

## National Conference at MIT to Weigh Energy Crisis

A major national conference on energy demand, conservation and legal and legislative problems will be held at MIT Feb. 12-14.

More than 500 persons from throughout the U.S. are expected to attend the three-day meeting, sponsored by the MIT Energy Laboratory in collaboration with the Research and

National Needs (RANN) Program of the National Science Foundation and the MIT Industrial Liaison office.

All told, the conference will feature four major invited addresses—on economic growth, on effluent control, on legal and legislative aspects of energy, and on energy conserva-

tion—plus 60 technical papers presented during 11 different half-day sessions.

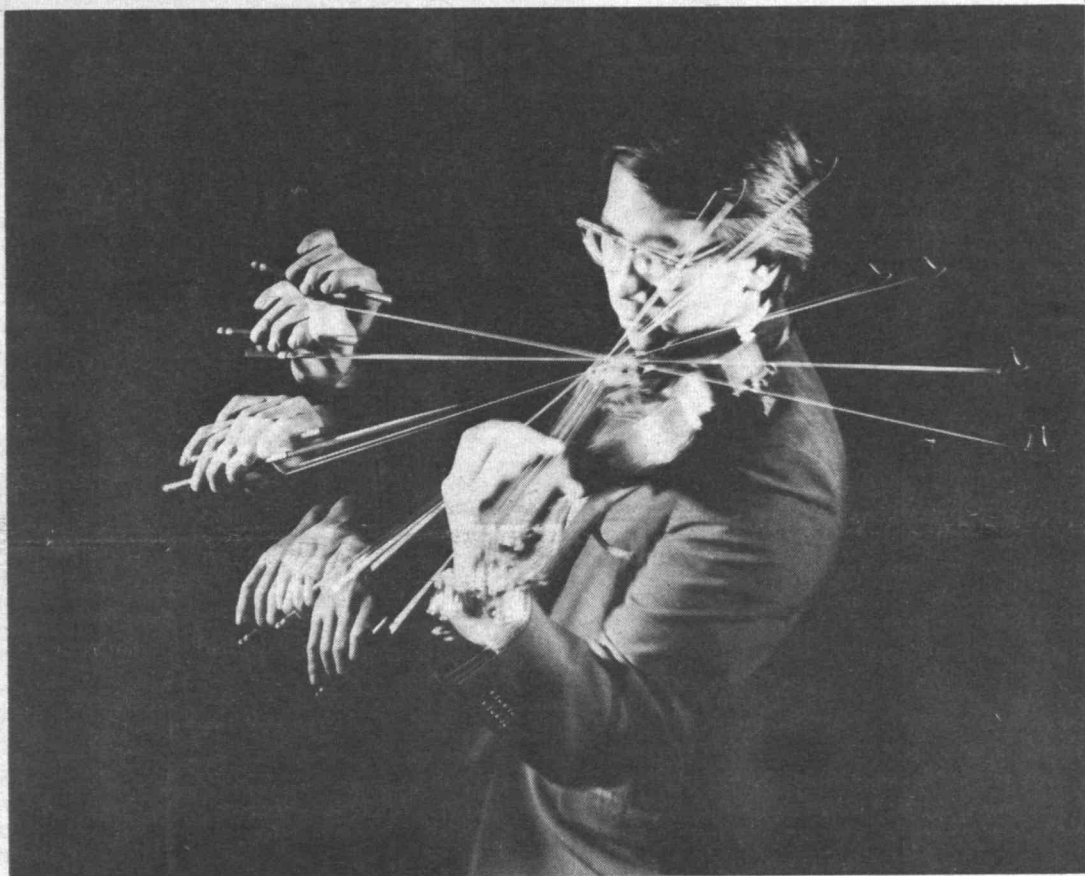
Chairman is Professor David C. White of MIT, director of the university's newly-established Energy Laboratory. Co-chairman is Dr. Michael S. Macrakis of MIT. Sessions will be held in the Kresge Auditorium.

The first two days of the conference, Monday, Feb. 12, and Tuesday, Feb. 13, will begin with major invited papers, following which attendees will go to one of two simultaneous sub-sessions dealing with specific aspects of the energy crisis. Similar invited papers will begin both the morning and afternoon

general sessions on the final day of the conference with two simultaneous sessions in the morning and a single session in the afternoon.

Invited speaker at the opening of the conference Monday morning, Feb. 12, will be Professor Tjalling

(Continued on page 6)



**HEY DIDDLE, DIDDLE, THE STROBE AND THE FIDDLE:** Violinist Alan Teranishi, a graduate student in chemistry and concertmaster of the MIT Symphony Orchestra, is shown fiddling at tenth-of-a-second intervals in this stroboscopic photograph, made in the MIT Strobe Laboratory. The Symphony, a 90-member full-scale ensemble, will make a five-city cross-country tour this spring, March 23-April 2, with appearances in major concert halls in Philadelphia, Dallas, Los Angeles, San Francisco and Chicago.

