest subsidies and guarantees. The total loaned by M.I.T. to both graduate and undergraduate students (\$3,107,231) was a decrease of 26 percent from last year's total.

CAREER PLANNING AND PLACEMENT

A quickening demand for the Institute's graduates in engineering and the physical sciences rose to a crescendo in 1978-79, with 416 separate organizations coming to the Career Planning and Placement Office to interview prospective employees. The office was the scene of 8,527 recruiting interviews. In only three years since World War II has the interview count exceeded 8,000. The demand was also strong for graduates of the Sloan School.

Confirming the evidence of interview schedules, starting salaries in many fields went up sharply, exceeding the 7 percent of Washington's wage and price regulations if not the rate of inflation. In electrical engineering, where demand was particularly strong, bachelor's salaries rose 13 percent (beating the rising cost of living by three percentage points). In management, master's salaries jumped 13 to 20 percent. The **median** salary accepted by masters was \$20,400, and the median accepted by doctors was \$25,520. The Sloan School reported an **average** starting salary for its master's graduates of \$28,700 (up from \$23,800 in 1977-78).

In other fields the employment picture was mixed. In architecture, for example, the demand for graduates showed signs of strengthening after several lean years, perhaps reflecting new approaches in the profession to the servicing of clients' needs. Graduate students and postdoctorals in the life sciences came to the office in increased numbers to discuss the alternatives to academic employment. It is clear that in many of the life sciences there are more qualified young researchers in the market than there are permanent jobs in the universities or industry.

The high demand for engineering graduates showed itself in the area of Alumni Career Services. Demand was particularly strong for electrical, mechanical, and chemical engineers, as well as for graduates in computer science. Many employers felt the need to come to the office in person to announce their requirements. The increase in employer activity was matched by a drop in the number of alumni requesting placement assistance. Favorable as the market was for job seekers, however, 40 percent of registrants still took six months or more to find satisfactory employment. Compared with 1977-78, this year's registrants were generally older, held higher degrees, and were at higher salary levels. Fifty-seven percent were over 40 and 41 percent earned over \$30,000. Fewer registrants were in manufacturing, and more were in service organizations (consulting, government, teaching, and so forth). A number were engaged in significant career changes, among them faculty members leaving academia and officers retiring from the military.

The past year also marked the retirement of seven distinguished members of the faculty. Their years of service to the Institute and to their students will long be remembered and appreciated. They are James M. Austin, professor of meteorology and director since 1969 of the Summer Session; Murray Eden, professor of electrical engineering on leave at the National Institutes of Health; John W. Irvine, Jr., professor of chemistry; Robert I. Rathbone, professor of technical communication; Claude E. Shannon, Donner Professor of Science and professor of electrical engineering and mathematics; Theodore Wood, Jr., professor of literature and American studies; and Henry J. Zimmermann, professor of electrical engineering and former director of the Research Laboratory of Electronics.

We were saddened this year by the deaths of several colleagues whose presence we miss, yet whose contributions

ber 1978 contained 162 minority students, representing 15 percent of the class.

STUDENT FINANCIAL AID

During the 1978-79 year the student financial program was again characterized by increases in the overall need for financial aid.

A total of 2,235 undergraduates who demonstrated the need for assistance (49 percent of the enrollment) received \$6,788,761 in scholarship aid and \$2,139,511 in loans. The total, \$8,928,272, represents a slight decrease in aid compared with last year. (There was a significant decrease in the amount of M.I.T. loans awarded, and a corresponding increase in loans obtained from commercial sources.)

Scholarship assistance was provided by the scholarship endowment in the amount of \$2,262,313, by outside gifts for scholarships in the amount of \$1,028,564, and by direct grants to needy students totaling \$1,651,967 (an increase of

*Minority students include Blacks (non-Hispanic), Native Americans (including Alaskan Natives), Hispanics, and Asian or Pacific Islanders.

FINANCES

As reported by the Vice President for Financial Operations and the Treasurer, the total financial operations of the Institute, including sponsored research, increased from the level of 1977-78. Education and general expenses — excluding the direct expenses of departmental and interdepartmental research, and the Lincoln Laboratory — amounted to \$144,069,000 during 1978-79, compared to \$130,928,000 in 1977-78. Reflected in the finances of the Institute was the use in operations of unrestricted funds of \$5,565,000, compared with \$5,875,000 the preceding year.

The direct expenses of campus departmental and interdepartmental sponsored research increased from \$89,736,000

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to \$107,521,000, and the direct expenses of the Lincoln Laboratory's sponsored research increased to \$102,279,000 from \$96,595,000 because of an overall increase in government research support.

The construction program of the Institute continued to make progress in 1978-79 with the book value of educational plant facilities increasing from \$205,992,000 to \$208,195,000.

At the end of the fiscal year, the Institute's investments, excluding retirement funds, students' notes receivable, and amounts due from educational plant, had a book value of \$387,463,000 and a market value of \$467,349,000. This compares to book and market values of \$348,481,000 and \$409,603,000 last year.

GIFTS

Gifts, grants, and bequests to M.I.T. from private donors increased from \$31,287,000 in fiscal year 1977-78 to \$33,944,000 in fiscal year 1978-79. The latter figure includes unrestricted direct gifts to the Alumni Fund of \$2,021,000 which constituted part of the total of \$5,158,000 reported by the Alumni Fund in 1978-79.

PHYSICAL PLANT AND CAMPUS ENVIRONMENT

Construction of a facility to house a 10 megawatt, superconducting, cryogenic generator adjacent to the High Voltage Laboratory was completed during the year. The generator, driven by a gas turbine engine, will eventually have its output fed into the Cambridge Electric Company system for a 30-day period to test the feasibility of this innovative approach to electric generation.

Other construction projects completed during the year included a 13,000 gross square foot (gsf) Interim Animal Care Facility on Vassar Street; renovations to the Suffolk Building, E38; and construction of three lecture halls for the Sloan School of Management in Building E51.

The following projects are in design: a 122,000 gsf building for the Whitaker College of Health Sciences, Technology, and Management; a 95,000 gsf Medical Services Building; a 111,000 gsf Athletic Facility; an 8,000 gsf Animal Care Facility within Building E18; and a complete renovation program for the Webster Building, E40.

Various facilities studies were conducted during the year and a number of space change renovations and renewal projects were completed. Included among the latter were facilities for the Laboratory for Nuclear Science, Department of Biology, Department of Chemistry, Department of Meteorology, Research Laboratory of Electronics, Department of Architecture, Center for Materials Research in Archaeology and Ethnology, and the Center for Materials Science and Engineering.

In the fall of 1978, after careful study of admissions information, campus housing retention rates, and proposed alternatives to relieve some of the resultant dormitory crowding problems, the decision was made to proceed with the design of a new undergraduate housing facility for 300 students. A "Program Planning Group" consisting of students, faculty, and staff was formed. This group met during the winter and produced a report which is now being used to generate a facilities program. It is planned that construction of the dormitory will begin in March of 1980 with occupancy scheduled for September 1981.

The major maintenance program to update the quality of residential facilities continues with several projects completed or under way. A major project this year is the conversion of the Westgate heating system from an independent boiler to the central steam system. It is expected to be completed before next year's heating season begins and will provide a more efficient and economical system. Major renovations to the graduate residents' facilities in Baker House are also under way. The sprinkler protection system, planned in conjunction with the Safety Office, is proceeding in McCormick Hall public areas and the apartment kitchens in Eastgate.

At the initiative of the Vice President for Operations and the Dean for Student Affairs, the Chancellor appointed a Committee on Campus Dining. The committee was charged to review the existing dining programs and to submit comprehensive recommendations which will enhance the quality of the living, learning, and working environment on campus. It is anticipated that these recommendations will be made early next year.

Jerome B. Wiesner, President Paul E. Gray, Chancellor October 5, 1979

An Provident fragmentation with all states

Page 8, Report of the President and the Chancellor, October 1979

Speed Chess Tournament* — Sponsored by the Chess Club. Informal speed tournament for people of all abilities, all entry fees returned as prizes. Sat, Oct 20, 4pm, Rm 407, Student Center. Admission: 75¢. Information: Brad 536-9596.

Faculty Club*** — Open Monday through Friday: Luncheon served noon-2pm; Dinner served 5:30-8pm. Happy Hour: Monday through Fridays, 4:30-6:30pm, wide variety of drinks \$1.05.

Movies

The Blue Angel** — Department of Humanities Film Series. German w/English subtitles. Wed, Oct 17, 7pm, Rm 66-110. Free.

The Sting** - LSC Movie. Fri, Oct 19, 7 & 10pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

Yojimbo** - LSC Classic Film Series. Fri, Oct 19, 7:30pm, Rm 10-250. Admission: 75¢ w/MIT or Wellesley ID.

Grease** — LSC Movie. Sat, Oct 20, 7 & 9:30pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

Day of the Jackal** - LSC Movie. Sun, Oct 21, 6:30 & 9:30pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

Earth, Dovzhenko** — Department of Humanities Film Series. Tues, Oct 23, 7pm, Rm 66-110. Free.

Triumph of the Will** — Department of Humanities Film Series. German w/no subtitles. Wed, Oct 24, 7pm, Rm 66-110. Free.

Foul Play** - LSC Movie. Fri, Oct 26, 7 & 10pm, 26-100. Admission: 75¢ w/MIT or Wellesley ID.

On the Waterfront** - LSC Classic Film Series. Fri, Oct 26, 7:30pm, Rm 10-250. Admission: 75¢ w/MIT or Wellesley ID.

Diamonds Are Forever** — LSC Movie. Sat, Oct 27, 7 & 10pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

Duck Soup** — LSC Movie. Sun. Oct 28, 6:30 & 9pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

Music

Noon Hour Chapel Concert* — Thurs, Oct 18. First Chapel concert of the season will be given by the Alexandria Quartet from the Boston area, program will include Charles Ives' Quartet No. 1; and Beethoven's Quartet Op. 59, No. 3 in C Major. Free.

Symphony Orchestra* — David Epstein, conductor, will lead the orchestra in an all Tchaikovsky program: Theme and Variations from "Mozartiana", piano Concerto No. 1 in B^b Minor and the Symphony No. 5, Melanie Macaronis, Wellesley student, will be the piano soloist. Sat, Oct 20, 8:30pm Walker Memorial Building. MIT/Wellesley communities free. Tickets \$1 at the door.

Brass Ensemble* — Directed by Gordon Hallberg, Works by Massaino, Palestrina, Tull, Zaninelli, Nelhybel, Hovhaness, Tomasi and Gabrieli. Sun, Oct 21, Walker Memorial Building, 3pm. Free.

Noon Hour Chapel Concert* — Jeffrey Steele, classical guitar, will play works by Bach, De Falla, Debussy and Rodrigo. Thurs, Oct 25, Free. Guest Artist Recital* — Rosemary Harbison, violin and John Harbison, harpsichord will perform Bach Sonatas in E Major, E Minor and C Minor. Sat, Oct 27, 7:30pm, Chapel. Free

The Great Boston Invitational Songfest* — Sponsored by the Logarhythms, featuring singing groups from local colleges. Sat, Oct 27, 8pm, 10-250

Exhibits

Recent Drawings by Frank Miller^{*} —On view daily, 8:30am-6pm, Rotch Visual Collections, through Oct 29.

Black & White & Color* — From the Creative Photography Laboratory. On view Oct 23 through Nov 29, Mon-Fri, 9am-10pm; Sat 10am-6pm; Sun noon-8pm, Creative Photography Gallery, 120 Mass Ave., 3rd Floor, Camb, Mass. For information call 253-4424.

Corners* — From the Committee on the Visual Arts. On view daily 10am-4pm; Wed evenings, 6-9pm, through Nov 4, Hayden Gallery, 160 Memorial Drive, Camb, Mass.

