

Telephone Seminar Series Set

A series of five seminars at MIT—the first one on Thursday, Nov. 20—will focus on the social impact of the telephone during its first 100 years.

Among the general areas to be covered by the seminars, which are being organized by MIT's Research Program on Communications Policy, are the telephone's effects on urban and suburban settlement, on social mores and human relations and on lifestyles.

It was in Boston on March 10, 1876, that Alexander Graham Bell first used his invention to transmit intelligent speech. Several historians also believe that the first public demonstration of Bell's early membrane and solenoid device was on the MIT campus, then in Boston, on May 25, 1876, before the Society of Arts.

The Nov. 20 seminar—in the Marlborough Lounge, Rm 37-252, from 4-6pm—will deal with the sociological effects of telephone use.

Among the papers to be presented at the seminar are "Bell's Electrical Toy: What's the Use?" by Sidney Aronson, professor of sociology at Brooklyn College, and "Sociologically Walking Through the Yellow Pages," by Donald Ball, chairman of the Department of Sociology at the University of Victoria, B.C. Dr. Aronson has written on the effect of the telephone on the individual and is now working on a book dealing with the federal field of telephone sociology. Dr. Ball has written on the telephone as it relates to social institutions.

Other papers will be presented by
(Continued on page 6)

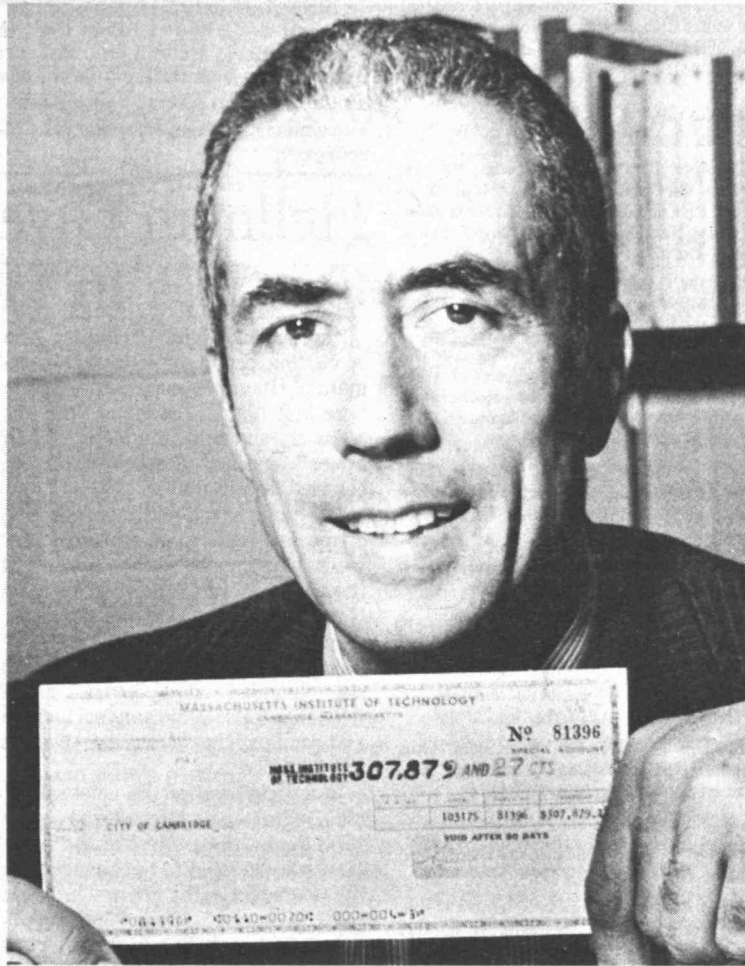
Final Bethe Lecture

The concluding Compton Lecture by the Nobel Prize-winning physicist Hans A. Bethe will be given Thursday, Nov. 13, at 4:30pm in Rm. 26-100.

The location is a change from the site of the previous lectures.

The subject of Dr. Bethe's concluding lecture will be "Energy Production in Stars from the Sun to Neutron Stars." The earlier lectures dealt with the world energy problem.

The lecture series was established in 1955 to honor the late Dr. Karl Taylor Compton, MIT president from 1930 to 1948 and chairman of the MIT Corporation from 1948 to 1954.



MIT PAYMENTS TO CAMBRIDGE—Kimball Valentine, assistant to the treasurer at MIT, holds a check for \$307,879.27 from the Massachusetts Institute of Technology to the City of Cambridge which he delivered this week to City Hall. The sum is the balance of the in lieu of tax payment of \$370,000 paid by the Institute to Cambridge this year. The difference of \$62,120.73 was paid to the city earlier. The in lieu of tax payments cover campus property used for educational purposes and exempt from taxation under state law. MIT has made voluntary payments in lieu of taxes to Cambridge since 1928. In addition, MIT will pay approximately \$2 million this year on the non-tax exempt property it owns in Cambridge. MIT is one of the largest taxpayers in the City of Cambridge.

Senator Goldwater to Speak At Observatory Dedication

US Senator Barry Goldwater of Arizona will speak at the dedication of the McGraw-Hill Observatory of the astronomy consortium of the University of Michigan, Dartmouth College, and MIT on Saturday (Nov. 15). Senator Goldwater is a member of the Senate's Aeronautical and Space Science Committee.

MIT Provost Walter A. Rosenblith, Professor Hale Bradt and Institute Professor Bruno Rossi will also participate in the dedication of the observatory, which is devoted to optical studies of x-ray stars. The day-long program will take place in Tucson, Arizona, and at Kitt Peak, the site of the observatory.

Professor Bradt, of the Department of Physics and the Center for

Space Research, will speak at a morning symposium on "X-ray Astronomy: The Birth of a Science," at the University of Arizona in Tucson. Professor W. Albert Hiltner, chairman of the astronomy department at the University of Michigan, and Professor Forrest Boley, chairman of the department of physics and astronomy at Dartmouth, will also speak.

Dr. Rosenblith will speak at a second morning symposium, on "The Growth of Science," which will be moderated by Dr. Rossi. Other speakers will include Professor Leonard M. Rieser, vice president and dean of the faculty of arts and sciences, Dartmouth College; and

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New Method Invented For Mixing Plastic

Why don't auto manufacturers make the front ends of cars out of light-weight, durable, resilient polyurethane plastic, thereby preventing damage at collisions up to 30 miles an hour and at the same time reducing weight and increasing mileage?

Auto makers, who have been looking into such an application of polyurethane for some time, may find that a process invented at MIT is the best way to mix and deliver polyurethane components in batches large enough to make feasible the manufacture of large-size parts at the high rate of production required by the auto industry.

The new mechanical-electrical hybrid mixing system and the high-rate fluid delivery system were an-

nounced Thursday, Nov. 6, at a symposium at MIT on recent developments in polymer processing.

Professor Nam P. Suh of the Department of Mechanical Engineering, who heads the MIT-Industry Polymer Processing Program where the systems were invented, called the developments a "significant breakthrough in the art of mixing and processing of polyurethane" and said it could lead to many new industrial applications, including auto front ends.

MIT has applied for three patents on the inventions.

The MIT mixing invention includes two concentrically-mounted cylinders. The inner cylinder can be
(Continued on page 7)

Radio Astronomy Instrument May Aid Medical Diagnoses

An instrument used by radio astronomers to detect molecules in space may help physicians diagnose breast cancer and identify potential stroke victims.

Two MIT researchers at the Research Laboratory of Electronics reported in the current issue of *Science* magazine that microwave radiometers, originally developed for radio astronomy, can detect abnormal temperatures in tissues as deep as 10 centimeters under the skin, by measuring microwaves emitted by the tissues.

Since abnormal temperatures often accompany breast tumors and other medical problems—such as hardening of the arteries that carry blood to the brain—such temperature measurements may prove to be a useful diagnostic tool.

Two professors in the MIT physics department, Dr. Alan H. Barrett and Dr. Philip C. Myers, are now testing the technique, called "microwave thermography," on female breast tumor patients at Faulkner Hospital in Boston. Their research is funded

by the National Institutes of Health.

If the technique is successful, Professor Barrett said, it will supplement, not replace, other methods of detecting breast tumors. Microwave thermograms would not
(Continued on page 6)

College Seminar To be Held Here

A one-day seminar introducing minority high school students from New England to area colleges will be held at MIT Saturday, Nov. 15, from 9:00am to 3:30pm in the Sala de Puerto Rico in the Student Center.

The students—participants in A Better Chance (ABC)—will hear representatives from more than 20 colleges speak on their particular colleges and on the college admissions process in general.

Peter Richardson, director of admissions at MIT and Gail Wilson, assistant to the director of admissions, will represent MIT.

Approximately 70 ABC students from Eastern New England are expected to attend the session, sponsored jointly by MIT's Office of Admissions and the Eastern New England Region Office of ABC.

A Better Chance, Inc., a national non-profit organization founded 11 years ago, recruits and provides scholarships for college-bound students from families with poverty backgrounds.

Holiday Guests

Members of the community interested in sharing their Thanksgiving Day with students (one or more) should contact Mrs. Robert Logcher at 275-9357 or Mrs. Donald Harleman at 862-9305.

Spectator Sports Not for Sloan Senior Executive

The program manager for a Boeing Aerospace Corp. Rail Dynamics Laboratory Project, the president of the National Association for the Advancement of Colored People's Northwest Area Conference, the coordinator for the development of a low-income housing project in Seattle and the chairman of the State of Washington's King County Personnel Board is enrolled in the intensive nine-week program for senior executives at the MIT Sloan School of Management.

"Is" is not ungrammatical in the preceding sentence since each of the titles, jobs and accomplishments refers to one man—Arlington Carter, who likes to race his 30-foot sloop on Puget Sound or fly-fish for rainbow trout and steelhead in his leisure time.

"There are two kinds of folks," the

42-year-old Chicago native said the other day during an interview, "spectators and players. Players sometimes win. They lose too, but spectators—they never win."

Carter cited the spectator-player philosophy when asked whether black people in the Washington, Oregon, Idaho, Alaska region he heads for the NAACP find his senior position with a major multinational company an anomaly.

"Sure, I've been tested in that way many times by members of minority groups," he said. "And of course it's difficult to convince people in a poverty situation that there is linkage between them and a middle-class black who works for a major company."

"My position is that I have no truck with dropouts, people who say that things are so bad they won't



have anything to do with anything. Working within the system to effect change is my style. That's the way the NAACP has done it for years, and done it successfully."

On another subject—the public's opinion of large corporations—Carter believes the business community needs to do a better job in telling its story. "Too often businessmen don't feel comfortable outside the corporate fence. We sometimes don't want to come out and tell our story. Consequently, opinions are formed without benefit of all the facts."

A 1961 graduate of the Illinois Institute of Technology where his degree was in electronics engineering, Carter has worked for Boeing for 14 years in a variety of posts.

The breadth of his experience and activities is typical of the senior

executives nominated for the Sloan School program at MIT, now in its 19th year.

The program is concerned with the qualitative and quantitative analysis of managerial decision making under conditions of constant change. The schedule is grueling.

"Even before I arrived here I was sent 14 books to read," Carter said the other day. "And none of it is what you call light reading."

Classes are conducted morning, afternoon and after dinner by Sloan School faculty and faculty from MIT's departments of economics and political science.

"Without a doubt it's a reward to be nominated and accepted for this program," Carter said, "but it's a lot of work, too."

In other words, it's not a game for spectators.

INSTITUTE NOTICES

Announcements

Literary Boston—Next Explore Boston trip sponsored by Undergraduate Urban Studies Program. Sat, Nov 15, meet outside Park Street T exit at 10am for narrated walking tour of buildings & sections of city memorialized in novels set in Boston. Info: x3-2012 or x3-4409.

Notice—Seniors in Electrical Engineering & Computer Science who wish to apply for graduate work in that Department in 1976 have already been asked to submit their graduate applications by Nov. 1. Seniors in other departments who plan to apply to EE & CS for admission during 1976 also should apply as soon as possible. Applications may be picked up in Rm 3-103.

Preprofessional Meetings—**Georgetown Law School**: Interviews with William Bridge, assistant dean, Wed, Nov 12, 1:30-5pm, sign up in Preprofessional Office. Graduate study in the basic medical sciences at Harvard: Meeting with Prof. Harold Amos, et al, Thurs, Nov 13, 4:30pm, Rm 3-133. **Cornell Law School**: sign up for interviews with Prof. John Brown, Fri, Nov 14, 10am-12n, in Preprofessional office. **Cornell Medical School**: Group meeting with admissions committee members Tues, Nov 18, 2pm, Rm 1-103. Preprofessional Advising & Education Office, Rm 10-186, x3-4158.

Course VI Steak Fry—Sponsored by EE & CS Stu-Fac Committee. Semi-annual event featuring steaks, cole slaw, baked potatoes, soft drinks, beer & a good time. Thurs, Nov 20, 6pm, Bldg 13 Lobby. Admission \$3.75, ticket info Rm 38-476.

IPC Short Courses—Introduction to TSO: Nov 12, 14, 17, 2-4pm. Using Random Number Generators: Nov 13, 3-4:30pm. Elementary PL/I Input/Output: Nov 17, 19, 21, 4:30-6pm. Introduction to Census Data Processing: Nov 18, 20, 3-4:30pm. Preregister for all with Lynne Penney, x3-6320, Rm 39-427.

Discount Tickets—For BSO open rehearsal Wed, Nov 19, are on sale at TCA, Stu Ctr Rm 450, x3-4885.

UNICEF Christmas Cards and Calendars—Now on sale at TCA, Stu Ctr 4th fl, 11am-3pm. Many different designs, including assorted, as well as wall & desk calendars.

MIT-Wellesley Ski Trip Meeting—Short meeting with slides & refreshments Wed, Nov 19, 7pm, ATO (405 Mem Dr). ATO Ski Club organizing week-long trips to Vt last 2 weeks of Jan. All members of community invited. Will be going to Smugglers Notch (nr Stowe). Low-cost professional lessons & rentals, beginners welcome. ATO, 494-0060, ask for "ski". Also in IAP guide.

MIT Figure Skating Club—A chance for figure skaters who feel confident at skating forwards and who can at least make an attempt to skate backwards to meet as a group. Sun, weather permitting, 11:30am-1pm, skating rink. Free, need athletic card & skates.

Placement

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 10-140, x3-4733.

Wednesday, November 12—CIA: Eastman Kodak Co; GE Co, PhD & Postdocs; Motorola, Inc; NYU Sch of Education, Dept of Human Relations; The Analytic Sciences Corp; United Technologies Corp, Sikorsky Aircraft Div. **Thursday, November 13—GE Co, PhD & Postdocs**: Arco Steel Corp; Bell Systems; Bell Labs, Long Lines, Sandia Labs, Western Elec; Celanese Corp; Exxon Corp & USA Affiliates; GE Technical Ctr; Naval Surface Weapons Ctr, White Oak Lab; Scientific-Atlanta, Inc; Stanford Research Institute. **Friday, November 14—Bell Systems**: Bell Labs, Western Elec; GM Technical Ctr; Merck & Co, Inc; Uniroyal Inc, Chemical Div. **Monday, November 17—Amherst Assoc**: Carnegie-Mellon Univ Grad Sch of Industrial Admin; ESL Inc; First Penn Bank; IBM Corp; MSB Systems, Inc. **Tuesday, November 18—Commonwealth Edison Co**; Institute for Defense Analyses; Maseonil Intl, Inc; Philip Morris USA; Dept of the Navy, CAPSO-N; Sandia Labs. **Wednesday, November 19—Sandia Labs**; Burroughs Corp; Defense Communications Agency/Defense Communications Eng Ctr/Joint Technical Support Activity; Diamond Shamrock Corp; Dorr-Oliver, Inc.; Hendrix Electronics, Inc; Sun Oil Co. **Thursday, November 20—Bell Telephone Labs, Inc**; Cornell University Grad Sch of Business & Public Admin; PRD Electronics; TRW Systems Grp; Westinghouse Elec Corp. **Friday, November 21—Bell Telephone Labs**; TRW Systems Grp; Westinghouse Elec Corp; Norton Co.