### 'Voice' to Air MIT Symphony

The MIT Symphony Orchestra will be heard around the world on Sunday, February 4, when it will be the featured performing group on the Voice of America's radio program, "Concert Hall."

The program, consisting of three pieces taped

during the orchestra's 1969-70 and 1971-72 seasons, will be broadcast in Europe and will be audible to US short-wave radio audiences. The program will begin at 3:15pm Boston time and will be on the following frequencies: 15.205, 11.76, 9.76, 7.17, 6.04, 3.98, .1196 and .0173 MHz.

### From Becton, Dickinson Company

## \$1,000,000 Gift Supports Health Sciences

A gift of \$1,000,000 from Becton, Dickinson and Company to endow two funds in health sciences and technology—one at Harvard and one at MIT—was announced January 26 at a luncheon at the MIT President's House.

The Becton, Dickinson Funds will be used to support promising younger faculty members in the recently formed Harvard-MIT Program in Health Sciences and Technology. Annual gifts over a period of six years will be made to each university until the \$1,000,000 total is reached.

President Derek C. Bok of Harvard and President Jerome B. Wiesner of MIT were hosts at the luncheon. Guest of honor was Mr. Fairleigh Stanton Dickinson, Jr.,

Chief Executive Officer and Chairman of the Board of Becton, Dickinson and Company, one of the nation's leading manufacturers of health care products, and Chairman of the Board of Trustees of Fairleigh Dickinson University, which was founded by his father.

Also attending were Walter A. Rosenblith, MIT Provost; Robert H. Ebert, M.D., Dean of the Harvard Medical School; Dr. Irving M. London, Director of the Health Sciences Program, who holds a joint appointment at both universities; Charles F. Adams, Chairman of the Board of Raytheon Company and co-chairman of the Health Sciences Program Sponsoring Committee; George W. Thorn, M.D., also co-chairman

of the Sponsoring Committee, a member of the MIT Corporation, Physician-in-Chief Emeritus at Peter Bent Brigham Hospital and Hersey Professor of Medicine, Emeritus at Harvard.

The Harvard-MIT Program in Health Sciences and Technology was established in 1970 to combine the two universities' complementary strengths in a wide-ranging attack on human health problems. The Program is aimed at the education of physicians with a strong base in science and engineering and at the education of biomedical engineers who can apply their engineering skills effectively to fill health needs. The Program provides a framework

(Continued on page 2)

## Funds Cut Augurs Shutdown of CEA

The Cambridge Electron Accelerator (CEA), a pioneering research tool for unraveling the mysteries of high energy physics, will cease operation in high energy physics in the next fiscal year and will close unless a conversion proposal is accepted.

The accelerator is operated jointly by Harvard and MIT with funds provided by the Atomic Energy Commission. The accelerator, which cost \$12 million, was opened in September, 1962.

Karl Strauch, professor of physics at Harvard and director of the accelerator, told the staff of the CEA today (Tuesday, Jan. 30) the 1974 fiscal year budget presented to Congress on Monday provided only funds for closing.

He quoted from the budget:

"At the Stanford Linear Accelerator Center (SLAC), experimental operation with the colliding beam device (SPEAR) will be initiated in mid-FY1973... SPEAR, with its substantially higher luminosity, will be able to extend the exciting high energy colliding beams research of the CEA."

"Operation of the Cambridge Electron Accelerator for colliding beam experiments, using the non-magnetic detector, will be terminated in the latter half of FY 1973. Close out of the laboratory and analysis of the data will be completed in FY 1974. The colliding beam research responsibilities are to be taken over by the SPEAR colliding beam device at SLAC."

The Laboratory has proposed to the National Science Foundation that it operate as a National Synchrotron Radiation Facility (see explanation below). A decision is expected in the near future.

The CEA budget for the current fiscal year was \$2 million. Next year, \$600,000 would be supplied for analysis of current experiments and for closing.

The accelerator now has 88 full-time employees. A substantial reduction of personnel will occur as of July 1, 1973, even if the proposal to the National Science Foundation is accepted.

Professor Strauch said, "The Harvard Personnel Office, working with the MIT Office of Personnel Relations and the CEA management staff, will provide all possible help in finding new employment to those affected. As you are all aware, we have for some

time made sure that all Harvard opportunities are brought to our attention."

"As you know from our discussions in November, the termination of high energy physics at CEA does not come as a surprise," he said.

He added, "Even though expected, I greet the formal announcement with very much sadness. CEA has had a great and vigorous life thanks to its very talented and dedicated staff."