Jim Pomeroy* — From the Committee on the Visual Arts. On view daily 10am-4pm; Wed evening, 6-9pm, through Nov 4, Hayden Corridor Gallery, 160 Memorial Drive, Camb, Mass.

MIT Historical Collections^{*} — Vannevar Bush, '16, Bldg 4 corridor. The New Technology Exhibit, 2nd floor balcony of Lobby 7. Energy Exhibit, Bldg E40, 1st floor. Solar Energy, Bldg 8, main corridor. Samuel Cote Prescott, main corridor, Bldg 4. Rogers Building Exhibit, Bldg 4. Meteorology, main corridor, Bldg 8. Norbert Wiener, and Karl Taylor Compton, Bldg 4. Laboratory for Physical Chemistry, Bldg 6.

Max Born^{*} — Institute Archives and Special Collections, 14N-118. Max Born, 1954 Nobel laureate in physics, visited MIT in 1925-26 to lecture on crystal dynamics and quantum theory. On display is a 1927 letter from Born to MIT President Samuel Wesley Stratton, which discusses some of Born's colleagues, including J.R. Oppenheimer, Karl and Arthur Compton, James Frank, and Norbert Wiener. The letter is part of the records of the Office of the President, 1897-1932 (AC 13). On view daily.

Fantastic Photography* — Sponsored by the Creative Photography Gallery. American premiere at MIT, includes the work of some 39 European and American photographers. Organized by the Canon Photo Gallery, Amsterdam, The Netherlands. On view Mon-Fri, 9am-10pm; Sat 10am-6pm; Sun noon-8pm, through Oct 18, Creative Photography Gallery, 120 Mass Ave., 3rd floor, Camb, Mass. For information call x3-4424.

Gjon Mili* — Sponsored by the Compton Gallery Committee. A '27 graduate of MIT, he is a noted photographer whose work for Time-LIFE Magazine; his pioneer use of strobe lighting; and his documentation of MIT will be exhibited. On view daily, Mon-Fri, 10am-5pm; weekends, 1-5pm, through Jan 31, 1980 Margaret Hutchinson Compton Gallery, Alumni Center, Rm 10-105. For information call 253-5014.

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.

New Records* — Music Library, Rm 14E-109. Exhibit of record jackets of recent Library purchases.

The Outdoor Collection* — There are many fine pieces of contemporary scupture displayed on the MIT campus, including works by Alexander Calder, Louise Nevelson, Pablo Picasso, Henry Moore, Tony Smith and Jacques Lipschitz. For information and guides to the campus, call the Information Center x3-4795.

MIT Science Fiction Society* - Come and visit the world's largest lending science fiction library. Hours posted on door, Rm W20-421.

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

Theater

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An Evening of One-Act Plays* — Presented by the MIT Dramashop. Oct 17, 18 and 19, 8pm, Agassiz Theatre, near Harvard Square. Free. For more information call 253-4456.

The Winter's Tale^{*} — Presented by the Shakespeare Ensemble. Oct 18 through Oct 23, 7:45pm, Student Center, Sala de Puerto Rico. Tickets: on sale at the door; or reserve by calling 253-2903. \$4.50 Fri & Sat nights w/\$1 off for students; further discount for a group of 10 or more, 50¢ off, other nights \$2.50.

Athletics

Home Schedule* — Oct 17: Soccer, Boston College, 3pm; W Tennis, Wellesley, 4pm; Water Polo, Harvard, 5pm. Oct 19: Field Hockey, W.P.I. 3:30pm. Oct 20:Cross Country, Tufts, Williams, 1pm; JV Cross Country, Tufts, Williams, 1:30pm; Club Football, Fitchburg State, 1:30pm; M Sailing, Oberg Trophy, Greater Boston Dinghy Championship, 9:30am; W Volleyball, G.B.C.A.A.; Water Polo, MIT League Tournament, all day. V Volleyball, Boston College & Northeastern U, 1pm. Oct 21: M Sailing, Smith Trophy, 9:30am.Oct 23: Soccer, Tufts, 3pm. Oct 24: JV Soccer, Boston University, 3:30pm. W Volleyball, Wheaton, MacAlester, 5pm. Water Polo, Rhode Island, 5:30pm. Oct 25: W Tennis, Boston State, 3:30pm. Oct 26: JV Soccer, Emerson, 3:30pm. Oct 27: Soccer, Colby, 2pm; W Tennis, Boston College, 10 am. Oct 27-28: M Sailing, Fowle Trophy, NEISA Team Racing Championship at MIT/Harvard, 9:30am, both days. Oct 28: V Field Hockey Invitational - WPI, Clark & Endicott. Oct 31: Soccer, Boston University, 3pm; JV Soccer, Phillips Exeter, 3pm.

Lunch-hour Volleyball* — Beginning Oct 17, pick-up games daily, start at noon, DuPont Gymnasium, all welcome.

Dance

Foxtrot Workshop* — Sponsored by the Ballroom Dance Club. Sun, Oct 21, 2-4pm, Burton Dining Hall. Admission: 75¢. Ticket info: Haroon 536-1300.

Dance Workshop** — Regular meetings Technique classes, Mon & Wed, 3-5pm; Improvisation, Thurs, 1-3pm, T-Club Lounge, DuPont. For information call 253-4456.

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 the MIT community on *Open to members only

Send notices for October 24 through November 4 to Calendar Editor, Rm 5-113, x3-3270, before noon, Friday, October 19,

CDC Honors Paul Keyser For Exceptional Service

(Continued from page 1) steering committee. More broadly, he has been an advisor to the last four presidents of the Institute.

He was a member of the Corporation Committee on the Presidency in 1970 and the Corporation Joint Advisory Committee on Institute-Wide Affairs from 1970 to 1972. He worked on behalf of the Sloan school, serving on its Visiting Committee for nearly a decade (1969-1977) and as its chairman from 1971 until 1977. He has in addition been a member of the Department of Chemistry Visiting Committee since 1974, and of the Council for the Arts since 1972.

Mr. Keyser is equally recognized, and even more widely known, for his service in every aspect of alumni affairs. He was elected to two consecutive terms as president of the Alumni AssociaAssociation posts, including membership on the Board of Directors; the Finance Committee from 1972 to 1975, the last year as chairman, and the Personnel Committee, which he served as chairman, in 1976.

He has long been active in the Alumni Center of New York, and was its chairman from 1969 to 1970. His varied services to the Alumni Fund include positions as Special Gifts Chairman in 1966, the first New York Alumni Fund Council Chairman from 1968 to 1971, and membership on the Alumni Fund Board. Relatedly, he served on the National Sponsoring Committee for Building 10 in 1976, and was a special gifts solicitor for the Building 10 renovation drive from 1977 to 1978.

In recognition of these many outstanding contributions to the Institute, the Alumni Association presented him with its Bronze Beaver Award in 1972.



tion (1970 through 1972) and has held numerous other Alumni



Paul V. Keyser receives Dalton Award bowl from Chairman Howard W. Johnson.





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City	State	Zip
		Tech Talk October 17, 1979 Page

CLASSIFIED ADS X3-3270

Ads are limited to one per person per issue and may not be repeated in successive issues. All ads must be accompanied by full name and Institute us be accompanied by full name and Institute tension. Persons who have no extensions or who is to list only home telephones may submit ads coming in person to the *Tech Talk* office, Rm 5exte 113, and presenting Institute identification. Ads be telephoned to x3-3270 or mailed to Rm 5-113. Deadline is noon Friday before publication.

For Sale, Etc.

Bell & Howell 8mm/Super 8 autoload projector best offer, Village Blacksmith Model 9900 Tiller best offer, Black & Decker Lawn Trimmer & Edger best offer, Coldspot Dehumidifier Model 3985, 1 yr old, \$50, Craftsman 1 Horsepower all purpose out-door vacuum best offer, and more. Call x3-4765, or for Craft ask for Carol.

Slp Sofa, \$150; assorted frmed/matted fine art prints, (Wyeth, Picasso, Van Gogh, etc); \$5-25. prints, (Wyeth, Picass Call 6-11pm 354-3656.

Telephone answering machine, exc cond, Sanyo M-139N, \$125, nego. Call Marjorie x3-4366 or x3-

Henke ski boots plastic, M sz 12, \$22; W sz 8, \$22. Call Carol x3-4183.

Pr B78-13 snows, \$10 ea; Ludwig drum set, Baldwin 2 keyboard organ, \$425, misc furn. Call x8-1418 Draper or 862-5955 eves.

Old fedders A/C, 10000 BTU, \$40; several imported wooded chess sets, nw; several denim caps, nw; sm typwrter, nds ribbon, \$25; AM car radio, \$5. Call. 864-2374.

Sofa, love seat & chr, floral back, 2 yrs old, \$260. Call Llovd x3-2215

Wash mach, fancy Sears mod exc cond, 2 cf, \$125. Call 324-6410

Tw bed, sprng, frme, matt, & lamp, \$35 or best, Call 494-0368 aft 6pn

Pr A78-13 ww tires, brn nw, nvr usd, \$30/pr. Call Jesse x3-2843.

2 Spanish sty sofas, red crushed velvet, 6 loose pil-lows ea, \$100 ea. Call Bernadette x3-5413.

Duckboat 11' lightweight mahogany construction, bronze fastenings, \$350. Call x5-6634 Dorm.

Sngl bed, matt, box sprng & frme, \$20, you pick up. Call S. Siwolop 661-6405 aft 5pm.

Maple dresser w/lg frmd mirror, brn nw cond, \$200, nego. Call Mary 232-7582 eves.

2 arm chrs, Scan design, grn teak frme, \$75 pr. Call eorge x8-1332 Draper.

35mm auto SLR camera w/fil set of lenses w/grnty. \$300. Call Andy x3-7369.

Lk nw OSI 8K 6502 computer, monitor, me software, breakout, Othello etc avail, fast BASIC mach language & graphics, \$500-750, nego. Call Al-len x5-7117 Dorm.

Snows, pr usd tires, sz E78-14, studded at least 1 season of use left, \$20/pr. Call Mike 661-3883 eves or x3-6432 days.

Citadel lg bike lock & bracket, \$25; black cable motorcycl lock w/integral shackle & tube keys, \$25; SWTP Co power supply 0-35V w/limit, 0-2 amp w/imiting, \$25; 36" Maylin parallel rule, \$25. Call Matt x3-1392 or x5-6676 Dorm.

Singer Sewing Machine, Fashion Mate 239, with base. 10 yrs old, excellent condition, with but-tonholer attachment. \$60. x3-8210 - Ron Stone.

Contemp, BR set w/vanity & bench, \$100, dble, nw matt & box sprng. Call x8-1256 Draper or 244-5958.

Component stereo, AR XB-91 turntable, Akai AA-1115 stereo receiver, Hegeman IA omnidirectional speakers, \$275; Ricoh TLS-SLR camera with built-in lightmeter, like new, \$125. Call Meredith x3-

Kneissl skis w/Look Nevada bindings; birdcage, lg metal, both exc cond, best. Call Jerry x3-2309 of 262-3894 eves.

Raleigh Grand Prix 21" M 10 spd, missing r/whl a sembly, you know why, gd cond, gears intact, \$65. Call Roger 277-5055 aft 7.

Biola, old exc tone, lion-head scroll. Call Jean x7456 Lincl.

B&W port TV, receives all chan, gd cond, \$40. Call x8-3235 Draper.

Head 170 cm. Jr. Giant Slalom Skiis w/Dover step-The at 10 cm of that Statement Statements with the statement of the state CTS spkrs, bkshelf sz but have tremend range & response. Acoustic suspens, $8^{\prime\prime}$ woofer & $2^{1}z^{\prime\prime}$ tweeter. Must be heard to be belivd, \$100/pr. Call x8-1505 Draper or 329-9725 aft 5:30pm.