New UROP Listings

Boston V.A. Hospital Boston, MA Assistance in developing a form of therapy

called VIC (Visual Communication) for patients with severe aphasia.

Harvard Medical School Boston, MA UROP opportunities exist in a laboratory involved with elucidating basic mechanisms of renal function on the organ and system level using new and sophisticated instrumentation. Projects available include: wet chemistry on samples of 1-100 picoliters; new methods of volumetric pipetting in the 1-100 picoliter range; osmometry of picoliter samples; collection of 6 x 10⁻¹¹ liter specimens from frozen tissue slices; and computer interfacing for elemental mapping using the electron probe.

Deaconess Hospital Boston, MA Research into the physiological roles and significance to the animal of various biochemical components, usually enzymes, found in tissues.

A Social Assistance Information File An undergraduate is encouraged to work with MIT faculty and staff of the Cambridge Public Library to develop a Public Information System that will help citizens of Cambridge public and private assistance centers. A data bank of available services will be gathered in areas such as child care, health, legal services, education, employment, housing, recreation, nutrition, etc. A unique, graphic, non-keyboard console is under design for this purpose. In some cases the system may be designed to be bilingual. Students interested in social applications of computer, data processing, organization and retrieval will find the project challenging. Contact Dr. M.M. Kessler or Prof. Roy Kaplow, Rm 13-5106, x3-3322 for more information.

Urban Settlement Design Program The research project involves the development of simple computer programs dealing with the interrelationships of physical planning variables. The variables would include population/community components; lengths of infrastructure to areas served; density tables, etc. Fortran skills and basic competence in computer programming are required. Contact Reinhard Goethert, Rm E21-306, x3-4404.

Project MAC The CSR division of Project MAC is offering a UROP project for undergraduates that involves: 1) planning and development of measurement tools for the Multics system; 2) application of these tools and analysis of measurement results. The students will learn to understand the mechanism of a complex time-sharing system and the problems of evaluating and maintaining performance of such systems. They will gain experience in design of scientific experiments and tools for such experiments. Programming experience is required (preferably PL/I) and some knowledge of the basic principles and concepts of a time-sharing system. Experience in system programming is especially valuable. Contact Liba Svobodova, Rm NE43-535 (545 Technology Square), x3-3489, M, W 10am-12n, and 3-5pm.

Quadex Corporation Cambridge, MA Quadex Corporation is a manufacturer of minicomputer based application systems for text processing and related functions. Two classes of software are being developed—systems and applications. The systems software consists of an operating system, a data management system, and a compiler for a PL/I-like high level language. The applications systems, which are developed and run under the systems software, are primarily in the area of multiterminal text processing and data management. Pay or credit.

MITRE Corporation Bedford, MA **Experimental Computer Science: System Penetration** MITRE is currently engaged in the design of computer systems that are not penetrable, i.e. no unauthorized access to information is possible. One such system, built on a DEC PDP-11/45 has been completed, and designs for other systems are proceeding. This task is the examination of the PDP-11/45 based system for design or implementation flaws and the exploitation of these flaws to produce a penetration. Car needed for transportation to Bedford. Pay or credit.

Cambridge Collaborative Cambridge, MA Cambridge Collaborative is studying new applications of continuum mechanics to the measurement of pulmonary function in infants and adults. The aim is to develop new non-invasive measures of pulmonary function which will yield information that has been inaccessible with conventional techniques.

Other Opportunities

Hahnemann Medical College Cross-Disciplinary Cardiovascular Training Program The purpose of the program is to orient talented students into investigative and academic careers in cardiovascular disciplines. Enrollment is limited to junior and senior college students. The program is for 10 weeks. In addition to full participation in independent and/or on-going research projects of cardiovascular design, each student will receive exposure to the basic sciences as they relate to cardiovascular disease, as well as specific subspecialty disciplines such as ultrasonics, electrophysiology, electrocardiology, cardiac catheterization, hypertension, renology, echophonocardiography. Additional information and applications are available in the Preprofessional Advising and Education Office, Rm 10-186, x3-4158.

Oak Ridge Associated Universities Undergraduate Research Training The undergraduate research training program provides students with opportunities for independent study, research, and development. Selection of trainees is based on scholastic record, aptitude, research interest, graduate school potential. Additional information about the specific nature of the opportunities is available in the Preprofessional Advising and Education Office, Rm 10-186, x3-4158. Applications must be complete by January 5, 1976.

Smith College Intern-Teaching Program The Summer Intern Teaching Program offers six weeks (June 28—August 6) of intensive training to MIT graduates who plan to teach in secondary schools. Requirements for admission: 1) undergraduate record, 2) Miller Analogies Test, 3) personal qualifications. No undergraduate study in education or experience in teaching is required. Additional information is available in the Preprofessional Advising and Education Office, Rm 10-186, x3-4158.

Franklin General Hospital Summer Scientific Work Program The program provides a six-week rotation through hospital departments, combined with daily association with practicing physicians. Enrollment is limited to junior and senior college students. Students are given employee status at minimum wage rates. The program affords the student first-hand experience in a community hospital. Additional information and applications are available in the Preprofessional Advising and Education Office, Rm 10-186, x3-4158.

MIT Club Notes

MIT Auto Club—Meeting Sun, Nov 16, 7:30pm, Stu Ctr Rm 491. Slide show of '75 US Grand Prix and discussion of '76 racing plans. Info: Bob Humphrey, 494-8683; Dave Schaller, x5-9640 Dorm.

MIT Baha'i Association—Will gather Mon, 5pm, Rm 8-105, every other week (Nov 17, Dec 1 & 15).

MIT Ballroom Dancing Club—The club will be very active this term with frequent workshops & dances. New members welcome at all functions. Info & times: Carl Sharon or De'ng King, 536-1300.

Beefaroni Chess Club—Alternative chess club. Interested in playing relaxed serious chess: Info: Gary Kaitz, 494-8234 or x5-6304 Dorm.

Bridge Club—ACBL Duplicate Bridge. Open pairs Tues & Thurs, 7pm, Stu Ctr Rm 473.

MIT/DL Bridge Club—ACBL Duplicate Bridge. Tues, 6pm, Walker Memorial Blue Rm.

MIT Chess Club—Meetings Sat, 12n-7pm, Stu Ctr 407.

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

Math Club—Meeting Sun, 4pm, Rm 4-182.

Psi Club—For all graduates of Silva Mind Control. Wed, 5pm, Rm 1-134.

MIT Science Fiction Society—Invites people to the world's largest science fiction library, Stu Ctr Rm 421, and to its zany weekly meeting, Friday, 5pm, Rm 1-236.

Shotokan Karate Club—Rigorous training for intercollegiate competition & self-defense, given by 6th degree black belt. Mon & Wed, 8pm, duPont wrestling rm; Sat, 1pm, duPont 2nd fl dance rm.

Space Habitat Study Group—Interdisciplinary studies on space colonization. Wed, 7:30pm, Rm 4-270. Office, Rm 24-415.

Strategic Games Society—Sat, 1pm-1am, Walker Rm 309 & 318. Offers opponents and discounts on merchandise to members plus gaming & periodical library. Info: Paul Bean, 266-6108.

Student Homophile League—Gay Lounge, Rm 50-306, open daily for lunch & random other hours, x5-6745 Dorm. Tom, Contact Line, x3-5440, provides info, referrals, counseling or just talking to gay persons. Meetings 1st & 3rd Sun every month, Gay Lge. Consult bulletin board, Bldg 3, for info.

Student Information Processing Board—Meetings Mon, 7:30pm, Rm 39-200. Info: x3-7788.

MIT Tae Kwon Do—For information call Barbara Illowsky, 492-4945.

TCA General Meeting—Topics: nominations, signing up for UNICEF cards booth, HoToGAMIT. Tues, Nov 18, 7:30pm, TCA Office.

The Tech—Organizational meetings Wed & Sun nite, Stu Ctr Rm 483. New staff members in all departments are always welcome.

Technique—MIT yearbook needs photographers, writers & workers. Sat, 11am, Stu Ctr Rm 451, x3-2980.

Tiddlywinks Association—Wed, 8pm, Stu Ctr Rm 473.

MIT Wheelmen—Meetings Tues, 7:30pm, Rm 1-203.

Religious Activities

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

Bible Study—Enjoy the good word of God. Fri, 12n, Int'l Students Lge, Walker 2nd fl, Mem Dr side.

Black Christian Fellowship—Bible Study Wed, 7pm, Masterton Lge, E Campus. Prayer group Mon-Fri, 12:15pm, Walcott 310, E Campus.

Prayer Time—Lunch hour Bible classes led by Miriam R. Eccles. Fri, 1-2pm, Rm 20E-226. All are welcome.

Campus Crusade for Christ—Family Time Fri, 7:45pm, Rm 37-252.

Celebration of Holy Communion—MIT Lutheran & Episcopal Ministry. Wed, 5:05pm, Chapel. Supper following, 312 Memorial Dr.

Christian Worship Service—Sun, 10:45am, Chapel. Refreshments following service.

Hillel—Traditional services Fri, 4pm, Kosher Kitchen & Sat 9am, Chapel.

Islamic Society—Prayers Fri, 1pm, Kresge rehearsal Rm B.

Meditation & Gita—Led by Swami Saravagananda. Fri, 5:15pm, Chapel.



Internationally known Alban Berg Quartet of Vienna will give a concert of works by Berg, Purcell and Mozart at 8pm, Wednesday, Nov. 19 in Kresge Auditorium. Quartet members, above, are: (left to right) Guenter Pichler, violin; Valentin Erben, cello; Klaus Maetzl, violin and Hatto Beyerle, viola. The concert, sponsored by the MIT Music Section, is open to the public free of charge.

Hellman Gives Reflections On 50's In Her New Book

Playwright Lillian Hellman, who is visiting professor in the Department of Humanities this term, spoke here last night (Tuesday, Nov. 11) after a showing of "The Little Foxes"—a film adaption of one of her best known plays.

She came to the Institute following a special celebration honoring her work, held Sunday night, (Nov. 9) at the Circle in the Square Theater in New York City. For the occasion, which was to benefit the Committee for Public Justice—an organization she founded five years ago—friends of Ms. Hellman performed and read excerpts from her 12 plays and two books.

In anticipation of the celebration, Ms. Hellman was interviewed by the *New York Times*. Most of the interview was devoted to her thoughts on the 1950 s McCarthy era and her next book *Scoundrel Time* (to be published next year) in which she writes for the first time about her troubles with the House Committee on Un-American Activities and its investigation of Communist activities in show business.

The following is excerpted from the *New York Times* article which appeared on Friday, Nov. 7.

"*Scoundrel Time* is a deeply personal book, in contrast to her two previous memoirs, *An Unfinished Woman* and *Pentimento*. 'In spite of the fact that both books seem personal,' Ms. Hellman is quoted, 'I don't have the feeling that I was doing myself. I was writing about me, but I was mainly interested in telling the story of other people. This book is just plain me.'

"I always found myself handicapped. I had wanted to put it into historical perspective. And it's very hard to remember how frightened I was.

"If you survive something, it's hard to remember the terrible pressure on you when you thought that survival is not possible."

"For her it was a time when every few days it was necessary to make a decision that would affect the course of her life. 'There was very little time to think about your feelings,' she said. 'You act. I did what I had to do by instinct.'

"Looking back on those anguished days, she admitted that it had its black comedy aspects as people in

the industry discussed the hearings. All the conferences they had with each other about who to name and who not to name. Very often people would call other people up and tell them they were going to name them."

"I have so little feeling against the McCarthys. I have a greater feeling against the intellectuals who don't come to each other's aid. In my book I mention one or two.

Ms. Hellman, who has taught at MIT on three other occasions, has given two of three scheduled lectures for "The Film Experience" (21.121) a subject which studies America's principal film genres. Her final lecture will be held on Tuesday, Dec. 2 and will be open to the MIT community.

Echoes

50 Years Ago

Nine graduates of Tech enrolled at Harvard Business School, making MIT eighth in percentage of graduates comprising the student body.

A dancing girl revue, from the stage of a local theater, was the main attraction at the Dormitory Smoker.

According to Professor Warren K. Lewis, Head of the Dept. of Chemical Engineering, the oil industry of the day offered more opportunity for rapid advancement to technically trained young men than any industry in the engineering field.

40 Years Ago

A resolution was passed recommending sailing as a new undergraduate activity at MIT. President Compton and Alfred G. Loomis each presented a boat, and fund raising was begun for the purchase of 10-15 dinghies.

Technology's debaters won over Harvard in support of an argument to amend the US Constitution to grant Congress the power to regulate all industry and commerce within national boundaries.

25 Years Ago

Groundbreaking ceremonies were held for the new John Thompson Dorrance Laboratory, named in honor of John T. Dorrance '95, former president of the Campbell Soup Company.

The appointment of Eero Saarinen as architect of the new proposed chapel and auditorium was announced.

TECH TALK

Volume 20, Number 15
November 12, 1975

Tech Talk is published 45 times a year by the News Office. Massachusetts Institute of Technology. Director: Robert M. Byers; Assistant Directors: Charles H. Ball, Barbara Burke, Robert C. Di Iorio, Patricia M. Maroni, Joanne Miller, William T. Struble, and Calvin D. Campbell, photojournalist; Reporters: Sally M. Hamilton, Ellen N. Hoffman; Institute Calendar, Institute Notices, Classified Ads: Susan E. Walker.

Address news and editorial comment to MIT News Office, Room 5-111, MIT, Cambridge, MA 02139. Telephone 253-2701.

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

Erratum

In a profile of Frank Urbanowski written for the journal *Directors* and reprinted last week in *Tech Talk*, the writer—not a member of the MIT community—was confused when he described the location of the MIT Press as "beside the lingering remnants of the once prestigious Lincoln Laboratory."

The description may fit the exterior of a building housing Lincoln's applied Seismology Group on Carleton Street. The main facility of the still prestigious Lincoln Laboratory is located in Lexington. The seismology group is in Cambridge in order to be near the Center for Earth Sciences.

Tech Talk regrets omission of an editor's note of clarification in the original story.

Sea Grant Seeks New Director

Dr. Ira Dyer has asked to be relieved as Director of the MIT Sea Grant Program, and efforts to find a successor are underway.

Announcement of the change in Sea Grant leadership was made on November 4 by Dr. Walter A. Rosenblith, Provost, and Dr. Alfred A.H. Keil, Dean of the School of Engineering and Chairman of the MIT Sea Grant Program's Policy Committee and its Faculty Council.

Dr. Dyer, who is and will remain Head of the Department of Ocean Engineering, cited as the reason for his reluctant resignation the press of departmental and other duties and in particular his teaching and research responsibilities. He has served as Director of the Sea Grant Program since July of 1973, and has been a major force in the Program's continued growth and stature as a focus for MIT's important contributions to the marine field.

Mr. Dean A. Horn, who has been the MIT Sea Grant Program's Executive Officer since its formation in 1970, was appointed Acting Director until a new head is chosen. As Executive Officer, Mr. Horn has not only provided the organizational leadership for the Program's day-to-day operations, but also has contributed substantially to the many phases of the development of the Sea Grant Program.

On behalf of the Institute, both Dr. Rosenblith and Dean Keil thanked Dr. Dyer for his effective leadership in developing and strengthening programs in marine research, advisory services, and education; they noted how important it was to find a new director whose interests and capabilities would resemble those of Dr. Dyer. The Program may face an exciting transition.

Preparations are well underway for submission of MIT Sea Grant's fifth comprehensive proposal to the Office of Sea Grant in the National Oceanic and Atmospheric Administration, and the possibility exists that, with this proposal, the US Department of Commerce may choose to designate the Institute a "Sea Grant College."