"It is never easy to accept old age and watch young upstarts

(Continued on page 8)

## Kistiakowsky Appointed Professor

Dr. Vera Kistiakowsky, an experimental high energy physicist, has been appointed professor of physics at MIT.

Dr. Robert A. Albery, dean of the School of Science, announced the appointment, which is retroactive to July, 1972. Dr. Kistiakowsky has been associated with the MIT Laboratory for Nuclear Science since 1963 and since 1969 has been a Senior Research Scientist in the physics department.

Dr. Kistiakowsky's research interests are centered in elementary particle physics. She is engaged in bubble chamber experiments carried out at Argonne National Laboratory and at the Stanford Linear Accelerator Center. Equipment is being built for a hybrid bubble chamber proportional plane experiment in which she will participate at the National Accelerator Laboratory in Illinois.

Dr. Kistiakowsky was born in Princeton, N.J. in 1928. She received the A.B. degree from Mount Holyoke College in 1948 and the Ph.D. degree from the University of California at Berkeley in 1952.

After serving as a staff scientist for the U.S. Naval Radiological

(Continued on page 2)



# \$1,000,000 Gift Endows 2 Funds in Health Sciences

(Continued from page 1) enabling scientists, engineers and clinicians to work together on major health problems. The first two classes, 25 students in each, have been enrolled in the M.D. program.

In acknowledging the Becton, Dickinson gift, President Bok said: "Central to our whole effort is the quality of the faculty that we can mobilize in the rapidly developing health sciences area. The educational, research and development programs underway and planned depend on our ability to attract gifted scientists, engineers and physicians who wish to apply their skills in a collaborative way to the solution of health problems."

Noting that named and endowed chairs enjoy unmatched prestige

at Harvard and MIT, President Bok said: "Such chairs attract outstanding scholars and enable the universities to cope more effectively with increasingly severe competition for outstanding teachers."

President Bok indicated that under the terms of the gift, the Becton, Dickinson Fund, would support two term professorships for productive young faculty members for a period of up to five years. But, he added, the gift has a built-in flexibility in that the universities are free to use the income from the whole endowment for a single, distinguished professorship for a senior faculty member in the joint Program holding an appointment at both universities.

Speaking of the Health Sciences Program, President Wiesner said: "Increasingly, biology derives its

intellectual support not only from chemistry but from the mathematical, physical and engineering sciences. The Program aims to promote the productive interaction of these disciplines with biology and medicine.

"In addition, we shall concentrate on research programs that range from the most fundamental to those that have a potentially immediate application. The active application of technology and the findings of research to the achievement of specific, planned goals is the key to providing the devices and techniques that make possible better prevention and treatment of disability and disease.

"MIT has an exceptional history of commitment and accomplishment in goal-oriented research and development. Cooperation with health agencies, including Harvard Medical School and its affiliated teaching hospitals, is well advanced. One of the most striking results of this interaction is the 'Boston Arm,' an electronically operated artificial limb developed by mechanical engineers at MIT and by Harvard orthopedic surgeons at the Massachusetts General Hospital.

Within the organizational framework of the Health Sciences Program, MIT and Harvard will apply their resources to the solution of problems for which the basic scientific knowledge is

already available and can be rapidly and efficiently applied by a systematic engineering approach."

The Becton, Dickinson gift is the first major industrial grant received by the Health Sciences Program. Other major grants have come from The Commonwealth Fund and the National Institutes of Health. The Commonwealth Fund, with grants totaling \$1.2 million, supported the planning and initial efforts of the joint Program.

The NIH grant, \$5 million over a period of five years, establishes and supports a large-scale program in biomaterials science and research which seeks an increased understanding of natural biological substances in order to develop new synthetic materials for use in human valves, skin and bone substitutes and other artificial organs.