Kelty frme xl, \$25; Hotpoint dishwash, \$35; Reynolds trumpet, \$265; Salomon ski bindings, \$20. Call Bruce x3-5867.

30" butcher blck veneer dine tble w/match chrs, \$20. Call x3-4694 or 494-8338.

Northland downhill skiis 190 cm w/bindings. \$60; GE B&W TV 12" perf cond. Call 494-0073 eves.

Sears Franklin stove, 3 yrs old, all accessories, cond, \$100 firm. Call Scott 582-4571 aft 6pm. Shaw grand piano, \$1500 or best. Call Dave x3-

2082 Natural finish solid oak cab, 6'x23 deep 30" h adj

shelf spkr section, \$200. Call 369-5646 Brnd nw fencing equipment, jacket 38, mask & foil, exc equipment. Call x5-9614 Dorm.

2 G 20" Schwinn bikes, exc cond, \$35 ea. Call Chet all x7612 Lincl or 944-7650.

3 cushion couch & club chr, five qual cust made classic lines, wl nvr go out of style, exc cond hand-some br twd, \$350/pr. Call Curt x3-6469.

40" Frigidaire elect range, \$25. Call Tony x7175

All leather br boots, sz 9, worn twice, \$20. Call x3-

Audio King all in one stereo sys incl phono AM/FM radio, 8 track csstt tapes, units integrated for recording from all other functions, nvr usd ask \$225. Call x3-2772.

Sansui AM/FM recvr, 60 watts rms per chan \$500 nw. ask \$225. Call x7661 Lincl

Vehicles

'65 Ply Fury III, gd general cond, rebit, auto trans, nwexh & pipes, \$350 or best. Call 354-1379

'68 Mercury Cougar, 2 dr, maroon, mostly reblt eng, runs great, vy strong, slight rust, vy gd shape, \$900. Call 536-5527 aft 4pm.

'69 Buick Sabre, exc cond, 4 dr. runs well, 33K. \$1000 or best. Call x8-1256 Draper or 244-5958

69 Mustang Mach 1, gd cond, no rust, recent eng work, mst see. Call Joe x5-8205 Dorm.

'69 Yamaha 175cc CTl Enduro, for on or off rd use low mlg from Calif w/loc & chain, \$295 or best. Call Pete 536-3935 aft 8pm.

'69 VW Bug in super cond, blue, radio fantastic econo car, \$755. Call 484-1874 eves.

'69 VW Beetle, gd run cond, only 2 winters in New Endland previous So. Calif no rust, \$800 firm. Call Lynette Lawrence x3-1822.

'70 Pontiac Lemans Sports, PS, man brks, exc run cond, nw radiator & brks, \$490, nego. Call Chen-doa lin x5-9640 Dorm or 494-8447.

'70 VW Bug, exc cond, \$600. Call 876-6863 eves. '70 VW Bug 8K reblt eng, all extras, radials, AM/FM, \$1800. Call Mark x3-5540.

'71 Capri, exc eng, bd nw bttry, nw clutch plates, bd nw muffler, bd nw radiator, 62K, 28mpg, \$1250. Call 494-8159 eves.

'71 Chevy Kingswood wg, gd run cond, Aug tune-up, winterized, pr snows on whls, AM/FM radio, \$500 or best. Call 484-8827.

'71 Fiat 124 wg, 60K, reblt eng, gd cond, \$500. Call 267-1064

'71 VW Bug, reblt eng, gd bdy runs well, \$1200 nego. Call Bertrand x3-5957.

'73 Ford LTD, 68K, A/C, \$900. Call 277-9892. '73 Ford LTD, perfect mech cond, 65K, 2 drs, hd top, A/C, \$1000. Call 277-9892.

'74 Cutlass S, blue & wh, 75K, nw tires, eng & bdy gd cond, PS & PB, \$1495. Call Manny x7565 Lincl.

74 TR6, showroom cond, 30K, \$5000 or best. Call Harvey x8-1760 Draper.

'74 Toyota Corolla, 57K, std trans, \$550. Call Ping x3-6546 or 354-7928.

'75 Custom Dodge Dart, slnt 6 eng, auto, PS radio, 25K, 1 owner, exc cond, \$2450. Call x3-4280. 75 Ply Val, wh vinyl rf, shows, rust proof, low mlg,

\$2500 or best. Call Bruce x3-7068 or 479-6910. '75 VW Superbeetle, sunrf, reblt eng, nw brks, clutch, bttry, exc cond, ask \$3000. Call x3-3897 or

492-0128 lv msg for Larry. '77 Dodge Aspen Special Edition, AM/FM, r/defog,

rads; slanted 6 eng, 15-17 mpg, yellow w/white bucket seats, 24400 mi, no dents, ask \$3500. Call Maureen 484-4558 aft 6pm

78 Dodge Diplomat, 225 slant six, A/C, vnyl top, AM/FM PS & PB, 20K, super cond, well main-tained, ask \$3800. Call x3-2772.

'79 Chevy van, 9 mo wrrnty left, 6 cyl, 16 mpg, 550-0mi, A/C, PS & PB, captains chrs sd dr w/win-dows, perfect cond, \$7000. Call 391-2637.

'79 Toyota 2 dr Corolla deluxe, 6K, auto, A/C, AM/FM, \$5500. Call Bob x7454 Lincl.

Housing

Animals

Call x3-4830, or 438-7496 aft 2.

Lost and Found

Found: The American Political Systems by E.S. Breenberg. Call Rakesh x3-2412 or x5-9721 Dorm

Lost: 3'x10' picture of Wright Brothers Plane. Was discovered missing 10/9 from 33-319. Please return for public viewing pleasure. If whereabouts are known call x3-7283.

Wanted

Wanted: Wood storm windows, 2 of sz 46x54 or 4 or sz 23/24x54. Call Bob Sherwood x8-4567 Draper. Visiting prof nds 2-3 BR hse or apt Jan '80 to end of May, early June, gd sch, under \$500, if poss. Call Beth x3-5115.

A gd usd ping-pong tble. Call Chip x3-4690 or 492-

Cannister type vacuum cleaner & cushions or back for studio couch. Pls call Linda x3-5188.

Nd someone familiar w/centralized sound sys, sm job, gd pay for more info contact Walt Correia x3 2458

Wanted: Carpenter to install attic drop stairway and ceiling louvres for attic fan. Lee Linsky x3-1782.

Sitter/companion for healthy but forgetful grand-mother, ideal for patient retired person or foreign wife, cls to T, Harv Sq, can bring child w/you. Call Reliate ar 2029 wife, cls to T, F Edith x3-7378.

Hse cleaning, approx 2¹/₂ days/wk, flex schedule possible. Call 491-4258 eves & wkends.

Carpools

Rd wntd to & from Arl Hgts area; M-W-F, hrs 9-5pm, wl shr gas. Call Betty x3-5503.

Driving to DC for Thanksgiving want 1 or 2 riders to shr, lv MIT early 11/21, return 11/25. Call x3 5030 and ask for Kay or drop a note to E52-102. Rd frm Newton Centre 3 mornings a wk. Call Eileen x3-5686 or 244-7052 aft 7pm

Nd ride to & from MIT, Newton Ctr area. Call Rachel x3-2584

Start or join carpool Winchester & MIT. Call Steve x3-6891 or 729-1486 eves.

Roommates

We nd 3 more people for spacious apt in No. Camb. Contact Debby x3-2851 or 876-2676. Wtd 1 rmmate M/f to shr lg 2 BR mod furn apt in

Nashua, NH, \$160 incl all utils & phone. Call Jerry x7924 Lincl 8-5 or (603) 889-0365.

Parking Stickers

Note to parking sticker swappers: pla ase remember to inform your supervisor and the Campus Patrol of the exchange you have made so that their records accurately reflect your new parking area. Trade N10 for West. Call Susan x3-2105.

Miscellaneous

WI do gen tech or thesis typing, IBM Correct Select, 11 yrs exp. Call x3-6695.

Classical Music Parties Club - a way to meet and enjoy people while sharing the finer things. For in for, write: Bill Kalt, NW16-200.

Learn to play guitar under the careful supervision of a qualified instructor who understands your special case. Call Kooros 536-2906.

Pro typing IBM Select, 10 yrs exp, papers thesis etc. Call x3-4965.

Interior hsepainter \$5/hr, you provide all material. I provide labor. Call Christopher 864-8166.

Pro tech typist will do thesis, reports, etc, fast ac-curate, reasonable rates, IBM Self-Correct curate, reasonable rates, IBM S Selectric. Call Judi x3-2686 9-1 daily.

Piano tuning & small repairs includ string replace ment by experienced piano tuner, reasonable rates, also thesis typing, including technical. Marjorie x3-4366, x3-6763.

Experienced classical piano teacher, beginners welcome. Call 566-1584.

Ken Hewitt Appointments: Marsha Gens Sally Hansen

3-4267 3-4268

3-4275

3-4269 3-4274

d/or

Lawrence Milan Kathleen Rick Appointments: Jenni Leibman Academic Staff, Nurse Practitioner/Physician As-st., in Lincoln Laboratory's Medical Clinic, Lex-ington, MA will treat patients for episodic illnes-ses; provide preventive health care services; in-itiate screening and diagnostic evaluation of patients. Massachusetts registration and comple-tion of Adult or Family Nurse Practitioner or Physician Asst. Program required. At least 2 years' synerience, preferably in ambulatory and/or

experience, preferably in ambulatory and emergency room, also required. C79-30 (10/17)

Admin. Staff. Administrative Officer, for the Provost's Office/Technology Adaptation Program in Cairo, Eygpt. Duties include supervision of staff in accordance with policies and procedures; provide liaison services between MIT Project par-ticipants and their Cairo University and ministry counterparts; arrange travel for Program partici-nants; oversee allocation and utilization of space

pants; oversee allocation and utilization of space,

pants; oversee allocation and utilization of space, equipment and furnishings. Will also handle finan-cial administration and insure that activities are in compliance with agency regulations. Broad educational background and extensive related ex-perience required. Ability to work well with a variety of people also required. US Citizenship and a minimum commitment of 1 year in Cairo also necessary. A79-77 (10/17)

Sponsored Research Staff, Technical Asst., in Nutrition and Food Science to employ analytical techniques in preparation of biological samples for trace mineral analysis, and perform measurements using absorption spectrophotometry; perform other lab procedures as necessary. Bachelor's Degree in Chemistry or Medical Technology re-nuired Experience in trace element analyses

Admin. Staff, Assistant Director, in the MIT As

sociates Program to plan and/or conduct activities

sociate's Program members: maintain liaison with Company representatives; facilitate contact between company representatives and MIT faculty for the purpose of technical consultation; solicit

new Program members. An engineering or science degree is required. (Master's Degree preferred.) At least 2 years' professional experience, preferably in an engineering capacity, also necessary as is the ability to communicate effectively with individuals within MIT and industrial representatives. A79-75 (10/10)

Academic Staff, Manager of Masters Program, in the Sloan School of Management to have direct responsibility for the activities of two Masters'

Programs: supervision of admissions evaluation process; participation of admissions evaluation process; participation in curriculum related policies and in monitoring of Program quality; development of Program budgets; counseling of students and prospective students; and supervi-sion of informational literature preparation. Appli-

cants should have Master's degree in Management or Business Administration and at least 5 years'

or Business Administration and at least 5 years teaching or administrative experience in a com-parable educational institution. The ability to em-pathize with students in a professional degree program also necessary. A Ph.D. is desirable. C79-28 (10/10)

Academic Staff, Inpatient Nurse, in the Medical Dept.'s 18 bed inpatient facility to perform general medical/surgical nursing. Massachusetts registra-

tion and at least 2 years' experience required

Medical/surgical nursing preferred. Day/evening rotation - every other weekend off. C79-29 (10/10)

Admin. Staff, Programmer Analyst, in the Infor-

mation Processing Services Office will be responsi-ble for consultation, problem diagnosis, program-ming assistance and trouble-shooting for a multi-faceted community of network users. Other duties

laceted community of network users. Uther duties may include implementing and maintaining software, preparing and conducting seminars and ono-credit programming courses. Bachelor's degree, preferably in Computer Science or a related field, and at least 2 years applicable ex-perience required. Oral, written and interpersonal skills and knowledge of time-sharing systems, system control languages and variety of high level programming languages also required. A79-73

programming languages also required. A79-73 (10/10)

Admin. Staff, Industrial Liaison Officer, will provide interface between MIT and assigned member firms of the Industrial Liaison Program.