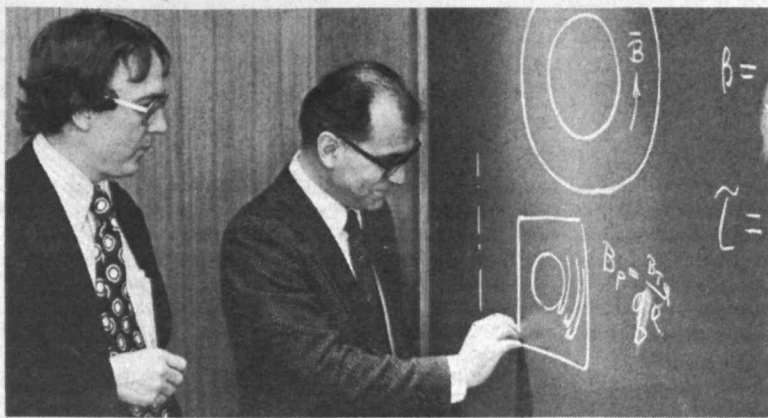
Award of "College" status, an honor that indicates recognition of excellence attained in a Program's research, education, and advisory efforts, would mean continuing and increased grant support beyond the almost one million dollars the MIT Sea Grant Program now receives from the Federal government.

With this challenge at hand, the Provost has established a Search Committee that is charged with finding a new director for the Program. Dean Keil, because of his long and successful association with the Sea Grant Program, as its Director from 1970 to 1973 and since then as Chairman of Sea Grant's Policy Committee and its Faculty Council, has been asked to head the Search Committee.

At its first meeting, the Committee agreed that this vacancy should be made publicly known. MIT faculty members who wish to be considered for the Directorship are encouraged to apply by writing to Dean Keil in his capacity as Chairman of the Search Committee. The Institute community is also asked to submit to him the names of potential candidates who should be considered for this position.

According to Dean Keil, "We are looking for a faculty member who is both a technical leader and a strong administrator, who will be able to spend at least half of his or her time on Sea Grant, and who will provide firm and imaginative leadership toward maintaining the Program's momentum and enhancing its further growth."

"This Directorship presents the opportunity to advance, through Sea Grant, both the Institute's dedication to the balanced, beneficial use of the oceans and coastal zones, and its philosophy of applying technology to marine resource development. It is important to continue the tradition of leadership set by Dr. Dyer, and the Committee intends to proceed without delay in its task of selecting his successor."



Dr. Ronald Parker (left) and Professor Bruno Coppi explain MIT progress towards controlled thermonuclear fusion to an audience of television reporters. The progress—a five-fold improvement in containment of fusion plasma by Alcator, MIT's doughnut-shaped fusion machine—was announced last week by the Energy Research and Development Administration.

Fusion Plasma Containment Major Advance Announced

[EDITORS' NOTE: The following news release was issued by the Public Affairs Office, US Energy Research and Development Administration, Washington, D.C. Wednesday, Nov. 5, 1975.]

WASHINGTON, D.C., Nov. 5—A five-fold improvement in containment of fusion plasma was announced today (Wednesday, Nov. 5) by Dr. Robert C. Seamans, Jr., Administrator of the Energy Research and Development Administration. A fusion plasma is an extremely hot gas wherein particles have enough energy to join or fuse to release large quantities of energy. Fusion is the process that produces energy in the sun and the stars.

Dr. Seamans called the achievement, "a major development in the fusion power program." Specifically, the product of the plasma density and the plasma confinement time has been raised to a value of 10,000 billion (10^{13}) seconds per cubic centimeter in the Alcator experiment at the Francis Bitter National Magnet Laboratory at MIT.

"This quantity is a critically important measure of progress for fusion," Dr. Seamans said. "The Alcator result exceeds by a factor of five anything previously achieved anywhere in the world, and it is ten times better than previous typical levels."

This new level of confinement was achieved at a temperature of about 10,000,000 degrees Centigrade in a plasma that was almost completely devoid of unwanted impurities. Alcator is a tokamak magnetic confinement system with an unusually high magnetic field. It is operated by a team of physicists and engineers headed by Dr. Bruno Coppi and Dr. Ronald Parker.

Dr. Seamans commented that the successful experiment at MIT is of major importance to ERDA's program leading to a demonstration fusion power plant by the end of the

century. However, a number of major scientific and technical problems remain to be resolved in order to achieve this goal, he said. Specifically, the density-confinement time product will have to be raised by another factor of ten to thirty.

Furthermore, temperatures of over 100,000,000 degrees Centigrade will be required, a factor of ten higher than achieved in Alcator. These temperatures have often been produced in the laboratory in the past. For instance, the 2XII-B magnetic mirror fusion experiment at Lawrence Livermore Laboratory in California achieved temperatures of 130,000,000 degrees in July, 1975.

The achievement of all of these conditions simultaneously will require larger new experiments, some of which are now under construction or being designed.

The goal of ERDA's fusion program is the development of fusion as a major source of abundant, economical and environmentally attractive energy, particularly for the generation of electricity.

A broad range of fusion research is carried out at MIT under contract with ERDA. The Alcator program is under the direction of Dr. Coppi, who originated the basic concepts underlying the Alcator. The experiment was initiated in 1971 and began operation in 1974. The recent results will be presented by Dr. Parker at a meeting of the Division of Plasma Physics of the American Physical Society in St. Petersburg, Florida, November 10-14.

[EDITORS' NOTE: At MIT, in addition to Dr. Coppi of the MIT Research Laboratory of Electronics and Dr. Parker of the Francis Bitter National Magnet Laboratory at MIT, other major contributors to the design and operation of the Alcator have been Dr. D. Bruce Montgomery of the Bitter Laboratory and Dr. Robert J. Taylor, now with the University of California at Los Angeles.]

300 Attend Retirement Party Honoring Miles P. Cowen

"When there is a public occasion, and you see Miles Cowen standing at the back of the hall with his black book under his arm, it's a reassuring feeling," Howard W. Johnson, chairman of the MIT Corporation, said.

"If he looks worried, that's even better, because it means he's thought of something you have not considered," Mr. Johnson said in citing Mr. Cowen as the MC of MIT and congratulating him on a superb term of service in the Institute.

Mr. Johnson's remarks were part of several tributes to Mr. Cowen at a retirement dinner in his honor Saturday (Nov. 8) at Walker Memorial, attended by some 300 members of the community with whom Mr. Cowen has worked over the past 33 years. Mr. Cowen will retire at the end of December.

Other speakers included Philip A. Stoddard, vice president for operations, Donald Whiston, deputy director for plant development before his retirement, and William R. Dickson, director of Physical Plant, who was

master of ceremonies.

A graduate of the Rhode Island School of Design, Mr. Cowen—like many others during World War II—came to MIT in 1942 to work in the Radiation Laboratory.

After the war, he joined Physical Plant as building services supervisor and became assistant to the superintendent in 1951. In 1957 Mr. Cowen was appointed superintendent for building services with the enlarging responsibilities brought about by the rapidly expanding campus.

In 1972 he was named assistant director of Physical Plant with responsibilities for special services. With this change he was able to devote full attention to events such as commencements, inaugurations, alumni meetings, major conferences and activities at the President's house.

"His dedication to service has been extraordinary," Mr. Dickson said, "and he is the most reliable man I have ever known."

"You don't replace Miles Cowen."

Memorial Tribute Planned For Giorgio de Santillana

From 2:30 to 6:00pm on Monday, 17 November in Bush Room 10-105, MIT, a number of distinguished faculty members and guests of the Institute will discourse on the topic "What Ought the Humanities to be Doing about Modern Science and Technology?" as a memorial tribute to Giorgio de Santillana (1902-1974), Professor of the History and Philosophy of Science in the Department of Humanities until his retirement in 1967.

Professor de Santillana was internationally recognized for such books as *The Crime of Galileo* (1955) and *Reflections on Men and Ideas* (1968), and for his political and historic commentaries in *The Atlantic Monthly*, *The Reporter*, and French and Italian periodicals.

The meeting will mark the dedication in his honor of a School of Humanities and Social Science common room, Room 20D-205. The events of the afternoon are jointly sponsored by the Department of

Humanities and the Technology Studies Program, and are supported by a grant from the I. Austin Kelly III Fund.

In 1967, just before Professor de Santillana's retirement, a similar "talking *Festschrift*" was held in his honor. Many of those who spoke at the previous meeting—President Jerome B. Wiesner, Professors Jerome Y. Lettvin, Philip Morrison, Noam Chomsky, and others from MIT, Professors I. Bernard Cohen and Everett Mendelsohn of Harvard, and Professor Robert S. Cohen of Boston University—will be joined by Dr. Walter Rosenblith, Provost of the Institute, Professors Charles Weiner and Harald A.T.O. Reiche of MIT, Professor Ruth Schwartz Cowan of SUNY at Stony Brook, and others. Moderator will be Professor Nathan Sivin of the Technology Studies Program. The public is invited, and refreshments will be served at 3:30 and 4:50.

United Way in Final Push

Cash donations and pledges of \$52,739.48 to the United Way were reported as of Monday, (Nov. 10) with only nine days remaining in the 1975 campaign.

The sum—more than half the total a year ago—was contributed by 1,197 donors—fewer than half the 2,800 who contributed last year. It signifies that, while the average

contribution has risen this year, the base of support has, so far, decreased.

A reason for this may be the distribution of pledge cards in pay envelopes, rather than person-to-person contact by solicitors. Solicitors are, however, responsible for contacting each person in their organizational units to collect the cards and answer questions donors may have. (A list of chief solicitors was printed in *Tech Talk*, Nov. 5).

As the drive comes to a close, Chancellor Paul E. Gray has called for a special effort by department heads, laboratory and center directors to offer support to solicitors as they contact everyone personally to be sure each person has an opportunity to contribute.

"In this year of continued economic recession, the need for United Way funds is greater than ever in Metropolitan Boston," Chancellor Gray said. "We feel sure that MIT people will respond to this need as they have always done if we afford them the opportunity."

Obituary

Susan S. Beyor, 31

A memorial service will be held in the MIT Chapel today (Wednesday, Nov. 12) at 11am for Susan S. Beyor, 31 of Arlington who died suddenly on Wednesday, Nov. 5.

Mrs. Beyor who had worked in various departments at the Institute since 1966, had been an administrative assistant in the Department of Humanities since 1974. She is survived by her husband Bruce Beyor, her mother, Mrs. Therese Stevens of Montclair, New Jersey, two brothers and a sister.



Yvonne Gittens, center, administrative assistant in Urban Studies and Planning and a trustee of the MIT Community Service Fund, recently presented a check for \$2,000 from the Fund to John Martin, executive director of the Cambridge Community Center. The check was part of this year's grant of \$4,000 to the Center, which provides services ranging from day care

to elderly programs for the Cambridgeport-Riverside area. Looking on are John Mack, left, MIT staff recruiter and vice president of the Center, Joseph S. Collins, executive secretary of CSF, Kenneth Leighton, right, a sophomore in aeronautics and astronautics who works at the Center under the work-study program, and children from the Center.

THE INSTITUTE CALENDAR

November 12
through
November 23

Events of Special Interest

Compton Lecture Series* - Hans A. Bethe, Compton Lecturer, Nobel Prize-winning physicist from Cornell University's Laboratory for Nuclear Science. 4:30pm, Kresge. **Thurs, Nov 13:** Energy Production in Stars from the Sun to Neutron Stars.

TWO Bake Sale* - Thurs, Nov 13, 8am-sellout, Bldg 10 Lobby and Rm 10-105.

UMOC Contest* - Sponsored by APO. Vote for your favorite Ugly Man on Campus thru Fri, Nov 14, Bldg 10 Lobby. Proceeds to the American Heart Association.

NASIC Information Bazaar* - Demonstrations of retrieval of bibliographic citations by computer. Continuous searching of literature data bases in 19 subject disciplines. Bring sample questions (key words, etc.) **Thurs, Nov 13 & Fri, Nov 14, 9:30am-1pm, Rm 14S-100; Mon, Nov 17, 12n-5pm, Bldg 10 Lobby. Info: x3-7746.**

Seminars and Lectures

Wednesday, November 12

Limit Cycle Behavior of a Typical Railcar Wheelset* - David Hannebrink, G. Mechanical Engineering Systems & Design Division Seminar. 12:05pm, Rm 3-465. Bring lunch, coffee & tea provided.

Harvard-MIT Joint African Luncheon Seminar* - Gavin Maasdorp, senior research fellow, University of Natal, South Africa. 12:30pm, Rm E53-482.

The Time Mean Flow Along the Continental Rising* - James Luyen, WHOI. Oceanography Sack Lunch Seminar. 1pm, Rm 54-611. Bring Lunch, coffee available.

Gamma Heating in Fast Reactors* - Manjeet Kalra, G. Nuclear Engineering Doctoral Seminar. 3pm, Rm NW12-222.

Physics UROP Symposium - Students speaking on their UROP projects, as follows: Fluctuations in Soliton States; Patrick Diamond; Phase Shifts in Plasmas, Kelly Pan; The Nitrogen Laser, William Rapoport; Crystalline Properties of Zns, Gregg Higashi; & A Rainbow Film, Patrick Jamieson. Beginning 3:15pm, each talk 20 min, Rm 26-414. Refreshments.

Science, Scripture and the Politics of Equal Time: A Study of Recent Textbook Controversies* - Dorothy Nelkin, research associate, political science. Technology Studies Seminar. 4pm, Rm 20D-205. Coffee 3:30pm.

Genetic and Anatomical Analysis of Sensory Behaviors in the Nematode C. Elegans* - Dr. Richard L. Russell, California Institute of Technology. Biology Colloquium 4:30pm, Rm 4-270. Coffee 4pm, Bldg 56, 5th fl vestibule.

Evaluation of Advanced Fast Reactor Blanket Designs* - J. Shin, G. Nuclear Engineering Doctoral Seminar. 4pm, Rm NW12-222.

Specification Writing: Some Thoughts on Conveying Thoughts* - Bill Swiger, vice president & senior consulting engineer, Stone & Webster. Constructed Facilities Seminar. 4pm, Rm 3-370.

Ideas of Progress in Art and Science* - Suzi Gablik, London painter & writer. Aesthetics in Science & Technology Seminar. 7-10pm, Rm 3-133.

Thursday, November 13.

Optical Wave Guide Microcircuits - Layout and Fabrication* - Clifton Fonstad, electrical engineering & computer science. EE&CS Optics Seminar. 2pm, Rm 36-428.

Process Engineering* - Don Leclair, Northeastern; Walt Johnson, Pfizer, Inc. chemicals division. AICHE Meeting. 2pm, Rm 12-124.

MIT Department of Civil Engineering: Its Underlying Philosophy in a National Perspective* - Frank E. Perkins, acting department head; William A. Little, constructed facilities division head; Donald R. F. Harleman, Ford Professor of Engineering, water resources & environmental engineering division head; Joseph M. Sussman, transportation systems division head. MIT Student ASCE & Chi Epsilon Seminar. 3pm, Rm 1-190. Refreshments.

The Seventeenth Century: Galileo, Descartes, Leibniz, Spinoza and Newton** - I. Bernard Cohen, history of science, Harvard University. Humanitas, an Evolving Perspective on Technology & Culture Seminar. 4pm, Rm 9-150.

Modeling and Analysis of Injection Molding** - Musa Kamal, chemical engineering, McGill University. Mechanical Engineering Polymer Processing Seminar. 4pm, Rm 37-187. Coffee 3:45pm.

Nitric Oxide Formation in Gas Turbine Engines: A Theoretical and Experimental Study* - Thomas Mikus, G. Mechanical Engineering Seminar. 4pm, Rm 3-343.

The Regression of a Dichotomous Variable* - William DuMouchel, statistics, University of Michigan. Mathematics Seminar. 4pm, Rm 2-338. Refreshments 3:30pm, Rm 2-349.

Necessary and Sufficient Conditions that Frost and Kailath's Innovations Conjecture Hold* - V.E. Benes, Bell Labs. Control & Communications Seminar. 4pm, Rm 39-400.

Experimental and Theoretical Study of NOx Formation in Gas Turbine* - Tom Mikus, G. Thermal-Fluids Seminar. 4pm, Rm 3-343.

Friday, November 15

The Dimensions of the Railroad Problem* - A.S. Lang, assistant to the president, Association of American Railroads. Center for Transportation Studies Seminar. Buffet 12n (\$1), lecture 12:45pm (free) Stu Ctr Mezzanine Lge.

Three-Dimensional Natural Convection in Glass Furnaces* - N. Curlet, G. Chemical Engineering Seminar. 2pm, Rm 10-105.

Civil Aviation Development in Africa* - E.R. K. Dwemoh, Director of civil aviation, Ghana. Flight Transportation Laboratory Special Lecture. 2:30pm, Rm 35-225.

Fate of Fuel Nitrogen* - J.H. Pohl, G. Chemical Engineering Seminar. 3pm, Rm 10-105.

Talks on IAESTE* - An organization which provides on-the-job training abroad for students of engineering, architecture, agriculture and the sciences during the summer. Foreign Study Office Seminar. 4pm, Rm 37-252.

Solid State Studies with Energetic Ion Beams* - W.L. Brown, Bell Laboratories. Materials Science Colloquium. 4pm, Rm 9-150. Tea 3:30pm.

Stability and Change: Scepticism, Authority, and the Enlightenment* - Otis Fellows, Columbia University. Crossroads Lecture Series. 4:30pm, Rm 14E-304.

Monday, November 17

Planning in the Arid Zones* - Gideon-Cyrus M. Mustiso, Department of government, University of Nairobi. CIS Seminar. 12n, Rm E53-482.

Long Range Transport of Air Pollutants and Acid Precipitation* - Jack Nordo, Meteorological Institute, Oslo, Norway. Meteorology Seminar. 2pm, Rm 54-100.

Digital Control in Nuclear Reactor Systems* - P. Nicholson, Draper Laboratory. Nuclear Engineering Seminar. 3:30pm, Rm NW12-222. Coffee 3pm.

Extreme Environments for Blacks* - Dr. Chester M. Pierce, Faculty of Medicine & Graduate School of Education, Harvard University; visiting psychiatrist, MGH; psychiatrist, MIT Medical Department. Minority Graduate Student Advisory Committee Lecture. 3:30pm, Stu Ctr Mezzanine Lge.

A Method for Extremal Set Theory* - Da-Lun Wang, mathematics, University of Kentucky. Applied Mathematics Colloquium. 4pm, Rm 2-338. Coffee 3:30pm, Rm 2-349.

Recent Developments in Hot Forging* - Sulekh Jain, Wyman Gordan Company, Worcester, Ma. Mechanical Engineering Seminar. 4pm, Rm 3-133. Coffee 3:30pm, Rm 1-114.

Radiation Standard-Setting: Some Analytical and Legal Issues* - Michael S. Baram, civil engineering. Ralph M. Parsons Laboratory for Water Resources & Hydrodynamics Seminar. 4pm, Rm 48-316. Coffee 3:45pm, Rm 48-410.

Tuesday, November 18

Education and Social Change in Malaysia* - Chai Hon-Chan, University of Malaysia in Kuala Lumpur, visiting fellow, Harvard. CIS Seminar. 12n, Rm E53-482.

Unsteady Cavity Flows* - Patrick Leehey, Naval architecture, applied mechanics. Applied Mechanics Seminar. 3pm, Rm 3-133. Coffee 4pm, Rm 1-114.

Identification by Measurement Filters with Applications to Submerged Craft* - V.J. Jain, University of Southern Florida. Control & Communications Seminar. 4pm, Rm 39-500.

High Order Search Methods for Solving an Equation* - W.L. Miranker, IBM. Operations Research Center Seminar. 4pm, Rm 24-121.

Critique of ERDA's National Plan* - David J. Rose, nuclear engineering. Energy Assessment Group Seminar. 4pm, Rm 26-210.

Materials Engineering in Advanced Solar Collectors* - John M. Woulbroun and George Mather, Owens-Illinois Corporate Technology Center. Materials Science & Engineering Seminar. 4pm, Rm 4-270 Coffee 3:30pm, Rm 8-314.

Galaxy Classification and Galaxy Evolution* - Sidney van den Bergh, University of Toronto. Astrophysics Colloquium. 4:15pm, Rm 37-252. Refreshments 3:45pm.

The Biography of the B Cell* - Norman Klinman MD, pathology, University of Pennsylvania School of Medicine. Biology Colloquium. 4:30pm, Rm 6-125. Coffee 4pm, Bldg 56, 5th fl vestibule.

Women and Feminism* - Laura Shapiro, columnist for Real Paper. SACC Social Issues Forum. 7:30pm, Stu Ctr West Lge.

Wednesday, November 19

Phase-Monitored Inspection* - Kim Stelson, G. Mechanical Engineering Systems & Design Division Seminar. 12:05pm, Rm 3-465. Bring lunch, coffee & tea provided.

The Interaction Between Internal Waves and Microstructure in IWEX* - Terry Joyce, WHOI. Oceanography Sack lunch Seminar. 1pm, Rm 54-611. Bring lunch, coffee available.

Introduction to the Formats and Protocols of SNA - Part I* - T.F. Piatkowski, IBM. Control & Communications Seminar. 4pm, Rm 39-500.

Evaluation of Combined Thermal Storage Pond-Dry Cooling Tower Concept* - E. Guyer, G. Nuclear Engineering Doctoral Seminar. 4pm, Rm NW12-222.

Problems in Recording and Reproduction of Sound* - Amar G. Bose, electrical engineering. WTBS & Boston Section, AES Lecture. 8pm, Rm 10-250.

Uncovering Traditions of Jewish Art* - Suzanne Goldstein. Hillel Lecture. 8pm, Stu Ctr Mezzanine Lge.

Thursday, November 20

Time-Space Evolution on Nonlinear 3-Wave Interactions in a Plasma* - Allan Reiman, RLE research staff. Plasma Theory Seminar. 11am, Rm 36-261.

A Pedestrian Viewpoint of Speckle Interferometry* - David Korff, University of Lowell. EE&CS Seminar. 2pm, Rm 36-428.

US Airline Field Management in the West and in the USSR* - Erastus Corning III, managing director for the United Kingdom, Pan American World Airways. Flight Transportation Special Lecture. 3:30pm, room to be announced.

Glass Filled Polypropylene: Rheology and Processing** - Lawrence R. Schmidt, General Electric, Corporate R&D Center. MIT-Industry Polymer Processing Program Seminar. 4pm, Rm 37-187. Refreshments.

Introduction to the Formats and Protocols of SNA* - T.F. Piatkowski, IBM. Control & Communications Seminar. 4pm, Rm 39-500.

The Potential of Coal Burning Diesel Engines* - John Appleton, vice-president of Thermo Electron Corp; lecturer, mechanical engineering. Mechanical Engineering Thermal Fluids Seminar. 4pm, Rm 3-343.

The Philosophes and the Dilemma of Utopia** - Frank E. Manuel, Kenan Professor of History, New York University. Humanitas, an Evolving Perspective Seminar on Technology & Culture. 4pm, Rm 9-150.

Matter-Antimatter Symmetry in the Universe* - Hannes Alfven, University of California at San Diego. Physics Colloquium. 4:15pm, Rm 26-100. Refreshments 3:45pm, Rm 26-110.

Romanticism in 19th Century German Song* - Rufus Hallmark, humanities. Crossroads Lecture Series. 4:30pm, Rm 4-160.

The Use and Future of Solar Energy* - Peter Glasser, Arthur D. Little Inc. Energy and the Environment Seminar sponsored by Lowell Institute, New England Aquarium and MIT Sea Grant Program. 7pm, New England Aquarium Auditorium. Free.

Meditation - the Missing Peace* - Sponsored by Withyou Club. Introductory discussion of experiencing inner peace through constant meditation. 7:30pm, Rm 3-133.

Friday, November 21

An Investigation of Mass Transfer in Packed Beds in the Presence of a Downward Cocurrent Gas-Liquid Flow* - M.W. Van Eck, G. Chemical Engineering Seminar. 2pm, Rm 10-105.

Heat Transfer Aspect in Glass Melting Tank Furnace* - K. Won, G. Chemical Engineering Seminar. 3pm, Rm 10-105.

Cultural Change in India* - M.N. Srinivas, Institute of Social and Economic Change, Bangalore, India. Joint Harvard Anthropology & CIS Seminar. 3:30pm, Rm E53-482.

Low Megavoltage Electron and X-Ray Beam Therapy* - Kenneth Wright, High Voltage Research Lab. Nuclear Engineering Biomedical Applications of Radiation Seminar. 3:45pm, Rm NW12-222. Coffee 3:30pm.

Community Meetings

MIT Club of Boston* - Frank Press, Robert R. Shrock Professor of Geophysics, 1975 James R. Killian Faculty Achievement Award recipient, head of Earth & Planetary Sciences, will speak on "What's New in the Study of the Earth?" **Thurs, Nov 13, 12:15-1:30pm, Aquarium Restaurant, 100 Atlantic Ave, Boston. Cost: \$4.25, payable at door. Reservations: Ms. Kiarats, x3-3878.**

Pot Luck Brunch** - Sponsored by Association for Women Students. Open to everyone, come meet women faculty & staff & each other. Men welcome. **Sun, Nov 16, 11am, Rm 3-310. Please bring yourself, a friend, something good to eat.**

No Inflation in China Today* - Slide show and discussion by Hanson Wang, Harvard Law School. CSC series on China Today. **Sun, Nov 16, 7:30pm, Rm 3-133.**

Sophomores: Class of '78 Meeting - **Sun, Nov 16, 8pm, Stu Ctr Rm 400.** Discussion of class ring (company, design, etc). What do YOU want? Send ideas &/or attend meetings. Refreshments. Sophomores only. Next meeting: **Sun Nov 23.**

Women's Forum*** - **Mon, Nov 17, 12n-1:30pm, Rm 37-252,** open to members only. Slide show on women's gynecological health and talk on GYN services available through MIT medical Department presented by Helena McDonough, nurse/midwife. Refreshments.

MITRHS** - Organizational meeting for new poetry/fiction/art magazine **Tues, Nov 18, 7:30pm, Rm 14N-311.** All interested members of community encouraged to attend.

TWO Meeting - Meeting with Joyce Chen **Wed, Nov 19, 7:30pm, Rm 10-340.**

Parent's Discussion Group** - Dr. Lora Tessman, psychologist, Medical Dept, will speak on toilet training and toddlers. **Thurs, Nov 20, 12:30-2pm, Rm 10-340.**

Sunday Brunch* - Rabbi Jack Reimer will speak on "Jewish Reflections on Death." **Sun, Nov 23, 11am, Rm 10-105. Cost: \$1.25 Hillel members, \$1.50 others.**

The Wives Discussion Group** - Led by Myra Rodrigues, social worker; Charlotte Schwartz, Sociologist and Carol Hulsizer. **Coffee. Babysitting in Stu Ctr Rm 473.**

MIT Diet Workshop** - **Thurs, 12n-1pm, Stu Ctr Rm 491.**

Wellesley Events

MIT Festival Jazz Ensemble* - **Sat, Nov 22, 8:30pm, Wellesley College Schneider Center.** Halbert White Quintet, composed of FJE members, will also perform.

Social Events

Inter-Collegiate Disco Night* - Sponsored by MSA. **Dancing.**

Refreshments. Sat, Nov 15, 8:30pm, Burton Hse. Admission \$1 in advance, \$1.50 at door. Info: x5-6129 Dorm.

at's Rat - Sat, Nov 15, 8:30pm, Sala. Light & dark beer, 1/2 oz/\$.25. Wine available. Live announcer & records by WTBS. Free, college ID required.

Hour Coffeehouse* - Enjoy relaxing conversation, piano playing, games, inexpensive food, candy & drinks. Open 24 hours a day, 7 days per week, Stu Ctr 2 fl lge.

er 30's Singles Club - Lunchtime meeting in Stu Ctr East Lge. Small dining room off Lobdell) Fri, 12:30-1:30pm, New members always invited. Alice, x3-3400 or Marty, x8-1206 Draper.

Movies

heological Behavior of Fluids* - Fluid Mechanics Film. Wed, Nov 2, 4pm, Rm 39-400. Free.

ncient America Speaks* - Sponsored by Latter Day Saint Student Association. Thurs, Nov 13, 7:30pm, Stu Ctr Rm 491. Free.

he Conversation** - LSC. Fri, Nov 14, 7 & 9:30pm, Rm 26-100. Admission \$.50, ID required.

essione (Visconte)* - Film Society. Fri, Nov 14, 7:30 & 9:45pm, Rm 6-120. Admission \$1.

he Fly** - MidNite Movie. Fri, Nov 14, 12m, Sala. Free, ID required. Bring blanket.

awrence of Arabia** - LSC. Sat, Nov 15, 6 & 10pm, Rm 26-100. Admission \$.50, ID required.

noon* - Sangam. Indian movie with English subtitles. Sun, Nov 6, 2:30pm, Kresge. Admission free with ID.

he Ipcess File ** - LSC. Sun, Nov 16, 6:30 & 9pm, Rm 26-100. Admission \$.50, ID required.

ayboy of the Western World* - Humanities Film Series. Mon, Nov 7, 7pm, Rm 10-250. Free.

avitation; Waves in Fluids* - Fluid Mechanics Films. Tues, Nov 8, 4pm, Rm 39-400. Free.

osferatu (Murnau)* - MIT Film Section. Tues, Nov 18, 7pm, Rm 21-013. Free.

The Working Class Goes to Heaven (Elio Petri, 1951)* - Cities on Film Series (Milan & Rome) sponsored by Undergraduate Urban Studies Program. Tues, Nov 18, 7pm, Rm 7-431. Free.

Tom Jones* - Humanities Film. Tues, Nov 18, 7pm, Rm 26-100. Free.

avitation; Waves in Fluids* - Fluids Mechanics Films. Wed, Nov 19, 4pm, RM 39-400. Free.

The Odessa File** - LSC. Fri, Nov 21, 7 & 10pm, Rm 26-100.

Admission \$.50, ID required.

The Passenger (Mumk)* - Film Society. Fri, Nov 21, 7:30 & 9:30pm, Rm 6-120 Admission \$1.

Murders Row* - MidNite Movie. Fri, Nov 21, 12m, Sala. Free, ID required. Bring blanket.

What's up Doc?*** - LSC. Sat, Nov 22, 7 & 9:30pm, Rm 26-100. Admission \$.50, ID required.

Aaina* - Sangam. Indian movie with English subtitles. Sun, Nov 23, 2:30pm, Rm 26-100. Admission \$.50.

Arsenic and Old Lace** - LSC. Sun, Nov 23, 6:30 & 9:30pm, Rm 26-100. Admission \$.50, ID required.

Lobby 7 Events

All Old New England Concert* - Jack Perron, flute and fiddle. Wed, Nov 12, 12n. Free.

MIT Sunset Happening* - Stonehenge at MIT. Weather permitting, the sun will go straight down the main corridor when setting. Wed, Nov 12, 4:20pm.

The Pavorian String Quartet* - Thurs, Nov 13, 12n. Playing Mozart & Dvorjak.

Music

Noon Hour Concert Series* - Mark Kroll, harpsichord. Thurs, Nov 13, 12n, Chapel. Free.

Carnatic Vocal Music Concert* - Sponsored by Sangam. T.V. Sankaranarayanan, vocal; M. Chandrasekaran, violin; T.K. Murthy, Mridhngam. Sat, Nov 15, 8pm, Stu Ctr Mezzanine Lge. Admission \$3. \$2 w/college ID.