Responsibilities include liaison activities among

faculty, staff and member companies' represen-tatives; soliciting new member companies. In-depth knowledge of Institute, excellent interper-sonal skills and willingness to travel extensively necessary. Bachelor's and Master's degrees (one degree in electrical engineering and computer science, materials science and engineering or mechanical engineering and one MIT degree preferred) and at least 2 years industrial ex-perience also necessary. A79-74 (10/10)

Sponsored Research Staff, Scientific Programmer

in the Meteorology Dept. will assist in analysis of meteorological data and in simple diagnostic and prognostic modeling. Familiarity with numerical

solution of differential equations and knowledge of

Fortran necessary. Experience with large computer systems and meteorology background preferred. R79-271 (10/17)

Sponsored Research Staff, Research Scientist, in the Energy Laboratory will work on combustion-generated pollution research: carry out experi-ments on turbulent flames and fluidized combus-tion: develop models describing the formation-

destruction process of polycyclic aromatic hydrocarbon compounds in flames. Ph.D. in chemical engineering or mechanical engineering necessary. Background in chemical kinetics and in flame property measurement techniques, such as

ments, also necessary. R79-295 (10/17)

laser

scattering spectro-radiometric measure-

faculty, staff and member companies' repres

to service a number of companies who are As

in trace element analyses

cessary. A79-77 (10/17)

quired. Experience in t desirable. R79-286 (10/10)

(10/10)

Exempt, Technical Asst., temporary, in the Energy Laboratory will assist in data collection and analysis to facilitate scenario construction; prepare draft materials for presentations and reports; assume responsibility for routine project administration. Computer data coding and programming skills, ability to prepare and analyze data in tabular and graphic form and knowledge of statistics, microsconomics and hencil/cost

statistics, microeconomics and benefit/cost analysis required. Routine typing skill and related experience preferred. E79-41 (10/17)

Exempt, Registered Nurse, part-time, in the Clinical Research Center to carry out general and specialized nursing procedures and medication on a 12 bed research unit; take charge duties when re-quired; work with dietary departments; observe and chart patient's condition. Applicants must be medicate of careful duties and the second seco

Exempt. Veterinary Research Technician, in the Division of Laboratory Animal Medicine will per-form routine diagnostic tests in hematology, virology, clinical chemistry, parasitology and bacteriology. Demonstrated ability to perform diagnostic tests and familiarity with techniques and kelle necessari tessiet in instance due

and skills necessary to assist in treatment and sur-gery of laboratory animals necessary. Bachelor's degree in biological sciences also necessary. Master's degree preferred. E79-37 (10/10)

Library Asst. in the Dewey Library will be respon

sible for serials processing: check in periodicals; systematically claim periodicals not received; maintain related records, card catalogs and Technical Services projects. Will also be responsi-

ble for collection duies: receive and process gifts; perform routine bibliographic searches; type orders; process materials for transfers, storage or discard; assist library users as necessary. Accurate typing skill, ability to organize work and set

priorities, as well as perform a wide variety of tasks required. At least 1 year's experience also required. Previous library experience preferred. B79-675

Library Asst., part-time, in the Department of Nutrition and Food Science will process and organize materials received from a variety of sources: assign subject classification; file. Will also order materials; maintain subject classification scheme; search for literature and secure past unblications; novide linison services with area

scheme: search for interature and secure past publications; provide liaison services with area libraries; catalogue monographs; utilize reference room materials in assistance of users. At least 2.5 years applicable experience necessary, including library or reference experience. Post BA background in Life Sciences preferred. 20 hrs./wk. B79-650 (10/10)

Library Asst., part-time, in the Center for Policy Alternatives to process incoming materials; catalogue from LC cards; file catalog cards; mail

publications; and update publication list on word processor. Ability to type and handle detailed work required. 10 hrs./wk. B79-654 (10/10)

Library Asst. in the Monograph Processing Section

of the Libraries will recommend policy; assist section of the Libraries will recommend policy; assist in in-terviewing and selection of staff; direct and evaluate support staff and student assts.; plan work flow; maintain statistics; prepare documen-tation and reports. Will also train personnel in cataloguing area; make on-line data correction; prepare activity and process activity and process of the process.

attacking area; make of the data correction, prepare and process catalogue card shipments. Ability to direct and coordinate work, interpret and teach complex procedures and accurate typing skill necessary. At least 4.5 years applicable ex-perience, including OCLC experience also necess and the base of the state of

sary. College, knowledge of foreign languages and supervisory experience a plus. B79-651 (10/10)

Administrative Secretary to Director, Sloan Automotive Laboratory, Mechanical Engineering will provide secretarial and adminstrative support

will provide secretarial and administrative support to a large research group; arrange appointments and travel; type proposals and technical manuscripts; handle editorial tasks related to Laboratory publications; manage research ac-counts; maintain files. Excellent typing and at least four and a half years applicable experience re-quired. Writing/editing background preferred. B79-524 (10/10)10/17)

Sr. Secretary in the Trasportation Systems Divi-sion of the Civil Engineering Dept. will type, xerox and file correspondence, manuscripts and technical reports; update and maintain a filing system and small library; answer phones; schedule appointments; communicate with students, visitors, staff, etc.; order office supplies; arrange mailings; assume responsibility for book loans. Organizational, interpersonal and typing skills, ability to set priorities and to follow through on

ability to set priorities and to follow through on tasks required. At least 2.5 years' applicable ex-

Sr. Staff Asst, will provide a variety of secretarial

SJ. Staff Asst, will provide a variety of secretarian and administrative support services for the senior Nuclear Engineering faculty on a team of research investigators working in the area of national and international energy policy, including the social, environmental, economic and political aspects, as well as the technological ones. Must be capable of effective present interaction with contact at the

effective personal interaction with contacts at the highest levels of government (both foreign and domestic), industry and the non-profit sector. Ability to assume responsibility and make in-dependent judgements is a necessary qualification.

Experience with dictaphone and a command of

English grammar is also required as is at least 2.5 years' of applicable experience. Technical typing and college study preferred. Non-smoking office. B79-658 (10/17)

Sr. Secretary to a research staff in the Center for

Policy Alternatives will type manuscripts, course materials, publication and Congressional testimony; organize proposals; coordinate projects and courses. Good typing and organizational skills and ability to set priorities necessary. At least 2.5 years' applicable experience also necessary. Interest in environment/orgunetional health policy.

Interest in environment/occupational health policy and regulation important. B79-644 (10/17)

Sr. Secretary in the Psychology Dept. will prepare travel vouchers; transcribe machine dictation;

perience also required. B79-672 (10/17)

(10/17)

have

graduates of accredited nursing program, Mass. registration and 2 years' nursing exper 16 hrs./wk. E79-36 (10/10)

Stereo 8 track, auto tape player, \$15. Call Rick x3-

Pr FR78-14 studded rad snows, mntd on GM rims. \$40. Call x3-5061.

19" B&W TV, gd cond, \$50; 13" color TV, broken picture tube, use for parts, \$10; sz 12W warmup pants, \$15. Call Tom x3-3106.

Pr 13" Dodge Dart rims, 1 14" Ford rims, \$5 ea. Call x5550 Lincl.

Raichle comfort ski boots, yr old, exc cond sz 10. M s, \$35. Call Dick x8-4159 Draper.

Wood stove, cast iron Atlantic #124, fire box, 23x-12x15, nw \$80. Call 369-9369

Pr Yamaha NS 690 spkrs, vy gd cond, \$575 nw, 112 yr old, \$375 or best. Call David x5-7582 Dorm.

2 storm drs 78x30'2" & 84x35'2" complete w/hardware; pr snows, G78-15 on 15" rims. Call x3-3913 or 926-0083.

Six wheels for Ford Galaxie, all w/H78-15 tires. in-cluding two snow tires, \$100 for set. Call x3-2244.

HP-67, \$200, Call Chris x3-4079.

Stunning drk grn vel evn gwn Empire sty. lk nw. nvr worn, sz 13-14, \$40. Call Pat x3-6315.

Compu Chess 2nd Edition, 6 levels of chess + game of Knights, Amazon Queen, Survival, \$80. Call x5-6270 Dorm.

Gerrard trntble mod 42M, gd cond, \$30. Call x3-5797 or 868-3243 eves.

Page 6, Tech Talk, October 17, 1979

Will the party who wished to share ski chalet on alternate weekends for season pls call 646-1330. We lost your telephone number.

Arl 4 rm 2 BR duplex nr T w/gar, \$350/mo unht. Call Dave 643-0591 or x3-1346

Lg 7 rm Col, unfurn, 3 lg BR, 1 ½ B, lg K, attic slp loft, attached htd, finished barn, ½ B, 2 gar, ideal for lg fam or will consider students, 3000 sq ft in Acton Ctr, 22 mi to MIT, \$97000 or \$695/mo + utils. Call Dave 263-7591 thru 5/30/80

Acton sublet, spac 3 rm apt, nw tennis ctrs, ning pool, \$315, avail 10/17. Call Tom x7368 Lincl.

Berlin MA, 8 rm 3 or 4 br split entry, 2 fp, 1'2B, pool, deck, barn-garden, nwly ptd, wd ht, ww l car gar. 1 3/4 acres, \$85900. Call Dave x7061 Lincl or 838-2636.

Keystone Colo lg 1 BR condo, slps 6, mins to 6 ma ski areas, clubhse has indr pool hottub & nas, \$300-400/wk. Call Dick x7124 Lincl.

Wht Mts ski rental, 3BR chalet w/frpl, 2 min to No. Conway NH, \$165/wk. Call x5583 Lincl.

Free to loving home 5 yrs old, spade, Vizla dog handsome, short haird, auburn color, energetic.

Kittens free 8 wks old, 2 M tan & white; 1 M grey & white. Call Jerry x298 Lincl or 486-8173.

POSITIONS AVAILABLE

available on the MIT campus. Duplicate lists are posted on the Women's Kiosk in Building 7, out-side the offices of the Special Assistant for Women and Work (10-215) and Minority Affairs (10-211), and in the Personnel Office, (E19-239)

Information on openings at Lincoln Laboratory (Lexington, MA.) is available in the Personnel Office.

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

Employees at the Institute should continue to contact their Personnel Officers to apply for positions for which they feel they qualify.

Dick Higham	3-4278
Pat Williams	3-1594
Appointments: Tertia Perkins	3-1393
V	0-4210
Virginia Bishop	3-1591
Richard Cerrato	3-4200

Sponsored Research Staff, Technical Asst., in the Harvard-MIT Division of Health Sciences and Harvard-MIT Division of Health Sciences and Technology will assume responsibility for the preparation of reticulocytes, lysates, cell extracts and other biological components. Will also perform protein synthesis assays, protein kinase assays and gel electrophoresis and assist in routine duties. Bachelor's degree in biological sciences required, as well as experience in molecular biology and biochemistry techniques. R79-288 (10/17)

Sponsored Research Staff, Research Specialist, in Sponsorea Research Staff, Research Spectuals, in the Cell Culture Center will prepare and control quality of cell culture media, mass production of animal cells and large-scale concentration and purification of virus. Work involves growth of cells from primary culture and production of cell lines in nsion and monolayers. Bachelor's degree in Chemistry or Biology required. Experience in animal cell culture also required. R79-293 (10/17)

Exempt, Administrative Asst. temporary, in the Office of Facilities Management Systems will act as central source of room function information: collect relevant data through site visits; contact faculty and administrators regarding room use; record field data and report in written form; perform special field audits: assist in special studies administer and assing space for storage facility: Bachelor's degree or equivalent required; as well as communications skill and ability to read & scale measurements from floor plans. An understanding of issues relating to space allocation also necessary Temporary for 6 months with possibility of becom-ing permanent. E79-40 (10/17)

Exempt. Building Services Asst., in the Physical Plant Dept. will supervise custodians, polishers Plant Dept. win supervise customains, pointeries and other employees. Ability to apply supervisory techniques and methods and complete familiarity with custodial procedures and methods required. At least 2 years' supervisory experience also re-quired. Must be willing to work various shifts and schedules for indefinite periods of time. E79-38 (1997) (10/17)

type correspondence tables manusci slides; arrange travel; order and pick-up books, reprints and supplies; escort patients to appoint-ment outside of Institute and handle miscellaneous errands. Excellent typing skill and ability to deal sensitively with patients in a professional manner required. At least 2.5 years applicable experience also required. Familiarity with graphics and medical terminology preferred. Non-smoking of-fice. B79-699 (10/17)

Sr. Secretary to Acting Department Head in Ocean Engineering will type correspondence, proposals, etc.; maintain files; answer phones; arrange travel and meetings; perform reception duties, including scheduling of appointments; provide liaison ser-vices between Dept. Head and faculty. Good typ-ing (preferably technical) and organizational skills required, as well as at least 2.5 years' applicable experience. Person may be re-assigned when Dept. Head returns. B79-673 (10/17)

Sr. Secretary to the Asst. Director and Ad-ministrative Staff for Research Development of the Harvard-MIT Health Sciences and Technology Dept. will assist in writing and preparation of various reports; type, edit and proofread cor-respondence, technical reports and proposals; schedule appointment; arrange meetings; screen phone calls; maintain records; organize symposia and arguing At heart 25 users' applicable or and experience in and seminars. At least 2.5 years' perience, including training and experience in writing, editing and proofreading required. Ability to organize work and good secretarial skills also re-quired. College training desired. B79-663 (10/17)

Sr. Secretary, Technical in the Mathematics Dept will type correspondence, class materials, proposals, reports and math manuscripts; compose correspondence; answer phones and initiate calls; arrange travel and mailings; schedule appoint ments; answer student inquiries; maintain files and records. Excellent and accurate typing skill, including technical typing, familiarity with office

This list includes all non-academic jobs currently available on the MIT campus. Duplicate lists are

routines and initiative required. At least 2.5 years' applicable experience also required. B79-667 (10/17)

Sr. Secretary in Earth and Planetary Sciences to Sr. Secretary in Earth and Planetary Sciences to assist 3 faculty members in seismology and marine geophysics, and their administrative assistant. Will type correspondence; proofread technical manuscripts; schedule appointment and meetings; arrange travel. Position includes student contact. Excellent typing, ability to organize work neces-sary. Position may require occasional overtime. B79-656 (10/10)

Sr. Secretary to 2 faculty members in the Architec Sr. Secretary to 2 faculty memoers in the Architec-ture Dept. will schedule appointment calendar; type manuscripts and correspondence; maintain files. At least 2.5 years' applicable experience re-quired. Good typing and organizational skills also required. MIT experience a plus. B79-659 (10/10)

Sr. Secretary in the Civil Engineering Dept. will Sr. Secretary in the Civil Engineering Dept. will handle several accounts; organize, maintain a variety of files; process and reproduce reports and papers; arrange conferences, summer programs, student function, etc.; type correspondence. class materials, reports and papers. Excellent typing, in-terpersonal and organizational skills necessary. At least 2.5 years' applicable experience also neces-sary. College background and knowledge of MIT procedures preferred. B79-642 (10/10)

Secretary to two staff members in the Center Sr. Secretary to two start memoers in the Center for Policy Alternatives to transcribe machine dic-tation; type proposals, reports, correspondence; operate word processing equipment; arrange travel and appointments; maintain accounts and files. Good general secretarial skills, at least 2.5 years applicable experience required. B79-643 (10/10)

Sr. Secretary in the Energy Lab to perform general Sr. Secretary in the Energy Lab to perform general secretarial duties for a newly formed research group, including scheduling of appointments and meetings; arranging travel; composing routine cor-respondence; typing reports and other materials. Will supervise temporary employees during peak periods. Position includes substantial telephone contact. Two and a half years' applicable ex-isting a chility to get moioriting and perience, ability to set priorities, and organizational skills are required. B79-655 (10/10)

Sr. Secretary to faculty and staff of the Man Vehi-cle Laboratory in the Center for Space Research will answer phones; arrange meetings and travel; schedule appointments; type correspondence, reports and papers form machine dictation; main-tain files; provide information to students. Ability to set priorities, make independent decisions and good typing skill required. At least 2.5 years' ap-plicable experience also required. Familiarity with MIT procedures also desired. B79-652 (10/10)

Sr. Staff Assistant to two faculty members in Electrical Engineering and Computer Science their research group. Will type correspondence, technical reports, proposals and class notes from draft or machine dictation; arrange travel; organize meetings; schedule appointments; in-teract with students and staff. Excellent typing, interpresent skills, machine transcription or interpersonal skills, machine transcription or shorthand skills required. Applicants must also have at least 2.5 years' applicable experience, B79-320 (10/10)

Secretary to 2 faculty members in the Dept. of Ocean Engineering will type correspondence, class notes, manuscripts, technical papers, etc.; file; answer phones; arrange travel; perform reception duties; monitor accounts. Good typing skill and at ,least 1 year's experience necessary. B79-674 (10/17)

Secretary, part-time in the Information Processing Office will type correspondence and reports; main-tain records and files; answer phones; distribute interdepartment reports. Excellent typing and proficiency in English grammar required. At least 1 year of applicable experience also required. 20 hrs./wk. B79-649 (10/10)

hrs./wk. B79-649 (10/10) Admin. Asst. will perform administrative and secretarial duties for the Administrative Officer in the Harvard-MIT Division of Health Sciences and Technology: organize and maintain reading room; supervise-library assistants and students; assist in compilation of HST Research Directory, proposals and reports; compose own correspondence; prepare financial and administrative forms and docu-ments, including subcontract analysis; handle all travel related activities. Ability to organize, detect problem areas, set priorities and willingness to per-form duties at varying levels required. At least 4.5 years' applicable experience also required: B79-665 (10/17) (10/17)

Technical Asst. in the Psychology Dept. will per-Technical Asst. in the Psychology Dept. will per-form a combination of secretarial and technical tasks. Technical duties involve assembling testing materials, stimulus items; preparation of tapes, films, etc.; administration of test protocols. Secretarial duties involve monitoring accounts and typing research papers. Familiarity with ex-perimental psychology especially human testing; and good typing necessary. At least 2.5 years' ap-plicable experience also necessary. Knowledge of accounting procedures. Fortran IV programming and audio recording and motion picture photographic equipment desired. B79-668 (10/17)

Sr. Office Asst. in the Information Processing Ser-vices Office will enter data and generate reports in vices office will enter data and generate reports in computing facility; coordinate requests for ser-vices, equipment and repairs; control key distribu-tion; order office supplies and copier supplies; prepare time reports; answer phones; handle petty cash; type correspondence and reports. Good organizational, interpersonal, and typing skills, ability to work with frequent interruptions and to work with number required High school gradua. work with numbers required. High school gradua-tion and 2.5 years' applicable experience also re-quired. Familiarity with word processing techni-ques a plus. B79-666 (10/17)

Service Asst. in the Athletic Dept. will control ad-mission to men's locker room (check ID's); super-vise part-time student help; sell athletic cards and guest tickets; maintain records and files; accept telephone reservations for facilities; disperse schedule and operation information. Applicants must be able to interact with members of the MIT community and have at least 1 year's experience. 40 hrs./wk. B79-671

technical equipment and experimental apparatus Will also be involved in maintenance and installa tion of light and heavy wiring, heavy switchgear and control equipment. Graduation from a 2 year day technical school or its equivalent and at least 2 years applicable experience required. Journeyman Electrician's license and demonstrated skill in par-ticular field also required. H79-152 (10/17)

Service Staff, Second Cook, in the Food Service to prepare food according to recipes and production standards; lead and train other personnel; main-tain sanitary work station and handle related duties as required. Position requires extensive food service background, knowledge of portion control and preparation timing. Ability to train others also necessary. H79-161 (10/17)

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

- ADMINISTRATIVE STAFF: A77-3, Admin. Staff, Systems Programmer, In-formation Processing Services (2/16) A79-9, Admin. Staff, Mechanical Engineering
- (2/14)
- (2/14) A79-47, Admin. Staff, Mechanical Engineer-Operations, Physical Plant (8/15) A79-51, Admin. Staff, Systems Programmer, In-formation Processing Services (8/29) A79-53, Admin. Staff, Asst. Editor, Technology Point-950, Admin. Staff, Asst. Editor, Technology
- Review (8/29)
- A79-54, Admin. Staff, Director of Alumni Fund,

A79-54, Admin. Staff, Director of Alumni Fund, Alumni Association (8/29) A79-55, Admin. Staff, Asst. to Manager of Central Utilities Plant, Physical Plant (8/29) A79-58, Admin. Staff, Industrial Liaison Officer, Industrial Liaison Program (9/5) A79-59, Admin. Staff, Systems Analyst, Infor-mation Processing Services (9/5) A79-60, Admin. Staff, Technical Supervisor, In-formation Processing Services (9/5) A79-62, A79-63, Admin. Staff, Applications Programmer, Information Processing Services Of-fices (9/12)

- fices (9/12)
- Itces (9/12)
 A79-64, A79-65, Admin. Staff, Systems Analyst,
 Information Processing Services Office (9/12)
 A79-66, Admin. Staff, Asst. Director of Purchasing and Subcontract Administration, Purchasing Office (9/12)
 A79-67, Admin. Value Value Value
- A79-67, Admin. Staff, Building Maintenance Manager (Structural), Physical Plant (9/12) A79-71, Admin. Staff, Associate Director, Hous-ing and Food Service (10/10)
- SPONSORED RESEARCH STAFF:
- SPONSORED RESEARCH STAFF: R77-91, Spons. Res. Staff, Sr. Accelerator Physicist, Lab for Nuclear Science (5/18) R77-137, Spons. Res. Staff, Experimental Physicist, Bates Linear Accel. (8/31) R77-228, Spons. Res. Staff, Plasma Physicist, Res. Lab of Electronics (1/4) R78-93, Spons. Res. Staff, Res. Engineer, Civil Engineerie (5/10)

- R79-102, Spons. Res. Staff, Research Associate, Mechanical Engineering (5/10) R78-105, Spons. Res. Staff, Research Associate, Mechanical Engineering (5/30) R78-105, Spons. Res. Staff, Temp., Lab for Nuclear Science (5/31)
- R78-117, Spons. Res. Staff, Temp., Economics
- (7/12)

- R78-117, Spons. Res. Staff, Research Lab of Electronics (7/26)
 R78-135, Spons. Res. Staff, Research Lab of Electronics (7/26)
 R78-145, Spons. Res. Staff, Laboratory for Com-puter Science (9/12)
 R78-145, Spons. Res. Staff, Electronics
 Engineer, Lab for Computer Science (8/16)
 R78-168, Spons. Res. Staff, Programmer, Center for Space Research (8/30)
 R78-105, Spons. Res. Staff, Physicist, tem-porary, Laboratory for Nuclear Science (9/5)
 R78-208, Spons. Res. Staff, Postdoctoral Research, Nuclear Materials, Nuclear Reactor (9/27)
- R78-209, Spons. Res. Staff, Postdoctoral Research, Nuclear Materials, Nuclear Reactor (9/27)
- R78-217, Spons. Res. Staff, Research Associate,
- R78-217, Spons. Res. Staff, Research Associate,
 Civil Engineering (10/18) R78-228, Spons. Res. Staff, Research Engineer,
 temporary, Energy Lab (10/18) R78-246, Spons. Res. Staff, Systems Porgrammer,
 Lab for Computer Science (11/1) R78-279, Spons. Res. Staff, Electron Microscopy
 Engineer, Material Science and Engineering (12/13)

- (12/13) R78-285, Spons, Res. Staff, Accelerator Physicist, Lab for Nuclear Science (12/13) R78-286, Spons, Res. Staff, Systems Program-mer, Lab for Computer Science (12/13) R78-306, 307, 308, Spons, Res. Staff, Laboratory for Information and Decision Systems (1/10) D78, 211, 241, Spens, Dec. Staff, Lab or Com-
- (17) Thormation and Decision Systems (1710) R78-311, 312, Spons. Res. Staff, Lab for Com-puter Science (1/10) R79-21, Spons. Res. Staff, Research Scientist, Energy Lab (1/24) R79-22, Spons. Res. Staff, Lab for Nuclear Science (2/7) D20.94 Science Res. Staff, Basearch Associate.