Alban Berg Quartet* - Sponsored by Music Section. Wed, Nov 19, 8pm, Free. Info: x3-3210.

No Dogs Allowed* - Noon Hour Concert Series. Ray Jackendoff & Steve Umans, clarinet; Tom Stephenson, bassoon; performing pieces by Mozart, Francaix & Beethoven. Thurs, Nov 20, 12n, Chapel.

Chamber Music Society Concerts* - Wed, 5:15pm, music library, Bldg 14E.

Theatre and Shows

Armageddon - A Vegetarian Hand Grenade in Four Acts* - Science Fiction radio play performed 'live' by the East Coast Karmic Annex. Sponsored by Withinyou Club. Mon, Nov 17, 8pm, Rm 26-100. Free. Mort Jones, 738-8883.

An Evening of One Act Plays* - MIT Dramashop performing Home

Free, by Lanford Wilson, and Interview, by Jean Claude van Itallie. Fri & Sat, Nov 21 & 22, 8pm, Kresge Little Theatre. Free. Coffee hour & discussion following.

Celebration* - MIT Musical Theater Guild production. Thurs-Sat, Nov 13-15, 8pm, Kresge. Tickets \$3.50, \$2.50 with ID. Reservations, x3-6294, or Bldg 10 Lobby.

Dance

MIT Folk Dance Club Workshop - Cesto will be taught by Dave Skidmore. Sun, Nov 16, 1-5pm, Sala. Free.

MIT Folk Dance Club* - **International:** beg-intermed Sun, 7:30-11pm, Sala. **Balkan;** advanced Tues, 7:30-11pm, Stu Ctr Rm 491. **Israeli:** all levels Thurs, 7:30-11pm, Sala. **Easy International:** Fri, 12n, Kresge Oval of Bldg 7 Lobby, depending on weather.

Exhibitions

Creative Photography Exhibit* - Works by Abe Frajndlich & Mark Orlove. Exhibit thru Tues, Nov 18. Hours: 10am-10pm.

Faculty Club Exhibit* - Lithographs and photographs by Deborah Dyer, daughter of Professor Ira Dyer, head of Ocean Engineering, Nov, Mon-Fri, 9am-11pm, 6th fl Faculty Club.

Creative Photography Lab Exhibit* - Works by Melissa Shook on exhibit beginning Fri, Nov 21, thru Dec. Hours: 10am-10pm.

Otto Piene: Paintings, Gouache, Drawings* - Works by the director of MIT's Center for Advanced Visual Studies. Exhibit divided into 3 locations: paintings, Hayden Gallery; gouache, Hayden Corridor Gallery; drawings, CAVS. Fri, Nov 7-Sun, Dec 7. Hours: Hayden, 10am-4pm daily, Tues evg 6-9pm; CAVS; Bldg W11, Mon-Fri, 9am-5pm. Free.

MIT Historical Collections* - Permanent exhibition Mon-Fri, 9am-5pm, Bldg N52, 2nd floor. **Bicentennial Exhibit:** Katharine Dexter McCormick, '04, exhibit in Bldg 4 corridors.

Schumann at Work on a Song* - Music Library exhibit of manuscript facsimiles & pictures. Daily, Bldg 14E.

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.

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

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

Send notices for November 19 through November 30 to the Calendar Editor, Room 5-111, Ext. 3-3279, before noon Friday, November 14.

Rate Increases, Inflation Hit MIT Telephone Bill—Hard Edwards Appointed By Alumni

MIT's telephone bill will be up \$300,000 this year as a result of the 15 percent across-the-board rate hike that will take effect later this week plus inflation and increased usage according to Morton Berlan, director of telecommunications.

And, he said, if restraint is not used, the overall cost could easily jump to \$2.8 million instead of the projected \$2.3 million. The increase, authorized by the state Department of Public Utilities, will increase the revenue for the New England Telephone Company by more than \$90 million.

This increase, he said, was preceded by an 11.5 percent increase in

intrastate rates in September 1974 and a 25 percent increase in interstate rates in March 1975.

"For example," Mr. Berlan said, "the rate of a long distance call to Washington, D.C. went up 20 percent if dialed direct and 36 percent if operator-assisted."

MIT's long distance charges last month, he said, were \$13,180.00 higher than in Oct. 1974. An analysis of September's statistics shows that 3,006 more calls were made this year than in Sept. 1974. The extra dialing cost MIT an increase of \$14,560.00.

Although there has been a definite decline in the number of telephone lines being used by MIT persons the

resulting drop in equipment costs does not reflect the inflationary increases in the cost of service over the past year. For example, between July and October of this year, the number of telephone lines and instruments in use dropped by 76, resulting in a reduction in monthly equipment costs of about \$1200.00.

These positive indicators, on the other hand, are outweighed by the rise in toll calls, Berlan said. As a measure of moderation, he suggested that users think before dialing and keep their calls short instead of using "hold" buttons while collecting information for long distance callers. He also encouraged use of MIT's

direct telephone tie-lines to local institutions, which, if used, do not result in a call charge.

In other efforts to reduce future toll costs, the Office of Telecommunications will initiate a two-fold call processing system next spring, Berlan said.

Two major goals of the new plan will be to give Class A telephone users an additional reduction in direct dialed long distance calls and later to give Class B users the same capability. The elimination of nearly all credit card calls will be a secondary feature of the plan, which could save MIT up to \$100,000 a year, according to Berlan.

Equally important, he said, would be the habits of "thinking before dialing," not making personal calls, and using tie-lines whenever possible. A map of the tie-lines is shown at left.

Joseph A. Edwards, MIT '72, has been appointed regional director of the MIT Alumni Association for southeastern states.

Mr. Edwards is one of five regional directors named by the alumni association in a new staff organization designed to improve support of many MIT activities carried on by alumni outside Cambridge.

Mr. Edwards received his SB in political science from MIT and a JD in 1975 from Yale Law School. He has just passed the Massachusetts bar exam. From 1973-75 he was legal advisor to the Chief of Yale University Police, providing advice on policy decisions and their implementation, on officer training and evaluation. He also has been assistant professor of criminal justice and political science at the University of New Haven, West Haven, Conn., for the past two years. He lives in Watertown.



Women's Teams Seek Advisors

MIT's women's athletic department is currently seeking MIT faculty and staff members to serve as advisors for its varsity teams and clubs.

The purpose of an advisor is to provide support for the individual teams and give team members a person with whom they can talk. The only prerequisite for becoming an advisor is an interest in the sport.

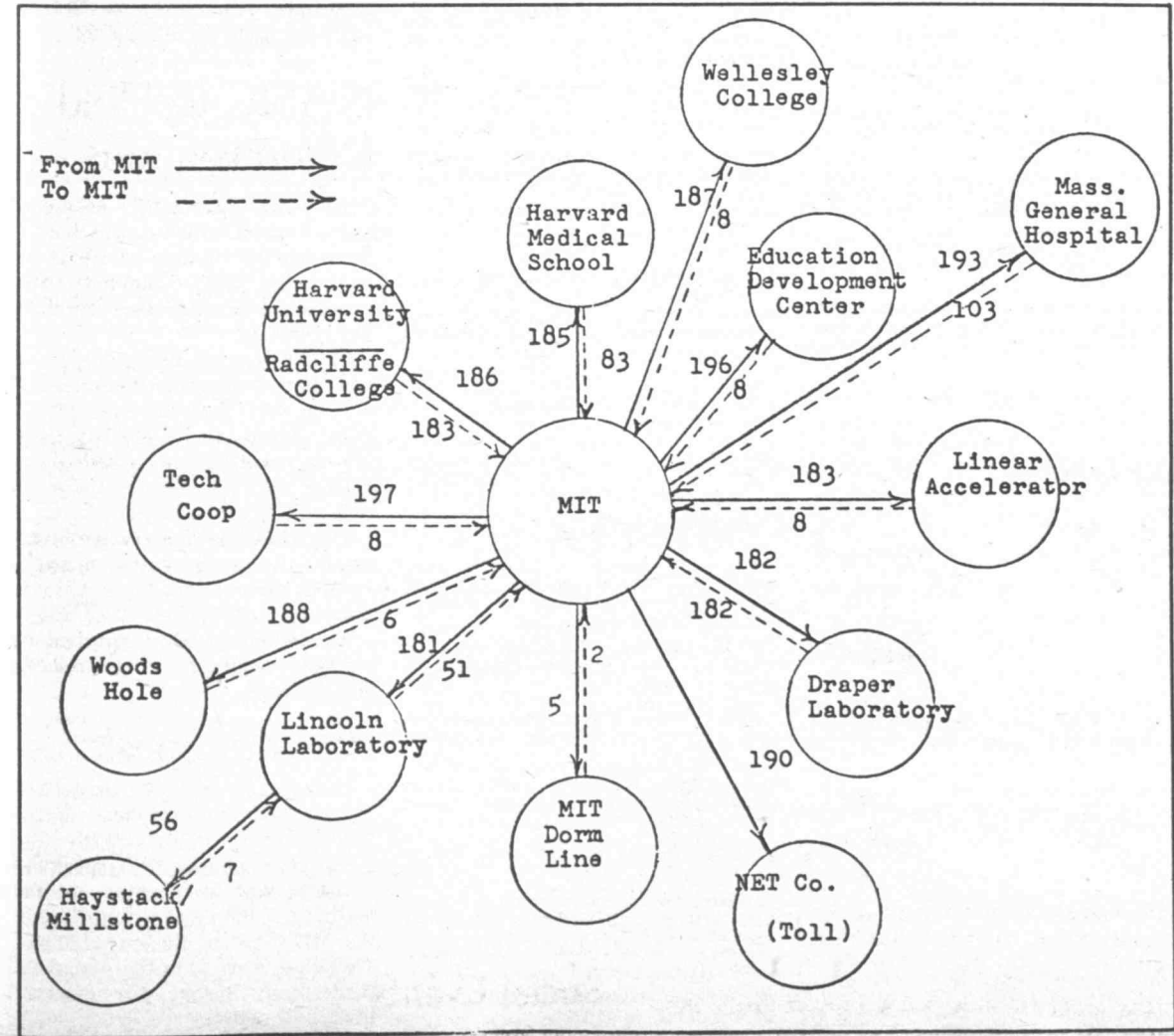
In addition to being an added spokesperson for the team, the advisor will help to provide additional communication between the Institute and the students.

At present, MIT women's teams include: tennis, crew, gymnastics, volleyball, basketball, fencing, sailing, swimming and softball. The basketball team has an advisor, Joyce Bowden, a staff writer in resource planning.

Anyone interested in becoming an advisor should contact Mary Lou Sayles, director of women's athletics, x3-4920, Patrice Desvigne, dorm line 8671 or Pat Schettig, 628-7471.

Pierce to Speak

Dr. Chester M. Pierce, professor of education and psychiatry at Harvard and a psychiatrist in the MIT medical department will speak on "Extreme Environments for Blacks," Monday, Nov. 17, at 3:30pm in the Student Center Mezzanine Lounge. All are welcome to attend the talk sponsored by the Minority Graduate Student Advisory Committee and John B. Turner, assistant dean of the Graduate School.



CLASSIFIED ADS

For Sale, Etc.

Ads are limited to one per person per issue and may not be repeated in successive issues. All ads must be accompanied by full name and Institute extension. Only Institute extensions may be listed. Members of the community who have no extensions may submit ads by coming in person to the Tech Talk office, Room 5-111, and presenting Institute identification. Ads may be telephoned to Ext. 3-3270 or mailed to Room 5-105. Please submit all ads before noon, Friday, Nov. 14. They will be printed on a first come first served basis as space permits.

Lg, comf solid oak desk, 9 drwr, dark color, \$150. Chuck, x3-6032.

Canon F-1 w/Minolta 38mm f2.8 wd angle lens, 2X converter w/cs, flash coupler, leather case for camera, side strap, exc cond, must sell, \$375. Barry, x3-5358.

Stud snows w/rims, ample tread, 8.25x15, \$20/pr. Fisher, x3-5571.

Marantz 2270 stereo revr. 70+ w/ch, 2 1/2 yrs, orig packing & manual, \$275 or best. Tom, 782-7689.

Slide-rule calc, Texas Instr SR-50, \$71.99. Richard, 876-0950, evgs.

Rock'n'roll, rare tapes, Joni Mitchell, James Taylor, Neil Young, etc. Gary, 494-8234.

Trunks, 2, 20"x36"x12", \$10/ea; fluor desk lamp, \$10. x3-3696.

Graph paper, rectangular semi-log & data sheets, Coop price \$0.06-\$0.10/sheet, \$0.04/sheet. Lanny, x3-5812, kp try.

Rnd dining tbl w/4 chrs, \$50; shlvs, \$25; sgl bed w/matt & cover, \$30; chest drwr, \$15; punch bowl set, \$30. Call, 661-9738.

Movie camera, sgl 8 Fujica Z450, nvr used, yr grnty, 4:1 zoom, var shutter, unlmtd backwind, great f spec effects, access, discount retail \$160, \$100 or best. Call, 723-8278, evgs.

Principia Mathematica, by Russell & Whitehead, 3 vols, b nw, ask \$50. Joe, x3-2529.

Slide rule, Post-Versalog 2. Celeste, x5-8686 Dorm, lve msg.

Heathkit AR-15, 50W/ch, \$250 or best. Alan, 354-0105, evgs & wknds.

Port GE b&w TV, Instaview, v gd cond, \$50. Manoel, x3-6631.

Hammond organ, M2, cstm chopped cabinet, w/leslie 147, preamp, etc. \$700. Mike S, 247-8275.

M leather coat sz 38, hrdly worn, nw \$100, \$38; f rabbit jckt, almost nw, \$68. Call, 494-0370, aft 6pm.

Peugeot PX-10E bike w/Campagnuolo front & rear derailleurs, perf cond, \$280 or best; Yamaha folk guitar, exc cond, \$50. x5-6512 Dorm, evgs.

Antique cherry vanity; '20's DR wmt fur incl tbl w/lves, 6 chrs (1 cptn); buffet; china cab, gd cond; pullman sofa, slps 2. Call, 266-9098, evgs.

Stacked TV tbls, b nw, blk w/eagle, \$25; rattan end tble for porch, \$20/pr; blu blk elec blnkt, sgl switch, \$10. Pat, x3-2603.

Ovenproof dishes, 8 pl set & serving pces, atrac deep blu & wht contemp pattern, \$15. Richard, x3-6153.

Wd K tbl & 5 chrs, \$30; 9x12 gold rug, \$50; 3 TV trays, \$5. x8-2185 Draper.

TV, 17" b&w, \$25. Bruce Wedlock, x3-4895.

Membership in Tech Aero Club, plan 180. Craig, x3-6893.

Advent spkrs, sm & lg, b nw, full wrnty, lowest prices in Bos. Carol, x3-4710.

Pr A78x13 (6.00x13) ww snows mtd Ford Pinto rims, also fit Mustang II, used 4 mos, \$50/pr or \$40/tires & \$10/rims. Dick Orr, x7386 Linc.

Garrard 40B trntbl compl w/Pickering ctrtdg & nw stylus, \$18. Alan, x3-4218.

Pr E78x14 mtd Sears Dynaglas snows, hrdly used, \$20. Howie, x3-2280.

Sofa, beaut contemp, lk nw, 84", all herculon, \$120. dinette set w/42" rnd chrome pedestal tbl, formica top, 4 mtch chrome swivel chrs w/vinyl seats, \$75. Call, 494-0432.

Leitz Focomat Ic w/50 mm f4.5 Focotar, present list approx \$750, ask \$250. Ed, x7448 Linc.

Pr mtrcycl helmets & chn, \$30. Call, 661-8440.

Empire sofa, nwly refinished & re-uphol; Victorian secretary; Eng oak Vic court cupboard. Alan, x3-6279.

Hart skis, 190 cm, Look-Nevada bndgs, \$75. Call, 494-8886.