- Science (2/7)
 R79-24, Spons. Res. Staff, Research Associate, Heterocyclic Chemist, Chemistry (3/7)
 R79-27, 28, 29, Spons. Res. Staff, Transportation Systems, Center for Transportation Studies (2/14)
 R79-38, Spons. Res. Staff, Policy Analyst, Energy Laboratory (2/28)
 R79-105, Spons. Res. Staff, Research Associate, Meteorology Dept. (5/2)
 R79-106, R79-107, Spons. Res. Staff, Experimen-tal Plasma Physicist, National Magnet Laboratory (5/9)

- (5/9)
- (5/9) R79-117, Spons. Res. Staff, Research Associate, Earth and Planetary Sciences (5/16) R79-125, Spons. Res. Staff, Counselor, Upward Bound Program (6/6) R79-129, Spons. Res. Staff, Experimental Plasma Physicist, National Magnet Laboratory (6/6)
- (6/6)
- R79-131, Spons. Res. Staff, Electrical Engineer mporary, Center for Materials Science and temporary, Engineering (6/6)
- ngineering (6/6) R79-135, Spons. Res. Staff, Microwave ngineer, Research Laboratory of Electronics En
- (0/20)
 R79-147, Spons. Res. Staff, Research Associate,
 Architecture Dept. (6/27)
 R79-150, Spons. Res. Staff, Laboratory for

R79-210, Spons. Res. Staff, Postdoctoral As-sociate, Lab for Nuclear Science (8/29) R79-211, Spons. Res. Staff, Research Scientist, Nuclear Engineering (8/29) R79-212, Spons. Res. Staff, Staff Scientist, National Magnet Laboratory (9/5) R79-213, Spons. Res. Staff, Research Associate, Energy Laboratory (9/5) R79-215, Spons. Res. Staff, Research Associate, Energy Laboratory (9/5) R79-216, Spons. Res. Staff, Technical Asst., Dept. of Nutrition and Food Science (9/5) R79-219, Spons. Res. Staff, Electrical Engineer, National Magnet Laboratory (9/5) R79-222, Spons. Res. Staff, Technical Writer.

Lecture Series On Public Policy

Dr. David Mundel, assistant

director for Human Resources and

Community Development at the

Half-Fare Coupons

For MIT Travel

supply of half-fare airline

coupons at Heritage Travel.

These coupons are for use on

official MIT travel in which

either American Airlines or

United Airlines is used and

represents an opportunity to

save substantially on Institute

Coupons are to be used for

trips that cost \$200 or more. To

take advantage of a coupon,

travel must be exclusively on

American Airlines or United

Airlines. Please contact Herit-

age agents for further

George W. Smith

George Warren Smith '26, whose

many services to MIT earned him

the Alumni Association's Bronze

Beaver, its highest award, in 1964,

died at the Addison Gilbert Hospi-

Mr. Smith received his SB

degree in Business and Engineer-

ing in 1926 and was employed for

many years as a District Sales

Manager for the duPont Co. in

Boston. After his retirement in

1965, Mr. Smith remained active in

Mr. Smith's enthusiasm for sail-

ing led him to head an agressive

fund drive launched in 1975 to

refurbish MIT's Sailing Pavilion

and to replace most of its fleet.

Against a goal of \$212,000, Mr.

Smith and his volunteer committee

B79-615, Secretary, Campus Information (10/3) B79-616, Sr. Secretary, Nuclear Engineering

B79-616, Sr. Secretary, Nuclear Engineering Dept. (10/3) B79-617, Sr. Staff Asst., Nuclear Engineering

B79-619, Secretary, part-time, Biology Dept.

B79-620, Sr. Secretary, MIT Leadership Cam-paign District Office (10/10) B79-621, Clerical Asst., Purchasing and Stores (1000)

B79-622, Office Asst., Naval Science Dept.

B79-624, Jr. Programmer, Laboratory for Com-puter Science (10/10) B79-625, Secretary, part-time, Dept. of Mechanical Engineering (10/10)

B79-627, Sr. Secretary, Dept. of Political Science (10/10)

Science (10/10) B79-628, Word Processing Operator, Word Processing Center (10/10) B79-632, Office Asst., Medical Dept. (10/10) B79-633, Technical Asst., Biology Dept. (10/10) B79-634, Sr. Secretary, Materials Science and Evripseing (10/10)

Engineering (10/10) B79-637, Sr. Secretary, part-time, Economics Dept. (10/10) B79-639, Sr. Secretary, Vice President for Finan-

B79-640, Sr. Secretary, Admissions Dept.

B79-641, Admin. Secretary, Planning Office

SERVICE STAFF: H78-106, Service Staff, Sr. Technician (Electronic), National Magnet Lab (8/16) H79-33, Service Staff, Technician A (Electronic), Chemistry (4/11) H79-118, Service Staff, Technician B (Electronic), Architecture Dept. (9/5) H79-121, Service Staff, Machinist A, Nuclear Reactor Laboratory (9/26) H79-123, Service Staff, Technician B, Materials Science and Engineering (9/12) H79-126, Service Staff, Technician A, National Magnet Lab (9/19)

his own business.

Dept. (10/3)

(10/3)

(10/10)

(10/10)

cial Affairs (10/10)

SERVICE STAFF:

Magnet Lab (9/19)

(10/10)

(10/3)

tal in Gloucester on October 15.

travel.

information.

Obituaries

MIT now maintains its own

Congressional Budget Office, will

speak at MIT on policy analysis in human services in the first of a

series of discussions on the practice of public policy, Wednesday,

Oct. 17, at 5pm in Rm 7-335. Dr. Mundel, an MIT alumnus,

received the SB in physics and poli-

tical science in 1966 and the PhD in

political science, also from MIT, in

1971. Before joining the Congres-

sional Budget Office, he was asso-

ciate professor of public policy at

the Kennedy School of Govern-

ment. He has consulted with

several federal agencies and has

written extensively on the applica-

tion of economic analysis to gov-

ernment policy-making with parti-

cular emphasis on education,

The discussion series is spon-

Earlier he had been a member of the Association's Executive Com-

mittee (1950-52) and seventh chair-

man of the Alumni Fund Board (1953-54) of which he was a mem-

At the time of his death, Mr.

Smith was a member of the

Corporation Visiting Committee to

the Department of Athletics and

the Awards Committee of the

Alumni Association. He replaced

his classmate James R. Killian,

Jr., as Secretary to the Class of

1926 in 1947 and ever since then his

accounts of his classmates' activi-

ties, generously supplemented

with local color from Cape Ann,

have been among the popular fea-

tures of Technology Review for all

Mr. Smith is survived by his

wife, Ruth, of Rockport. A

memorial service will be held in

the MIT Chapel at a time to be

A memorial service will be held

Thursday, October 18, in the MIT

Chapel for Suvit Viranuvut, a

graduate student in civil engineering from Chonburi, Thailand. Mr.

Viranuvut died October 10 of

injuries received when he was

John W. Benoit, Jr., a patrol

officer at the Campus Patrol from

1967 until his retirement in 1978,

He was a retired Lieutenant of

the State Police, a member of the

Weymouth Historical Society, and

the Massachusetts State Police

Mr. Benoit, who lived in Port

Rickey, Florida, formerly of East

Weymouth, is survived by his wife, Mary V. (Davis) Benoit; four

daughters, Mrs. Teresa Rollins of

Scituate, Mrs. Barbara Murphy of

Tennessee, Mrs. Linda Card of Maine, and M. Catherine Minahan of Braintree; his mother, Cather-

ine (McMormack) of Brighton; a

sister, Mrs. Elizabeth Alm of

Brookline, and eight grand-

died October 6, at the age of 61.

Suvit Viranuvut

sored by the Public Policy Group

of the Department of Urban

youth and early childhood.

Studies and Planning.

raised over \$300,000.

ber from 1948 to 1954.

its readers.

announced.

struck by a car.

Association.

children.

J.W. Benoit, Jr.

- National Magnet Laboratory (9/5) R79-222, Spons. Res. Staff, Technical Writer, Energy Laboratory (9/5) R79-223, Spons. Res. Staff, Center for Transpor-tation Studies, (9/5) R79-225, Spons. Res. Staff, Research Associate,

- R'19-220, Spons. Res. Staff, Research Associate, Materials Science and Engineering (9/5)
 R'79-227, Spons. Res. Staff, Programmer, Meteorology Dept. (9/12)
 R'79-228, Spons. Res. Staff, Research Associate, Division for Study and Research in Education (9/10)
- (9/12)R79-229, Spons. Res. Staff, Technical Systems

- (9/12)
 R79-229, Spons. Res. Staff, Technical Systems Programmer/Analyst, Energy Laboratory (9/12) R79-232, Spons. Res. Staff, Oil Market Analyst, part-time, Energy Lab (9/19)
 R79-235, Spons. Res. Staff, Research Specialist, Materials Science and Engineering (9/19)
 R79-236, Spons. Res. Staff, Technical Asst., Earth and Planetary Sciences (9/26)
 R79-246, Spons. Res. Staff, Technical Asst., Center for Cancer Research (9/26)
 R79-247, Spons. Res. Staff, Technical Asst., Nutrition and Food Science (10/3)
 R79-250, Spons. Res. Staff, Schift Supervisor, Nuclear Reactor Laboratory (10/3)
 R79-265, Spons. Res. Staff, Friancial Manager, Energy Laboratory (10/10)
 R79-265, Spons. Res. Staff, Scientific Program-mer, Center for Space Research (10/10)
 R79-265, Spons. Res. Staff, Systems Designer/-Computer Programmer, Architecture Machine Group (10/10)
 R79-267, Spons. Res. Staff, Computer Systems Programmer, Architecture Machine Group (10/10)
 ACADEMIC:
- ACADEMIC:
- C78-17, Acad. Staff, Research Associate (7/12) C79-7, Academic Staff, Associate Director of braries (5/9) C70-16, Academic Staff, Development Associate
- C79-16, Academic Staff, Postdoctoral Associate, Nutrition and Food Science (7/11) C79-17, Academic Staff, Asst. Librarian, Rotch
- C19-17, Academic Staff, Asst. Librarian, Rotch Library (7/25) C79-21, Academic Staff, Librarian Documenta-tion Specialist, Rotch Library (9/5) C79-23, Academic Staff, Radiation Protection Office, Medical Dept. (9/12) C79-24, Academic Staff, Asst. Librarian, Rotch Library (9/12)
- Library (9/12) C79-25, Academic Staff, Administrative Officer, Division of Laboratory for Animal Medicine (9/26)
- EXEMPT:

(8/29)

(8/29)

(9/5)

Re

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Work Service (8/29)

- Exempt, Shift Supervisor, Physical E79-20. Plant (7/11)
- Plant (7/11) E79-24, Exempt, Engineering Asst., National Magnet Laboratory (8/15) E79-25, Exempt, Engineering Asst., National Magnet Lab (8/29) E79-26, Exempt, Supervisor, Food Service (9/5) E79-28, Exempt, Asst. Auditor, Audit Division (9/5)
- E79-30, Exempt, Supervisor Illustration Service, Graphic Arts (9/26)
- E79-34, Exempt, Supervisor Illustration Ser-vice, Graphic Arts Dept. (10/10)
- SUPPORT STAFF: B79-167, Secretary, Medical Dept. (4/11) B79-214, Secretary, National Magnet Laboratory (5/9)
- Laboratory (5/9) B79-280, Secretary, Research Laboratory of Electronics (6/6) B79-306, Sr. Secretary, Humanities Dept./Center for Materials Research in Archeaology and Ethnology (9/5) B79-321, Sr. Secretary, Mechanical Engineering (7/11)
- (7/11)
- B79-331, Secretary, Laboratory for Information and Decision Systems (7/11) B79-351, Secretary, part-time, Center for Cancer Research (10/3)
- esearch (10/3) B79-357, Sr. Secretary, Physical Plant (7/25) B79-364, Sr. Secretary, Mechanical Engineering
- B79-373, Sr. Office Asst., Artificial Intelligence Laboratory (7/25) B79-387, Project Documentor, Information

Processing systems Office (9/5) B79-413, Secretary, Military Science (8/29) B79-421, Office Asst., Registrar's Office (8/29) B79-436, Reactor Operator, Nuclear Reactor Lab

B79-440, Sr. Secretary, Alumni Association

B79-443, Library Asst., Lab for Computer

cience (8/29) B79-456, Sr. Secretary, Medical Dept.'s Social

Work Service (8/29) B79-463, Sr. Secretary, Sloan School of Management/Systems Dynamics Group (8/29) B79-481, Office Asst., Admissions Office (9/5) B79-488, B79-489, Secretary, Chemical Engineering Dept. (9/5) B79-494, Sr. Office Asst., Treasurer's Office (9/5) D70, 406 Sec. Secretary, Office of Minority

B79-494, Sr. Onice Assc., Treasurers Onice (373)
 B79-496, Sr. Secretary, Office of Minority
 Education (9/12)
 B79-498, B79-499, Sr. Secretary, Technical,
 Energy Laboratory (9/5)
 B79-505, Sr. Secretary, Mechanical Engineering (9/5)

B79-525, Sr. Office Asst., Center for Space

seearch (9/12) Br9-531, Secretary, part-time, Sloan School of lanagement (9/12) Br9-537, Secretary, Technical, National Magnet

Laboratory (9/12) B79-548, Clerical Asst., part-time, Medical

Technical Asst., temporary, in the Energy Laboratory will provide technical and ad-ministrative assistance: assist in data collection and analysis; prepare draft materials for presentaand analysis, prepare drait materials for presenta-tions and progress reports; handle routine project administration. Computer data coding and programming skills, ability to prepare and analyze data in tabular and graphic form, and knowledge of statistics, microeconomics and benefit/cost analysis as applied in resource planning necessary. Temporary for 1 year. B79-657 (10/10)

Office Asst. in the Office of Personnel Services to Office Asst. in the Office of Personnel Services to process and distribute Personnel actions; answer phone inquiries; operate DEC word processor; coordinate records and salary with other sections of Personnel and with Payroll; maintain office sup-plies; perform related duties and projects as neces-sary. Good typing and interpersonal skills, discre-tion and initiative necessary. High school gradua-tion and at least 2 years' clerical experience also necessary. Word processing experience preferred, but will train if necessary. B79-465 (10/10)

Office Asst. in the Registrar's Office will perform reception duties for the records section; answer calls and inquiries; type correspondence; maintain files. Good typing and interpersonal skills re-quired, as well as willingness to work with stu-dents, patience and ability to handle detailed work. At least 1 year of applicable experience also remired. **B73**, 652 (10/10) required. B79-653 (10/10)

Service Staff, Counter Person, in the Food Service to assist in food portioning; serve food; set up and dismantle work station; maintain sanitary work area; handle other related duties as necessary. Ap-plicants must able to read and speak English H79-158 (10/17)

Service Staff. Technician A (Electrical), at the Bates Linear Accelerator (Middleton, MA) in the Laboratory for Nuclear Science will operate highly

Nuclear Science (7/1) R79-155, Spons, Res. Staff, Laboratory for Nuclear Science (7/1) R79-156, Spons, Res. Staff, Project Specialist,

R79-156, Spons. Res. Staff, Project Specialist, Center for Space Research (7/11) R79-157, Spons. Res. Staff, Technical Asst., Chemistry (7/11) R79-158, Spons. Res. Staff, Sr. Scientific Programmer, Meteorology (7/11) R79-170, Spons. Res. Staff, Research Specialist/Technical Asst., Biomechanics and Human Rehabilitation Laboratory, Mechanical Engineering (8/15)

Regineering (8/15) R79-171, Spons. Res. Staff, Research Specialist/Technical Asst., temporary, Mechanical

Specialist/Technical Asst., temporary, Mechanical Engineering (8/15) R79-172, Spons. Res. Staff, Research Specialist/Technical Assistant, temporary, Mechanical Engineering (8/15) R79-176, Spons. Res. Staff, Research Engineer, Electronic, Haystack Observatory (8/15) R79-179, Spons. Res. Staff, Electric Utility

Systems, Programmer/Analyst, Energy Laboratory

(8/15) R79-180, Spons. Res. Staff, Design Engineer, National Magnet Laboratory (8/15) R79-186, Spons. Res. Staff, Research Associate, Earth and Planetary Sciences (8/29) R79-187, Spons. Res. Staff, Research Dietician, part-time, Clinical Research Center (8/29) R79-192, Spons. Res. Staff, Electronics Engineer. Lab for Nuclear Science (8/29) B70 100 Science Res. Staff, Lectronics

R79-196, Spons. Res. Staff, Lab for Computer cience (8/29) R79-201, Spons. Res. Staff, Technical Asst.,

R79-201, Spons. Res. Staff, Technical Asst., Biology Dept. (8/29) R79-206, Spons. Res. Staff, Computer Systems Engineer, Meteorology Dept. (8/29) R79-207, Spons. Res. Staff, Chemist, Nuclear Reactor Lab (8/29) R79-209, Spons. Res. Staff, Center for Space Research (8/29)

B17-040, United Dept. (9/12) B79-552, Secretary, National Magnet B79-552, Secretary, National Magnet Laboratory (9/12)
 B79-554, Sr. Secretary, Technical (word process-ing), School of Engineering (9/12)
 B79-562, Tech. Asst., Psychology (9/28)
 B79-571, Sr. Secretary-Technical, Chemistry Dept. (9/26)
 B79-572, Account Page B79-636-Dept. (9/26) B79-572, Account Representative, Information B79-593 R79-204 Processing Services Office (9/26) B79-577, Secretary, Sloan School of Mangement R79-183 B79-609 (9/26) E79-31 B79-578, Secretary, Housing Office (9/26) B79-579, Office Asst., Comptroller's Accounting B79-607 B79-261 Office (9/26) H79-122 B79-583, Sr. Secretary-Technical, Chemistry B79-516 B79-586 Dept. (9/26) B79-584, Sr. Secretary, Center for Materials Processing (10/3) B79-587, Office Asst., Admissions Office (9/26) C79-15 B79-448 B79-423 B79-588, Office Asst., part-time, Resource Plan-ning and Development Office (9/26) B79-589, Secretary, temporary, Biology Dept. B79-343 R79-11 R79-43 9/26) B79-592, Office Asst., Graphic Arts Dept. (9/26) B79-596, Sr. Secretary, Biology Dept. (10/3) B79-597, B79-598, Console Communications B79-597, B79-598, Console Communications B79-530 B79-631 B79-575 B79-610 Operator, Physical Plant/Telecommununications B79-570 B79-638 Office (10/3) B79-600, Sr. Office Asst., Dept. of Nutrition and B79-542 R79-253 Food Science (10/3) B79-645 Food Science (10/3) B79-601, Sr. Secretary, Nuclear Reactor Laboratory (10/3) B79-604, Secretary, Technical, Plasma Fusion Center (10/3) B79-605, Office Asst., Plasma Fusion Center (10/9) R78-207 B79-618 C79-26 B79-608, Admin. Secretary, Editorial, Office of Pe

Bro-oto, value, services (10/3) Br9-611, Sr. Secretary, Medical Dept. (10/3) Br9-612, Office Asst., Resource Planning and Development (10/3)

dent, Physical Plant Dept. (9/12) H79-138. Service Staff, Swimming Pool Attendant, Physical Plant (9/19)

H79-137, Service Staff, Swimming Pool Atten-

H79-129, Service Staff, Machinist A, Nuclear

Reactor Laboratory (8/29) H79-134, Service Staff, Technician A (EM). Chemistry Dept. (9/5)

The following positions have been FILLED since the last issue of Tech Talk: B79-544 Sr. Secretary Sr. Secretary (canceled) Sr. Secretary Sponsored Research Staff Sponsored Research Staff Sr. Secretary Exempt Library Asst Sr. Secretary Service Staff Secretary Acad. Staff (canceled) Sr. Secretary Office Asst. Office Asst. (canceled) Sponsored Research Staff Sponsored Research Staff Secretary Admin. Asst. (canceled) Sr. Secretary Secretary Receptionist Library Asst. Secretary Sponsored Research Staff Library Asst Sponsored Research Staff Admin. Secretary Academic Staff

The following positions are on HOLD pending further decision: A79-35 Admin. Staff B79-423 Office Asst. B79-579

B79-614

Office Asst. Office Asst.

Hyman Karasik

Hyman Karasik, a machinist-A at the Laboratory for Nuclear Science from 1947 until his retirement in 1976, died October 6. He was 69 years old.

Mr. Karasik, who lived in Belmont, is survived by his wife, Idella (Nerenberg); a son, Richard P. Karasik of California; a daughter, Nancy F. Karasik of Cambridge; a sister, Betty S. Karasik of Belmont; and a granddaughter, Shanna Lee Karasik.

John A. Carroll

Word has been received that John A. Carroll, 77, an employee at the Lincoln Laboratory from 1957 until his retirement in 1966, died September 27

Mr. Carroll, who lived in Nashua, NH, is survived by his wife, Mary Carroll.

Tech Talk, October 17, 1979, Page 7

Engineers Triumph, 37-14 Government Action Needed In Homecoming Contest **To Change Commercial Risks** team responded well," said Smith.

United States.

standards.