Phillips 3 spd f bike w/side bsks, \$50; go-cart, fair cond, runs well, \$65. x8-1566 Draper.

IBM elec typwrtr mdl C, \$175; Sony amfm radio w/cassette, \$60; 14,000 BTU AC, \$100; Ntnl 88 sw radio, \$50; port typwrtr, \$30; fan, \$10; Pitney Bowes postage mach 6800, \$15. Patil, 494-0390.

Mtd snows for BMW 2002, \$25/ea or best. Frailey, x3-4974.

Tektronix 465/DM43 oscilloscope zoom Hz. Alan Goldberg, x3-1708.

Pr blkwall 4 ply tires, 7.35x15, replaces 6.50x15, deep tread, \$5/ea. John Golis, x182-183-201 Bedford Fl Facil.

Doors, 2 exc cond, w/parts of glass in upper half, 78x30 w/hinges. Call, 965-3257, evgs.

Girl bike, Chiora 5 spd 23", 1 1/2 yrs, exc cond except for left pedal, perf for enthusiastic bike mechanic, \$45 or best; wtrbed htr, \$12.50. x3-7187.

Ski boots; La Dolomite Sintesi m sz 9M, used 1 sea, \$80; Le Trappeur f sz 10N, gd for beg, \$25; nego. Linda, x3-2030.

Reclining chr, gd cond, \$10 or best. Sam, x8-3686 Draper.

Used gas K stove w/oil heater in exceptionally cln & gd cond, \$75. JK, x8-3235 Draper.

Pr Michelin X snows, 1.65x15, mtd rims for 122 Volvo. Call, 862-8690.

Den set, 3 pc Naugahyde leath, sofa becomes bed, best. x8-3844 Draper.

Snows, BR78x13 Frstn T&C WW radials, used 2,925 mi. John, x3-2869.

Rosemont ski boots, blk, sz 8 1/2 w/xtra packs, exc cond, \$40 firm. Al, x7844 Linc.

Cntr-top broiler oven w/rotisserie nrly nw, exc cond, \$35. Call, 484-0802, aft 1pm.

Pr '68 Mustang 4 lug whls w/mtd tires, \$12. Carl, x3-2250.

Set golf clubs, 2 iron thru wedge & bag, \$5. Phil, x8-3629 Draper.

Moving, selling many K & hsehold items, linens, bedding, clothing, misc. Call, 453-2491.

B&H 9820 slidecube proj, 50 cubes, \$75; dbl-gourd sitar & case, \$250. Aldrich, x3-5360.

Wntr clothes: some dresses, slacks, p suits, ski clothes, coats, swtrs, sz 10-14. Susan, x3-4006.

Vivitar autozoom lens, 85-205 mm, Canon FD mnt, \$125. Marko, x3-6903.

Pr G78x15 stud belted Delta snows, under 1 k, mtd & blncd on GM 15" rims, \$50. John, 494-8646, aft 6pm.

Pr HR78x15 dynaglas radial stud snows, used 1 seas, exc cond, \$85. Debbie, x8-4419 Draper.

Pioneer hdpphones, SE-L401, \$25. Neal, 661-8240, evgs.

GE 12 cu ft refig, 29 1/2" W, 24" deep, 59" hi, \$50. Maureen, x3-3406.

Navy MK 4 6 man life raft, nvr used, any offer accepted. Stan, x3-5484.

All mpl wd dining or K tbl, 6'3", 2 lves exc qual, ask \$65. Per, x3-3920.

Solid wd 3x5' tbls, 2, 2 drwrs ea, \$30 & \$40; icebox/sink unit for camper, \$35; 2 elec typwrtrs, \$40/ea; 2 elec add machs, \$25 & \$35. Call, 321-2737, aft 4pm.

Waterbed frame, 6'x7'x8", finished, nvr used, \$15 or best. x3-7920.

Hide-a-bed sofa, perf cond, bge, \$80; Panasonic port stereo, AC/DC, \$35. Sia, x3-3911.

Bubble gum machines, 35, all nw, only \$15, come see in Rm 20C-007. Bill, x3-2503.

Eng recreational forglas kayak, spray skirt, paddle, life vest, used twice, \$200. Cara, x3-4076.

Wd bkese, 4 shlvs, 3' W, 4' hi, gd cond, \$20. Lou, x3-6610.

Mpl dinnette set, 42" diam tbl w/10" leaf, formica top, 4 cptn chrs, exc cond, \$75. Paul Menadier, x3-4211.

Stereo equip, 25-50% off most brands, full wrnty & grnty. Bob, x3-4242.

Blk kangaroo suede coat w/wht mink trim, lk nw, sz 14, \$75; red suede fringed poncho, \$15. Jane, x8-3386 Draper.

Shure vocal mstr spkr column; 70 W Scott amp; rocking horse; folding cots. Paul, x8-1357 Draper.

Pr 5.60x15 VW stud snows on rims, yr old, best. Ed, x3-3854.

Vehicles

'63 Rambler, run cond, nds int work but bd body, \$175 or best. Sarah, x3-3112.

'64 VW bug, selling parts, eng, transaxle, doors, fndrs, ft & rear deck lids, windshield, bumpers, etc. x8-3379 Draper.

'65 Dodge wgn, ac, body exc 70 K, \$300. Call, 891-4940, aft 6.

'65 Pont, auto, p st & br, exc run cond, nw tires, extra cln, \$300 or best. Stan, x3-1638.

'65 Dodge Dart GT, dependable, gd mpg, sgl ownr, some body rot & poor driver's seat, \$200. Ken x108 Linc.

'67 Chevy Impala, hi mileage but runs well, b nw exh, \$100. Randy, x3-6022.

'67 Old Delmont, gd eng, nds some work, \$225. Jan, x7174 Linc.

'67 Olds Delta 88, ac & all power, \$650. Ken, x3-4426.

'67 Merc Park Lane, 90 K, auto, 4 gd tires & 2 snows, runs, nds valve work, \$200. Lund, x3-1666.

'68 GMC Handivan, blu, auto, 6 cyl, closed end type, nw tires, lo miles, amfm stereo, bit in tape deck, \$1,150. Herman, x3-5708.

'68 Chrysler Newport, 4 dr, ac, gd cond, must sell, \$895 or best. x3-3873.

'68 Olds, 4 dr sed, p st & br, tinted wndshld, postraction rear end, 4 nw tires, exc run cond, ask \$1,000. Call, 396-5339, aft 6pm.

'69 VW bug, 72 K, radials, nw muff, \$850. Call, 484-6392.

'70 Maverick, 6 cyl, std, 53 K, runs well, gd on gas, \$850 or best. Tom, 876-5447.

'71 Ford Pinto, 30 K, \$1,000; Kenmore gas stove, 10 yrs, \$75. Kathy, x3-7360.

'72 Vega Htchbk, 4 tires, 2 snows, gd cond, \$1,300. Call, 494-8154, evgs.

'72 Datsun 510, 2 dr sed, amfm radio, tach, exc cond, Ben Dores, x8-2818 Draper.

'72 Pinto, std, am radio, 24 mpg, \$1,600 or best. x3-1855.

'73 Chevelle Laguna, 350 V8, p st & br, vinyl toof, swivel bekt seats, blu ext, exc cond in & out, ask \$2,000. Vicky, x7764 Linc.

'74 MG midget, 12K, exc cond, \$2,700 or best. Judy, x414 Linc.

Housing

Allston, 2 BR apt for rent nr Comm Ave, 1/2 blk T, LR, mod K & B, back porch, avail 12/1, \$245 incl ht & hot wtr. x3-7176.

Camb, attrac 2nd fl furn rm w/Kette, on T bus, \$140 incl ht & util. x3-7138.

Framingham, rent 3 BR ranch w/garage, fenced yard, d&d, washer & dryer, ww, avail immed, 1/2 hr to Bos, \$340. Linda, x3-1590.

Gunstock, 3 BR chalet, use of indr pool, etc, \$210/wk. x8-4415 Draper.

Office suite, 4 rms, ground fl mod office bldg, Mass Ave, Arl Hts, free pkg, \$285 incl util. Call, 862-3760.

Animals

Free kittens, litter trained, beaut. Ross, x3-3224.

Want go home for great dog, yng m mongrel, short hair, mid sz, almost fully trained. Wilson, x3-5121.

Lvg entry, nd loving home for v tame, personable parakeet. Julie, x3-4434.

Lost and Found

Lost: blk m leath billfold, no \$ in it, cards & ident, vety bldg 3. David x3-5110, lve msg.

Lost: 2 notebooks, 18.075 & 18.443, on Oct 31, 10:30, Coop book drop, x3-3357.

Wanted

Apt for 1 month, from 12/19. Paul, x3-2189.

Crtms or drapes, 2 pr, for BR wndws 5'x3'. Steve, x3-6330.

Grad stu wishes to rent apt or hse in Camb area for parents visiting from Eng over Xmas vac. x3-2342.

Ride over Thanksgiving vac to Dolgeville, Utica, Albany or nrby in that order, w/ help w/exp &/or driving. Dan Zwillinger, 547-7894.

Cabin in woods of Vt or NE area week of Xmas-New Years, ski area not necessary. Patty, x3-1606.

Stu apt for f, S End, Camb, Back Bay area, safe nrhnd essential, nr T, can pay \$100-\$150 incl util. x3-4251.

Stereo, amfm stereo radio, trntbl, spkrs, Linda, x3-4669.

Driver(s) to drive car back from Ft Lauderdale to Bos, w/ pay gas + \$50 toward exp. x3-7582.

Refrig, nw or used. Irene, x3-5127.

Help wanted to rewire my hse in Billerica. Rick, x5845 Linc.

Someone to transport 2 snows from Chicago to Bos bef 12/1, w/ pay. Dean Hope, x3-7979.

Cross cntry skier, pref f, for 6 prsn hse nr Sugarbush & Stowe, Vt. Jay, x3-4107.

Stus nded for psych exp w/pay. Pls lve name & nmb w/Judy, x3-6047.

Married grad stus nd apt 1/1-6/1, about \$200/mo. Call p-to-p collect for Karl, 201-582-3213 btwn 6 & 8pm, lve name & number.

Cleats sz 8-9 hcky skates sz 8 1/2-9. x5-8604 Dorm.

Ride to Md Thanksgiving vac, lve 11/24-26, rtn 11/30 w/ share driving & exp. Joel, 547-1420.

Bike, 16" w/training whls. Wren, x3-6722.

HP-35 & HP-45, 1 ea. Jan, x3-7139.

Pr hcky skates sz 10-11; f 3 spd bike. Harry, x3-6061.

Ride nded to & from NYC for Thanksgiving, w/ share exp & driving. Marilyn, x3-1659.

Foreign girl, native Spanish spkr, wd like to exch lite hsework or babysitting for rm & brd w/Amer fam, starting mid Dec. Elaine, x3-3418.

Volunteer readers nded, approx 2 hrs/wk for blind stu in polit sci, on campus. Call, 494-9077.

Roommates

Camb, Exotic Cent Sq, mmate nde, to share 6 rm hse w/2 m, spac, sunny, ww upstairs, sub 1/1 or 2/1, partial furn if nd, \$100 + ht & util. Call, 492-7597.

Radio Astronomy Instrument May Aid Medical Diagnoses

(Continued from page 1)

give as precise information about breast tumors as x-rays.

But unlike x-rays, microwave thermography is suitable for routine checkups: it is both easy and safe. No radiation or probes are sent into the body, so the measurements can be repeated as often as desired without endangering the patient.

"It's no more harmful than taking your pulse," Professor Barrett said.

To measure internal temperatures with a microwave radiometer, one places on the skin a small sensor attached to the radiometer by a cable. The radiometer measures the heat radiated by the internal tissues, in the form of microwaves.

The technique is possible because microwaves can penetrate biological tissues. Just as the microwaves of a microwave oven can penetrate food to cook it, the small amount of microwave radiation generated by the body internally can escape to the skin, from depths of several centimeters.

A similar technique, in which infrared radiation is measured to determine temperatures, is now used by some physicians in detecting breast tumors, Prof. Barrett said.

But "infrared radiation," he said, "originates from a depth so small as to be essentially surface emission."

He hopes that the deeper temperature measurements possible with microwave thermography will detect breast tumors sooner than manual examinations or infrared thermography.

The technique may have other applications: for example, it may be possible to use it to diagnose appendicitis in adults, or to identify regions of the blood vessel blockage by detecting cool areas where blood supply is too low. A cool area in the head may indicate a developing stroke; a cool area in the leg may indicate phlebitis.

But Professor Barrett said that it is too early to evaluate the usefulness of microwave thermography. "Its usefulness is difficult to predict," he said, "because detailed knowledge of the internal thermal structure of the human body is sparse. Extensive clinical evaluation, involving observations at more than one frequency, will be required."

The researchers are measuring body emission at a frequency of 3.3 billion cycles to detect internal breast temperatures of 30 to 40 female patients a week at Faulkner Hospital, under the direction of Dr. Norman L. Sadowsky, chief radi-

F rmmate nded, Bri, \$117.50 incl ht. Cathy, x3-2030.

F rmmate to share lg beaut Camb apt nr H Sq w/3 f, grad stu & 2 working, \$81 + util. Laura, x3-3106.

M or f, 23+, share 5 BR Back Bay apt w/3f, m, Mass Ave nr bridge, 2 mos security, avail now, \$75. Call, 266-5742, evgs.

F to share 3 BR Bos apt nr T & shops, carpet, d&d, pref non-smoker, \$140 incl all util. Call, 426-8032.

Avail 1/20, BR in Tang 20D, unusually nice apt w/nice people. Bent, 494-0364 evgs.

Carpools

Want to join or form carpool Needham-MIT, hrs usually 9-5:30, sometimes sporadic. Dan, x3-3887.

W Hanover to MIT, want to form or join, working hrs 7:30-4:30. Tony, x8-4600 Draper.

Miscellaneous

Wl swap Albany for East. Joe, x3-3815. (Note to swappers: be sure to notify your supervisor & Campus Patrol of sticker swaps.)

Wl babysit full or part time for yng child up to 2 yrs at my Eastgate apt. Call, 494-0046.

Theses, manu, term papers, etc typed on IBM Correct Selec II. Linda, x3-7023.

Cannonball Ski Club wants skiers, skaters, snowshoers, bikers, hikers. Kathy, 876-6177.

Typing, theses, reports, stat, fast & accurate. Jean, x3-7410.

Typing theses, term papers, fast & accurate. Sandy, x3-4342.

Wl type theses, manu, IBM Selec. x3-5115.

Wl type theses, manu, etc, IBM Correct Selec. Carol, x3-4153.

ologist.

Even if the results are unsuccessful, compared to other methods of detecting breast tumors, it could just mean that microwaves of a different frequency—maybe 2 billion cycles, or 6 billion cycles—should be measured.

The choice of frequency is complicated by the fact that low frequencies indicate temperatures at a greater depth, but high frequencies seem to give more precise information about the location of the source of the radiation.

Moreover, Professor Barrett said, "it is almost certain that different medical applications will require different frequencies for optimum results."

Telephone Seminars Set

(Continued from page 1)

Suzanne Keller, professor of sociology at Princeton University, whose research includes the impact of the telephone on the nuclear family, and by Henry Boettinger, director of corporate planning for the American Telephone and Telegraph Co., who has written a personal history of Bell's invention and early entrepreneurial efforts.

Other seminars are scheduled for Jan. 29, Feb. 12 and 26, and March 9-10. All except those in March will be held in the Marlur Lounge from 4-6pm.

Those seminars and their participants are as follows:

Jan. 29—"The Telephone: Usage and Applications": Emanuel Schegloff, professor of sociology, UCLA; David Lester, professor of psychology, Stockton State College in New Jersey and co-editor of *Crisis Intervention*; Paladugu Rao, chairman, Information System Department, Eastern Illinois University.