(Continued from page 1)

The authors rejected what they

said were frequent claims that the

risks of innovation are so great

that government policy should be

to reduce them by subsidizing tech-

nology development, weakening

antitrust laws or rolling back

environmental, health and safety

"The main message of this book is just the opposite," the analysts concluded. "Government should

take steps to encourage innovation

by increasing the risks that firms

face-not by increasing the risk of

failure of new technology, but by

increasing the risk that a firm will

The book, "Technological Inno-

vation For a Dynamic Economy,

edited by Christopher T. Hill and

James M. Utterback of the Center

for Policy Alternatives, was

published by Pergamon Press of

New York City in cooperation with

the Center. The Center, headed by

Dr. J. Herbert Hollomon, Japan

Steel Industry Professor of

Engineering, prepared eight reports for the Department of

Commerce as part of the Domestic

Policy Review of Industrial

Innovation which was ordered by

President Carter late in 1978. The

revised and edited reports are the

"To get the country moving again," the book says, "it is

imperative to prod the less

dynamic industries to move more

rapidly than they have in many

years, through exposure to foreign

competition and through other

Protecting domestic industry from

foreign competition "ultimately

brings technological obsolescence

plicable to many areas of industry. "Industry underinvests in these

areas, which provide the basic

knowledge upon which the next

generation of technological inno-

-Avoiding support for com-

mercializing new technology. The

report warns that if federal

support for commercialization of

new technology is carried too far

"resources may be diverted from

other promising areas and com-

petition may be stifled by con-

centrating resources in a small

number of large firms ... '

vation can be built.'

means of creating rivalry."

chapters of the book.

in its wake.'

fail it if does not innovate."

MIT coach Dwight Smith is the first to admit that special teams play an important role in any football game. That fact was never more evident Saturday when the Engineers turned three blocked punts into a pair of touchdowns and a safety en route to a 37-14 homecoming win over NY Maritime before 750 fans in Steinbrenner Stadium.

With the score 0-0, Tech exploded for 23 points in a little over seven minutes in the second quarter thanks in part to the fine defensive play of freshman nose guard Jeff Muss of Dallas, Texas, who blocked two punts on two consecutive Panther possessions.

In that quarter, quarterback Bruce Wrobel of Evergreen Park,

one-yard run, and threw two touchdown passes to freshmen Barry Jordan (9 yards) and **Troy Beutel** (24 yards) for the Engineers, now 3-1 on the season Sophomore defensive tackle Steve Stayduhar of Poland, Ohio,

blocked another Maritime punt in the third period as end Art Aaron of Poland, Ohio, fell on it in the end zone for another Tech score. Mike Barrett of North Tarrytown, NY, ran five yards for the final Engineer tally in the fourth quarter.

The visitors held MIT to only 178 total yards (including 22 yards rushing on 32 attempts), but Wrobel came to the rescue by hitting 9 of 14 passes for 109 yards.

Jordan, the speedy split end from Henderson, NC, also had a fine game with three receptions, a punt return for 37 yards, and a 30-yard kickoff return. Beutel, the talented right end from Lockport. NY, grabbed three passes for 67 yards.

team (2-2-2) tied Clark (1-1) while the women's volleyball team (2-5) lost to Massachusetts, 3-1.

um.

...MIT's soccer team dropped its sixth consecutive game, 5-3, at Lowell Saturday. Bill Uhle of Miami, Fla., Jay Walsh of Foxboro, and Tim Miexsell of Sudbury scored goals for the Engineers (1-6). Tech hosts Boston College Wednesday afternoon at 3pm in Steinbrenner Stadium.

"Our game with Fitchburg this

Saturday will be our toughest test

of the season." That contest starts

at 1:30pm in Steinbrenner Stadi-

...Sophomore Karen Haug of

North Attleboro, Mass., captured

the Division III number one singles

championship Sunday at the Mas-

sachusetts AIAW women's tennis tournament in Worcester. She defeated Pat Bishop of Assump-

tion, 6-2, 6-3. Tech is now 2-4 on the

year after beating Clark (6-3) and

... The women's field hockey

losing to Holy Cross (5-4)

In Other Sports...

..."Everything that could go wrong, did," said coach John Benedick after his water polo squad dropped three games at the Brown Invitational over the weekend. MIT lost to Loyola of Chicago (13-5), Washington & Lee (8-7), and Army (11-9). Entering the tournament, captain John Dolan of Barr, RI, and Tim Eggert of Portland, Texas, were tied with 11 goals The Engineers host apiece. Harvard this afternoon at 5pm in the Alumni Pool.

... In sailing, the Engineers qualified for the New England Team Championships here October 27 by finishing fourth among eight teams in the elimination regatta. The young squad also placed 10th in the Hoyt Trophy at Brown. "It's been a difficult year, but we were pleased with our performances," said coach Hatch Brown. There are 20 freshmen on

"I was pleased with the win, the the 39-member men's roster. Sustaining Fellows

(Continued from page 1)

grams. This, in turn, is expected to give rise to a widespread network of men and women who are well informed about MIT's purposes, can promote active discussion of them and can help the Institute's leadership formulate goals.

An individual can become a Sustaining Fellow through a minimum annual gift of \$2,000 for unrestricted purposes or for endowment in support of general purposes, scholarships or professorships. Those who have made cumulative

Photo Gallery Exhibit To Open

Photography in "Black and White and Color" is the theme of a four-artist show on view October 23-November 29 at the MIT Creative Photography Gallery in du Pont Gymnasium.

The public is invited to attend an

gifts of \$25,000 or more for any purpose will be invited to become Life Members. Unrestricted gifts received from Sustaining Fellows will be assigned to the MIT Sustaining Fellows Fund to be used at the discretion of the MIT President.

Dr. Johnson and Dr. Wiesner are Honorary Chairmen of the program. The Faculty Chairman is Elias P. Gyftopoulos, Ford Professor of Engineering. An office has been established in Rm 3-231, x3-5176, under the direction of Eric C. Johnson, to coordinate activities for the Sustaining Fellows and help foster their special relationship with the Institute. Mr. Johnson was formerly Assistant Director of the Industrial Liaison Program.

Brass Ensemble To Give Concert

Members of the MIT Brass En-Gordon Hallberg semple, tor, will present a free, public 3pm, in Walker Memorial.

-Maintaining strong programs to control the non-commercial risks that new technology can pose feats, or advocates of 'appropriate to health, safety and the envi-ronment. "Regulation may reduce technology.' Instead, policy toward technological innovation innovation in some regulated inis...a key element in the long-term dustries, but encourage the develeconomic and social policies of the opment of less costly or more

others. Dr. Hollomon, who as an assistant secretary of commerce in the first years of the 1960s encouraged an early analysis of the innovation process, said the new report constitutes an "attack on conventional thinking.

desirable substitute products in

The authors of the report, he said in the book's foreword, "believe that rivalry and competition, venture, risk, entrepreneurship and creative engineering are crucial to the innovation process...

"The authors believe that unless the old perspectives and approaches are changed, the US competitiveness will be further weakened. It is incumbent on our country to reverse the direction of past practices that have failed. I hope that this book will serve to stimulate political discussion of these important issues," Dr. Hollomon said.

The authors, listed alphabetically, are:

Nicholas A. Ashford, assistant director of the Center for Policy Alternatives, associate professor in the School of Engineering, chairman of the National Advisory **Committee on Occupational Safety** and Health, member of the Science Board of the Environmental Protection Agency.

Clinton C. Bourdon, assistant professor in the Harvard Business School. He has been a consultant to the National Center for Productivity and assistant professor of economics at Boston University.

Edward M. Graham, currently on the staff of the Office of the Secretary, US Treasury Department. At the time he prepared his chapter he was assistant professor in the Sloan School of Management.

George R. Heaton, Jr., a lawyer and research associate at the Center for Policy Alternatives.

Christopher T. Hill, senior research associate at the Center for Policy Alternatives. He has worked for the Congressional Office of Technology Assessment, Washington University in St. Louis and Uniroyal, Inc.

J. Herbert Hollomon, director of the Center for Policy Alternatives. Previously, he was president of the University of Oklahoma, acting undersecretary of commerce and assistant secretary of commerce for science and technology

Paul Horwitz, principal research scientist and member of the Business Planning Group at Avco Everett Research Laboratory, Inc. He has been a Congressional fellow in the office of Sen. Edward M. Kennedy.

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14

Burton M. Klein, professor of economics at the California Institute of Technology. Previously, he was the head of the economics department at the Rand Corp.

W. Curtiss Priest, a research associate at the Center for Policy **Alternatives**

James M. Utterback, research associate at the Center for Policy Alternatives. He has taught at the Harvard Business School and at Indiana University.

The book summarizes the findings of the analysis this way:

-Government's most effective role "in reversing the current decline in productivity gains" is to create a more positive climate for technological innovation.

—A more positive climate is not one that is necessarily benign, 'especially toward entrenched firms which are slow to protect their positions by reducing costs or improving their products.

-Creating a more dynamic economy "depends on generating greater rivalry and competition between firms. This, in turn, depends on increased rate of capital formation and, especially, on the formation and entry of new technology-based ventures by existing firms and by new firms aimed at invading established markets."

-A more dynamic economy requires steps "to free some industries from the protective cocoon of economic regulation and to subject others to new and more vigorous antitrust standards, including limits on mergers and on vertical integration."

The US should move to increase the availability of venture capital, thereby encouraging new firms to enter the market. A model for effective programs of this type can be found in Japan. "In no other developed country (except Japan) is there such a complete array of programs to encourage innovation, including: grants-in-aid for the implementation of inventions, special development contracts and grants, arrangements for commercialization of new developments, support for capital equipment for new ventures, rapid tax write-off for new developments, low-interest loans for high-technology firms, special analysis and advice for small firms, special procurement policies for small businesses, open' research laboratories...for the use of new and small firms, and no-interest loans for modernization of small firms.'

-Existing industrial structure should be modified by prohibiting corporate mergers above a certain size and by changing antitrust laws "to recognize the importance of stimulating rivalry and dynamic behavior.'

-Removing economic regulations of prices and markets where possible, including consideration of a proposal to separate electric generation firms from the business of distributing electric power."

In addition, the report calls for: -New government assistance programs to educate, retrain and relocate workers from declining industries into new growth areas. -Government support for research and development in basic science and engineering and in technologies that are widely ap-

concert on Sunday, October 21, at



Mr. Wrobel

opening reception from 5-7pm, on October 23, which will launch the display of works by Leland Rice, Luther A. Smith, Jr., Deborah Hunter and Ralph Gibson.

On Oct. 24, Mr. Rice will give a free, public lecture, "Con-temporary Directions in West Coast Photography," 7:30pm, in the gallery.

The exhibit presents the photographers' work, exploring the relationship of black and white images and color, the influence of one medium on the other and the transition between them.

Los Angeles photographer Le-land Rice has had one-artist exhibitions throughout the United States, including the Witkin Gallery in New York, Hirshhorn Museum and Sculpture Garden in Washington, DC, and most recently, the Rosamund Felsen Gallery in Los Angeles.

The group will perform liturgical music for brass, featuring Italian composers of the late 16th and early 17th centuries, a period renowned for the famous antiphonal brass music of the Gabrieli family. Works by Tiburtio Massaino, Giovanni Palestrina and Giovanni Gabrieli will be included. Contemporary liturgical music will complete the program, featuring works composed in the 1960's by Fisher Tull, Luigi Zaninelli, Vaclay Nelhybel, and Alan Hovhaness. MIT student Mike Strauss will be trombone soloist in Fanfares Liturgiques by Henri Tomasi

Well known as a conductor, performer and instructor with many brass groups, Gordon Hallberg is beginning his second season as director of the 25-member MIT Brass Ensemble, a student group organized by the Music Section in 1973.



Tom and Louise McNamara, left, are the host family for Machiko, Terry and Morihisa Sugiyama and they all attended the first Host Family Program concert given Sunday, Oct. 14, by the MIT Brass Ensemble in Huntington Hall. Mr. Sugiyama is a graduate student in civil engineering. The family comes from Kyoto, Boston's sister city in Japan. Mr. McNamara, a 1945 graduate of MIT, has been active in alumni affairs

and is now serving as a member of the Alumni Association's Committee to Strengthen Alumni Involvement with the Institute. His special interest is in developing supportive programs for foreign students. The Host Family Program, which still has students awaiting placement, may be reached through the Women's League Office, x3-3656.

-Photo by D.J. Dudzik

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