Feb. 12—"Development of Telephone Service": Charles Perry, professor of history, University of the South; Ronald Abler, professor of geography, Pennsylvania State University; Ithiel de Sola Pool, professor of political science, MIT.

Feb. 26—"Innovation and Diffusion": Colin Cherry, professor of telecommunications, Imperial College, England; Asa Briggs, vice-chancellor, Sussex University, England; Bertil Thorngren, professor of economics, the Stockholm School of Economics.

Mar. 9 and 10—"The Telephone Experience": Martin Meyer, journalist; Alex Reid, head, Long Range Studies Division, Telecommunications Headquarters, British Post Office; John Pierce, professor of engineering, California Institute of Technology; Jean Gottman, professor of geography, University of Oxford, England; John Brooks, author.

NASIC to Hold Demonstrations

The NASIC Search Service, a division of the Libraries, will hold a three-day information bazaar to acquaint the MIT community with computer-aided literature searching and retrieval.

On-line demonstrations of 19 bases containing bibliographic information will be held Thursday and Friday (Nov. 13 and 14) and Monday (Nov. 17) from noon to 5pm in the lobby of Building 10. Free searches and printouts will be given to visitors.

The NASIC Search Service began at MIT two years ago and operates by appointment on a fee-for-service basis in Rm 14SM-48. Hundreds of searches have been performed on subjects ranging from nude mice to solar energy.

Press to Speak

Professor Frank Press, Robert R. Shrock Professor and head of the MIT Department of Earth and Planetary Sciences, will speak on "What's New in the Study of the Earth?" at the luncheon meeting of the MIT Club of Boston, 12:15pm, Thursday, Nov. 13 in the Aquarium Restaurant, Boston. For reservations, call x3-3878.

POSITIONS AVAILABLE

States; requires extensive travel through N.E. Candidate should have a wide familiarity with the Greater Boston business and financial community, a high degree of poise and orientation towards other people, demonstrated initiative and ability to work independently, oral and written communication skill. Familiarity with MIT desirable. A75-26.

Admin. Staff, Area Coordinator/Systems Analyst in the Office of Administrative Information Systems to analyze and resolve user information systems problems. Duties include development of new modified external specifications for computer programs; ensure program testing and release documentation; manual development; interpretation of systems use for client users. Bachelor's degree or equivalent combination of education and experience, plus experience in systems analysis or computer related activities required. A75-64 (11/5).

Spons. Res. Staff, in Nutrition and Food Science to perform assays of brain neurotransmitters, enzymes and amino acids in laboratory of Brain and Metabolism; teach assay methods to students and others; maintain quality control of lab techniques and oversee lab maintenance. Methods used are fluorescence assay, scintillation counting, and spectrophotometry. BS or MS in Biochemistry or related field required. D75-222 (11/5).

Spons. Res. Staff, part-time, temporary, in Earth and Planetary Sciences to assist in mineralogical, chemical study of marine manganese nodules and synthesis of manganese oxide phases. Graduate training in advanced chemistry and mineralogy required. MS in Chemistry preferred. Experience in reflected light optics, electron-microprobe and XRF analyses, chemical synthesis of inorganic oxides and ligand-field calculations of mineral oxide systems desired. 17½ hrs/wk, temporary for 3 months but may be extended. D75-223 (11/5).

Tech Asst IV in Center for Cancer Research to maintain supplies and facilities in animal operating room; sterilize instruments and pipets; assist in preparation of animals for experimentation. High school graduate required; some college training preferred. Must have good manual dexterity and be able to work overtime if necessary. 40 hr. wk. B75-622 (11/12).

Tech. Asst. IV in School of Humanities and Social Science Oral History section. Duties include historical editing and writing, setting up and maintaining document files and indices for oral history projects. Bachelor's degree in history or history of science desirable. Position is full time but can be adjusted to part-time to accommodate selected candidate. B75-596. (10/29).

Tech. Asst. IV, temporary, part-time, in the Psychology Dept. will prepare testing materials, administer tests to 2-16 year old subjects; code and analyze data. BA in linguistics, experience working with children required. Experience with the tape equipment experiment design, data analysis helpful. B75-578 (10/22).

Secretary V to the Director, Division for Study and Research in Education: take and transcribe meeting minutes, correspondence, research reports; maintain a busy calendar; handle large volume of telephone calls; arrange travel. Excellent shorthand, typing and organizational skills required. Applicants must be able to exercise judgment and sensitivity in a position which includes interaction with a wide variety of people. B75-607 (11/5).

Section Head V in Medical to have responsibility for operation of X-Ray/ECG unit; supervise ECG technician and clerical assistant; administer state-required chest x-ray program; process x-ray reports including report transcription, distribution, record keeping, compiling of statistics; scheduling; maintaining of supplies. Supervisory and organization skills, excellent typing and ability to transcribe radiologic reports required. Applicants should have previous experience in a responsible secretarial position. 37½ hr/wk. B75-616 (11/5).

Secretary V to Chemistry Department Faculty member working with large international research group in field of enzymology; take and transcribe shorthand dictation; maintain small library; arrange appointments; answer telephones; order lab materials; handle varied administrative matters. Excellent secretarial skills, including shorthand. A mature, sensitive manner in dealing with people required. B75-475.

Editorial Sec. IV-V in Physics Dept. to handle duties related to preparation of *Annals of Physics*: coordinate processing of manuscripts; type correspondence arrange meetings; prepare articles for printing; handle payment procedures; order supplies. Typing skills, command of English language required. B75-625 (11/12).

Secretary IV-V to Sea Grant Program Executive Officer will type varied material from draft; answer and refer inquiries on Program activities; organize meeting agenda; maintain files; arrange luncheons, dinner and other social activities; coordinate work of other secretaries in peak loads; arrange travel and appointments. Perform occasional secretarial duties for Program Director and the Advisory Services Staff. Secretarial school training and 2-3 years secretarial experience required. Shorthand and machine dictation skill helpful. B75-609 (11/15).

Secretary IV in Sloan School to handle varied duties relating to all phases of Ph.D. and Masters Program: admissions, financial aid, registration; maintain records; compile statistics; correspond with prospective and admitted students; coordinate several aspects of thesis preparation, review and grading process. College training, previous secretarial experience, excellent typing and organizational skills necessary. Applicants must be able to compose correspondence independently and deal effectively with students and faculty. B75-617 (11/12).

Secretary IV, part time, will work with staff of three to produce monthly *American Journal of Physics*: edit, transcribe machine dictation for and keep track of approximately 100 manuscripts per month. Requires typing and editing skills. This is ½ of a job-sharing position, 20 hrs/wk. 1pm-5pm B75-619 (11/12).

Secretary IV in Chemistry to faculty member/editor of the *Journal of Organic Chemistry*: process journal manuscripts and maintain related records and statistics; type correspondence, monitor accounts. Organization, machine dictation, typing skill plus ability to handle detail required. Minimum of 2 years secretarial experience necessary. B75-623 (11/12).

Secretary IV part-time to several Mechanical Engineering faculty members will type varied material: arrange travel appointments; coffee seminars; maintain accounts; Excellent secretarial skills including shorthand/machine dictation, technical typing and the ability to interact well with people required. (20 hours/wk.) B75-253.

Secretary IV, part-time to faculty member in Civil Engineering to type technical reports, correspondence; answer phone; maintain files. Position requires good secretarial, organizational, technical typing and machine dictation skills. 15-20 hrs/wk. B75-612 (11/5).

Secretary IV to Director, Secondary Technical Education Project, Office of the President and Chancellor to organize office (set up files, procedures, etc.) for new office directing MIT's role in Boston desegregation plan (East Boston schools). Excellent shorthand, typing, writing skills plus ability to deal effectively with people required. MIT experience helpful. Non-smoking office. B75-615 (11/5).

Secretary III-IV to assist with two research projects in the Linguistics Group of the Research Laboratory of Electronics: schedule a regular series of project-related meetings including travel and hotel arrangements; type reports and manuscripts; maintain project accounts; perform other standard secretarial duties as required. Good typing and general secretarial skills plus one year's secretarial experience required. Non-smoking office. B75-590.

Secretary III in Psychology to handle general secretarial duties including manuscript and report typing; transcribe machine dictation; handle weekly colloquia arrangements. Perform occasional secretarial duties for research staff. Command of English language, excellent typing skill, discretion, required. College training desirable. B75-621 (11/12).

Secretary III, in Center for Advanced Engineering Study to perform secretarial duties for Video Services Manager and Chief Engineer: answer phone, type, order supplies, file, coordinate equipment rental and meetings, check monthly statements. Must be able to establish priorities and have typing and organizational skills. B75-624 (11/12).

Sr. Lib. Asst. IV, in Rotch Library to process all new book materials; catalog and maintain pamphlet collections; supervise card corrections, maintain accuracy of card catalog; process special collections; supervise student assistants; assist in special projects. May be asked occasionally to cover circulation/reserve desk and to work in evening. Position requires previous library experience/training, organizational ability, creativity and typing skills. College graduate preferred; background in art, architecture, urban planning desirable. B75-610 (11/5).

Computer Operator/Dietician V, in the Clinical Research Center to install and maintain active protocols in computer for diet and other medical samples; print and file patient summaries from disc files; check disc files for errors; handle other duties related to operation of computer system. Will also establish dietary library on computer; assist in development of associated programs for calculation of diet formulas. Experience in computer operation including familiarity with PDP 12 Clinilab software, as well as experience in diet preparation and calculation of formulas required. 40 hr. wk. B75-620 (11/12).

Computer Operator III-IV, part-time, in the Lab for Nuclear Science: will operate IBM 360/65 Operating System; perform all phases of batch processing installation (input-output, set up, console operation); act as liaison with IBM customer engineers in correcting hardware/software malfunctions; perform necessary maintenance functions such as cleaning tape drives. Ability to operate IBM 360/65 computer complex without supervision, knowledge of HASP and OS operating commands required. 4pm-8pm, 20 hrs/wk. B75-560.

Accounting Asst. V in Comptroller's Accounting Office to perform internal cost audits on research programs; prepare monthly invoices and fiscal reports; assist in cash flow and forecast functions. Position requires general business background, 2-3 yrs applied accounting experience, and 2 yrs college or business school education. B75-613/614 (11/5).

Sr. Clerk IV-V in Comptroller's Acctg. Office will tabulate research expenditures and cash flow for sponsored research projects; assist in data collection for cash forecasts; maintain daily cash balances; prepare monthly billings and fiscal reports; handle all aspects of interim and final audits. Interest in and aptitude for figures, 2-3 years accounting experience required. Good typing and some college or business school training desirable. B75-254

Technician C (EM), temporary, in the Lab for Nuclear Science to perform routine duties such as wiring, keeping apparatus in good condition, performing lab tests and analyses. Work requires handling of epoxies and the ability to work with delicate equipment. Experience with machine and

hand tools desirable. 40 hr. week. Temp. for a maximum of 1 year. H75-157 (11/5).

The following positions have been FILLED since the last issue of *Tech Talk*:

- B75-305 Secretary V
- H75-119 Campus Patrol Officer
- B75-583 Jr. Lib. Asst. II
- B75-602 Secretary IV
- B75-599 Secretary IV
- B75-598 Secretary III
- B75-585 Secretary III
- B75-545 Secretary IV
- B75-559 Data Clerk III
- B75-601 Secretary IV
- B75-526 Secretary III
- B75-595 Secretary IV

The following positions are on HOLD pending final decision:

- B75-604 Sr. Clerk III-IV
- E75-39 Unit Coordinator
- A75-44 Admin. Staff
- D75-109 Spons. Res. Staff
- B75-587 Secretary IV-V
- B75-575 Sr. Clerk III
- B75-562 Tel. Operator III

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

ADMINISTRATIVE STAFF:

- A75-49, Asst. Director, Admissions (9/10)
- A75-54, Sec. for Alum. Relations, Alumni Assn. (9/24)
- A75-56, Sr. Consult/Trainer, Personnel (10/8)
- A75-59, Applications Programmer, Off. of Admin. Inf. Syst. (10/22)
- A75-60, Systems Analyst, Off. of Admin. Inf. Syst. (10/8)
- A75-62, Alumni Regional Director, Alumni Assn. (10/29)
- A75-63, Asst. Director, Development Off. (11/5)

BIWEEKLY:

- B75-95, Comp. Op. IV, Off. of Admin. Inf. Syst. (9/10)
- B75-273, Sec. IV, Mt. Sc. & Eng. (7/9)
- B75-306, Sec. V, Physics (10/8)
- B75-427, Comp. Op. IV, Off. of Admin. Inf. Syst. (9/10)
- B75-543, Sec. IV, Chem. Eng. (10/15)
- B75-547, Sec. V, Civil Eng. (10/15)
- B75-561, Sec. V, Resource Development (10/22)
- B75-566, Sec. IV, Medical (10/22)
- B75-571, Clk-Typ. III, Develop. Off. (10/22)
- B75-580, Sr. Clerk II, Admissions (10/29)
- B75-584, Sec. IV, Development Off. (10/29)
- B75-585, Sec. III, Mat. Sc. & Eng. (10/29)
- B75-586, Sec. IV, Planning Off. (10/29)
- B75-588, Sec. V, Civil Eng. (10/29)
- B75-593, Sec. IV, Resource Devel. (11/5)
- B75-594, Sr. Clerk III, Stud. Fin. Aid. Off. (11/5)
- B75-597, Sec. III-IV, Technol. Studies Prog. (11/5)
- D75-600, Sec. IV, Engineering Lib. (11/5)
- B75-603, Sec. IV, Urb. St. & Pl. (11/5)
- B75-605, Sec. IV, Council for the Arts (11/5)
- B75-606, Sec. III, Medical (11/5)

ACADEMIC STAFF:

- C75-28, Nursing Supervisor, Medical (10/8)

SPONS. RES. STAFF:

- D75-8, Biophysicist, Nat. Magnet Lab. (6/25)
- D75-48, Economist, Energy Lab. (6/25)
- D75-107, postdoc res., for Nuc. Sc. (6/25)
- D75-111, Programmer, Artificial Intell. Lab. (6/25)
- D75-112, Engineer, Energy Lab (6/25)
- D75-120, Systems Programmer, Lab. for Nuc. Sc. (10/29)
- D75-125, energy modeling, Energy Lab (8/6)
- D75-126, postdoc res., Energy Lab. (8/6)
- D75-127, postdoc res., Energy Lab. (8/6)
- D75-129, Proj. Mngr., Cntr. for Trans. St. (8/20)
- D75-138, Programmer, Proj. MAC (9/3)
- D75-143, Plasma Physicist, Cent. for Space Res. (9/3)
- D75-150, Systems Programmer, Hlth. Sc. & Tech. (9/3)
- D75-153, Applications Programmer, Lab. for Nuc. Sc. (9/10)
- D75-161, Economist/Policy Analyst, Energy Lab. (9/10)
- D75-164, computer graphics, Architecture (9/17)
- D75-166 Operations Branch Mngr., Energy Lab (9/17)
- D75-167, end-use technology, Energy Lab (9/17)
- D75-169, Plasma Physicist, Res. Lab. of Elec. (9/17)
- D75-178, Programmer, Center for Space Res. (10/1)
- D75-181 immunology, Center for Cancer Res. (10/1)
- D75-202, Scientific Programmer, Earth & Pl. Sc. (10/15)
- D75-204, machine vision research, Artificial Intell. Lab. (10/22)
- D75-205, Research Engineer, Economics (10/22)
- D75-210, machine vision research, Artificial Intell. Lab (10/29)
- D75-217, biochemist, Center for Cancer Res. (11/5)
- D75-218, Tech. Asst., Psychology (11/5)
- D75-219, continuing education, Chemical Eng. (11/5)
- D75-220, Executive Director, continuing education, Chemical Eng. (11/5)

HOURLY:

- H75-55, Tech. B., Lab. for Nuc. Sc. (6/25)

Polyurethane Plastic Mixing

(Continued from page 1)
smooth to make cleaning easier, or it can have a series of V-shaped grooves. The grooves enhance the vortex-like motion the mixing process creates in the fluid components. But more importantly, MIT engineers found, a major improvement in the mixing quality can be achieved if an electric field is applied between the inner and outer cylinders in a direction perpendicular to the streamline of the fluids.

Papers on the new techniques were presented at the symposium by Christopher A. Rotz and Sal C. Malguarnera, graduate students in mechanical engineering.

Rotz worked on the hybrid mixing process in collaboration with Professor Suh and Professor James R. Melcher of the Department of Electrical Engineering and Computer Science. Malguarnera, under the direction of Professor Suh, worked on the high-rate delivery system.

The participation of the graduate students in the symposium, Professor Suh said, "points up the unique educational experience offered by the Program. Students have an opportunity to apply the basic principles and laws of nature in innovating advanced industrially viable processes."

The MIT-Industry Polymer Processing Program is a cooperative government-industry effort to innovate new polymer processing technologies and applications. Polymers are the chemical compounds that form the base of plastics. The program was initiated with a \$462,000 grant from the National Science Foundation and is supported by several industrial firms including Instrumentation Laboratory, Inc.; International Telephone and Telegraph Corp.; The Kendall Co.; and Rogers Corp.

A major step in molding parts from polyurethane is the mixing of two or more highly viscous liquids which react within three to five seconds chemically to form the polymer.

Most conventional batch mixing systems—usually made up of rotating blades—mix no more than 8 to 12 pounds at a time. Another system—not yet widely used in industry—mixes by the impingement of fluid from high pressure nozzles. Although up to 30-pound batches can be mixed by the impingement method, the system is effective for only a limited range of fluid viscosities. Furthermore, the machine uses about 10 times the power required for the MIT system and consequently is very expensive.

The MIT mixing system can process at a higher flow rate than the existing commercial impingement system and yet is mechanically simple—making maintenance easier and the total cost lower—and it can handle liquids over a wider range of viscosities, Professor Suh said.

In their preliminary study, the MIT engineers found that most commercial and patented mixers, which use mechanical rotating blades and cores, do not have the right configuration, Professor Suh said.

"Furthermore," he said, "all these mechanical mixers have inherent shortcomings. The major shortcoming is that the mixing efficiency decreases rapidly with mixing time since the interfaces between the liquids tend to line up parallel with the fluid streamlines."

League School Has 2

Two MIT faculty members will be among eight speakers at the League of Women Voters' School of State Affairs on "The Massachusetts Economy" Wednesday, Nov. 19. They are: Dr. Bennett Harrison, associate professor of economics and urban studies and planning, and Dr. Ann F. Friedlaender, professor of civil engineering.

- H75-117, Tech. B, Radioactivity Center (10/15)
- H75-120, Campus Patrol Officer (10/1)
- H75-125, Electrician, Phys. Plant (10/8)
- H75-143, 2nd Cl. Eng. (10/15)



Varsity crew coach Peter Holland and Mrs. Homans and a friend were present for dedication of the new women's shell.

Women's Eight-Oared Shell is Dedicated

For the first time ever, the MIT fleet includes an eight-oared shell especially designed and designated for women.

She's the "Mary Hemenway", and her arrival at the Pierce Boathouse represents a significant gain for women's athletics at the Institute, thinks Professor Mary-Lou Sayles, women's athletic director.

That's the donor's intention, too. Mary Hemenway was one of the pioneer proponents of athletics for women in a pre-Victorian era when only men were supposed to have the pleasures and benefits of competitive sports; the Hemenway Gymnasium at Radcliffe also celebrates her enthusiasm for women's athletics.

The original Mary Hemenway's granddaughter is the donor: Mrs. Mary Homans of Milton, Mass. No coincidence that Mrs. Homans' granddaughter is Roseanna Means, '76, an enthusiastic member of MIT's varsity women's crew; she's majoring in biochemistry and hopes to attend medical school next year.

Though the "Mary Hemenway" was christened in informal ceremonies on Class Day (November 8),

she had already felt the pressure of competition on the Charles. The MIT varsity women's crew were among 2,870 competitors entering the annual "Head of the Charles" Regatta on October 26; though this year's varsity rowing the "Mary Hemenway" failed to place in the top ten women's eights, they significantly bettered their time of a year ago in the same race. Miss Means gives the credit to the "Mary Hemenway"—"she's a lovely boat!"

Roos to Speak To MIT Club

Dr. Daniel Roos, associate professor of civil engineering at MIT, will speak about "Directions in Urban Transportation" to the MIT Alumni Club of Fairfield County, Conn., at 8pm Tuesday, Nov. 18, in the Westport New England Motor Inn, Westport, Conn.

Dr. Roos' principal area of research is in demand responsive transportation systems, frequently referred to as Dial-A-Bus. Recently he was chairman of the national Para-Transit Conference at the National Academy of Science and Engi-

neering, where he proposed a number of alternative approaches to conventional urban transportation service.

At MIT, where he received the Bs, MS and PhD degrees, Dr. Roos has been technical director of the Integrated Civil Engineering Systems Project (ICES), a cooperative large-scale computer project of government, university and industry groups. The MIT-based system, which combines advanced information and powerful problem-solving capabilities, is now used by over 1,000 international organizations.

Senator Goldwater to Speak At Observatory Dedication

(Continued from page 1)

Harold W. McGraw, Jr., president of McGraw-Hill, Inc.

At noon, guests, including regional alumni from the three universities, will travel 50 miles by bus to Kitt Peak for a tour of the new facility, which was made possible by grants from the Alfred P. Sloan Foundation and McGraw-Hill, Inc. The observa-

Blood Drive Nets 1679 Pints

A total of 1679 pints of blood were collected at the MIT Fall Blood Drive—making it one of the most successful drives in recent years.

This year's total was 208 pints more than last year's fall drive collection of 1471 pints.

Much of the success of the drive can be attributed to the large number of students who participated in the person-to-person solicitation of donors. Blood drive chairperson Jean Hunter estimates that approximately one half of the undergraduate students on campus took part in the effort.

The help of the Technology Matrons was also instrumental in the success of the drive. Under the leadership of Mrs. Maureen Miller, wife of Professor Rene Miller, head of the Department of Aeronautics and Astronautics, more than 115 Matrons volunteered at the drive. The Matrons kept records, served refreshments and several who are registered nurses helped the Red Cross nurses in taking medical histories.

The three fraternities and three subdorm groups with the largest number of donors in proportion to the number of residents were: Theta Chi (90.1 percent), Student House (78 percent), Phi Kappa Theta (76.4 percent), Senior House Nichols (74 percent), Conner 5 (60 percent) and Baker 1 (56 percent). Each won a half keg of beer.

Sigma Alpha Epsilon finished less than one percent out of third place for the fraternity group with a 75.9 percent donation. Approximately one half of the fraternities had 45 percent donations or better.

tory is one of several observatories built on the 6,300-foot mountain with the cooperation of the National Science Foundation and the Papago Indian Nation, whose reservation includes the peak.

Senator Goldwater will give the dedication address at a dinner in Tucson following the tour. Also speaking will be Nils Y. Wessell, president of the Alfred P. Sloan Foundation, which awarded the consortium a \$100,000 grant to move the University of Michigan's 52-inch Cassegrain telescope to Arizona and install it in the consortium observatory.

The observatory went into operation last May, three days before the MIT-equipped Small Astronomy Satellite 3 (SAS-3) was launched into orbit to study x-ray sources. Three months later, the satellite's precise measurements of the location of an exceptionally active x-ray source enabled Professor Boley and a Dartmouth graduate student to use the new observatory to make the first optical observation of the source.

Among the MIT researchers who have used the observatory are staff researcher Dr. Jeffrey E. McClintock, the MIT member of the observatory's steering committee; Professor Claude R. Canizares; graduate student Doron Bardas and staff engineer Patrick Peterson.

108 from MIT Aid Government

MIT has 108 representatives on federal advisory committees, placing it fourth in the nation, according to a report released last week by the Senate Government Operations Committee.

The University of California leads with 350, followed by Harvard, 167, and the University of Texas, 110. After MIT are Johns Hopkins University and the University of Michigan, 103 each, and Columbia University, 102.

The report lists all those serving on the 1242 Federal advisory committees which influence the Federal government in almost every area of policymaking.

Women Victorious In Volleyball

MIT's women's volleyball team (10-1) notched their first Metropolitan Championship last Saturday at Boston College.

To do so, they had to defeat the defending champion Eastern Nazarene 16-14, 15-13. The win over Eastern Nazarene also avenged MIT's only loss of the season. In last week's regular season action, Tech had lost to Eastern Nazarene, but defeated Boston College, Southeastern Mass. and the University of Rhode Island to improve their record to 10-1.

This Saturday, MIT will play in the Massachusetts Collegiate Championships at Boston University. The teams in the tournament are Salem State, Gordon College, Wheaton, Worcester State, Lowell University, Fitchburg State, Eastern Nazarene, Holy Cross and MIT. MIT has drawn Holy Cross as their first round competition scheduled for 10:00am Saturday.

A victory in this tournament would enhance MIT's chances of being invited to participate in the Eastern Championships slated for Southern Connecticut on November 21-22.

MIT's women's basketball team will participate in the University of Chicago tournament on February 6-7. MIT, Northwestern, Oberlin, Brown and host University of Chicago are included in the tourney. Tech placed third in a similar basketball tournament hosted by MIT last winter.

MIT's cross country team will be toeing the line this Saturday in the annual National Collegiate Division III Cross Country Championships at 1:00pm at Franklin Park. The entries have swollen the field to approximately five hundred runners. MIT last participated as a team in the N.C.A.A.'s in 1968. Junior Frank Richardson (Sac City, Iowa) placed thirtieth last fall when the meet was held at Wheaton College, Illinois.

MIT Student-Built Ocean Robot Passes All Tests

MIT student engineers have successfully operated an underwater robot using an on-board mini-computer to guide the vehicle and to store data collected by sensing instruments.

The accomplishment is the most recent development in a student research project that began in 1973.

The torpedo-shaped robot submarine—designed for oceanographic research—was operated under computer control for the first time this past July at the MIT Department of Ocean Engineering's Summer Laboratory Program in Castine, Me. Then, in October, at a lake near Boston, the vehicle demonstrated sev-

eral maneuvers that included circles, figures-of-eight and out-and-back pre-set compass runs.

Its first oceanographic use also was achieved at the lake on the straight runs—two minutes out and two minutes back—when water temperature readings at specified depths were measured and recorded in the computer memory. These data later were printed out from the memory to provide tables of the measured information.

The robot—it is eight feet long, 15 inches in diameter and weighs 250 pounds—has been designed, built and tested by undergraduate and graduate students of the MIT Ocean

Engineering Laboratory. Many of the undergraduate participants have been freshmen. The project is supported by the Sea Grant Office and the MIT Undergraduate Research Opportunities Program.

The underwater robot, which has an aluminum body and fiberglass nose and tail, is battery driven and designed to travel 20 miles at three knots at a maximum depth of 200 feet.

A special purpose computer and autopilot were designed and built by the students to control the vehicle. The computer starts the robot and sends the selected depth and course to the autopilot. After the specified

time has elapsed, the computer modifies the autopilot instructions or stops the robot.

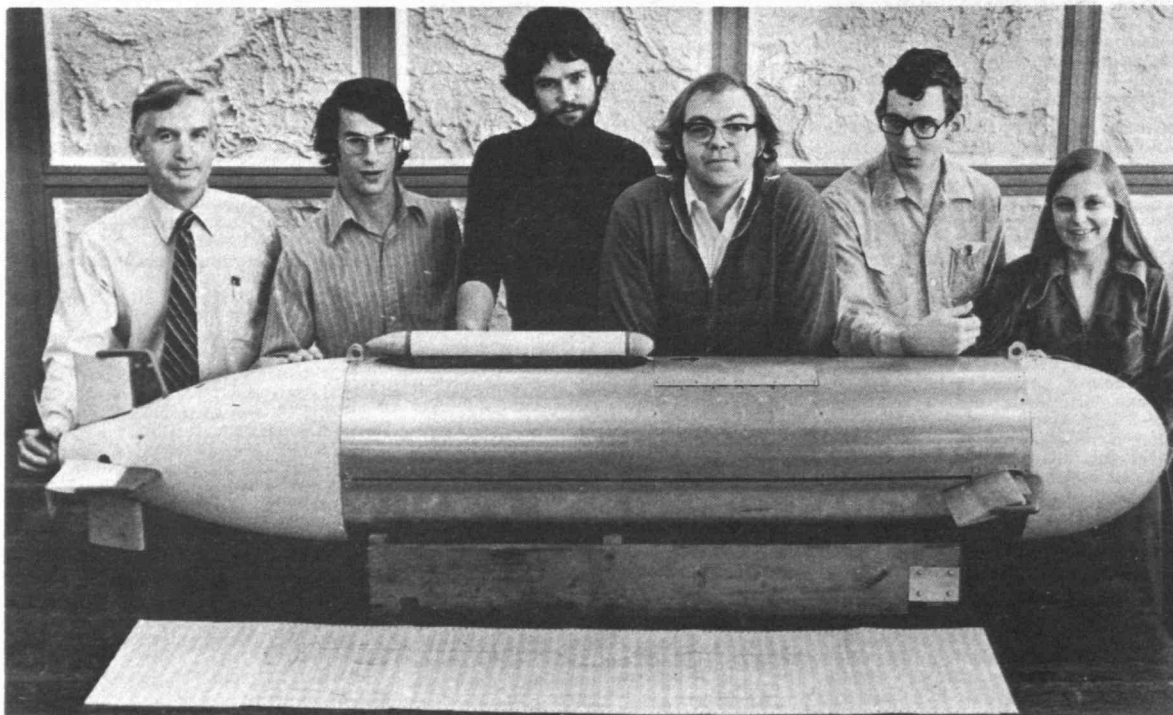
The project is directed by Dr. A. Douglas Carmichael, professor of ocean engineering, who said that robots such as the one designed at MIT could be used to prow coastal waters gathering oceanographic data or searching for sunken objects. The robot could be outfitted with up to 50 pounds of scientific measuring instruments, plus a movie camera and sonar device to function as its eyes.

Dr. Carmichael said the students now will concentrate on improving the robot's reliability. They also plan to design and install a collision avoidance system to guide it away from underwater obstacles and a sonar communications system that will enable the robot to send back its data to land or to a mother ship by telemetry.

Recent participants in the robot project include:

Undergraduates—Debra G. Abbott, a sophomore from Portsmouth, N.H.; William Burke, a senior from Weymouth, Mass.; Miles R. Fiedelman, a senior from Boston, Mass.; Charles Finkelstein, a senior from Somerville, Mass.; Werner R. Haag, a junior from Lawrenceville, N.J.; Deborah S. Hoover, a junior from Higgamun, Conn.; Marek K. Klonowski, a sophomore from Chicago, Ill.; Philip A. Kramer, a sophomore from Newton, Mass.; Michael J. Saylor, a sophomore from Red Pion, Pa.; Thomas W. Smith, a freshman from Millville, N.J., and William F. Whitelaw, a junior from East Orleans, Mass.

Graduate Students—Joseph M. Driear of Arlington, Mass.; Stuart D. Jessup of Laconia, N.H.; Glenn J. Keller of Greensboro, N.C.; Roger A. Longhorn of Arlington, Mass., and James P. Radochia of Wallingford, Conn.



Professor A. Douglas Carmichael, left, and some of the students who have worked on the robot submarine project, from left: Charles H. Mazel, a graduate student from New Rochelle, N.Y.; Stuart D. Jessup, a graduate student from Laconia, N.H.; William Burke, a senior

from Weymouth, Mass.; Glenn J. Keller, a graduate student from Titusville, Fla., and Deborah S. Hoover, a junior from Higgamun, Conn. In the foreground is a computer printout showing water temperatures and depth readings recorded by the robot's computer.