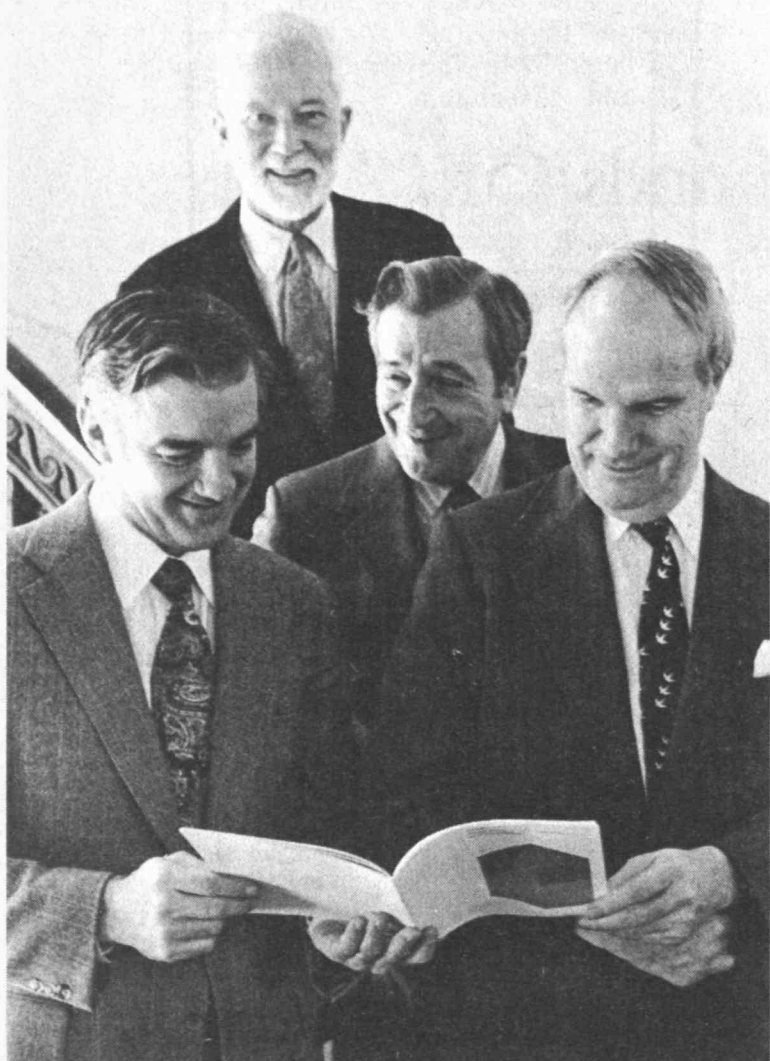
Becton, Dickinson and Company is a diversified international manufacturer of more than 2,000 medical, surgical, laboratory, scientific and industrial products used by physicians, nurses, hospitals, medical schools and laboratory personnel world-wide.

Other senior officers from Becton, Dickinson who attended the luncheon at the President's House include Henry P. Becton, Vice Chairman of the Board of Directors and Chairman of the Corporate Policy Committee;

Wesley J. Howe, President; Marvin A. Asnes, Executive Vice President; William S. Little, Senior Vice President; G. Briggs Phillips, Ph.D., Director of the Becton, Dickinson Research Center; and John L. Watters, M.D., Corporate Medical Director.

Mr. Dickinson is widely known as a philanthropist and statesman in the fields of education and medicine. He was born December 9, 1919, in Rutherford, N.J., and graduated Phi Beta Kappa from Williams College in 1941 with honors in political science. He served as New Jersey State Senator from Bergen County from 1968 to 1971, and has been a member of the board of the Health Information Foundation and the American Foundation for Pharmaceutical Education. He served as Commissioner on the Board of the National Commission on Community Health Services, Bethesda, Maryland, and is a past chairman of the New Jersey State National Foundation of the March of Dimes.

Mr. Dickinson is an honorary fellow of the University of Cambridge, England, and has received honorary L.H.D. degrees from Bard College and Saint Peter's College as well as the Order of Vasco Nunez de Balboa, Panama's highest civilian decoration. Mr. Dickinson has two children and lives with his wife, the former Elizabeth Harrington, in Ridgewood, N.J.



President Derek C. Bok (left) of Harvard University and Fairleigh Stanton Dickinson, Jr., (right), chief executive officer and chairman of the board of Becton, Dickinson and Co., examine a brochure describing the Harvard-MIT Program in Health Sciences and Technology. Henry P. Becton (top), vice chairman of the firm's board, and President Jerome B. Wiesner look on.

—Photo by Marc PoKempner

## Alexander's Feast Puts Early Music on Menu

Early English street cries, lute songs, and the twang of the rebec will reverberate in the Building 7 lobby when Alexander's Feast comes marching in for two free concerts Wednesday, February 7, at noon and 1 p.m.

Alexander's Feast is a group of five musicians specializing in medieval, renaissance, and early American music. In addition to the rebec, a three-stringed instrument with a pear-shaped body and a slender neck, the group will play recorders, the lute, guitar, medieval fiddle, harp, and violin.

The program will include English and American country dancing, lute songs by Robert Jones, Tobias Hume, and John Bartlet, renaissance music by Senfl, Josquin Desprez, and Orlando di Lasso, and selections from the Sacred Harp, a collection of Hymn tunes published in 1860.

Terrence Tobias, the group's leader, holds a bachelor of music degree from the Oberlin Conservatory of Music, a Master's degree

at Harvard and MIT, President Bok said: "Such chairs attract outstanding scholars and enable the universities to cope more effectively with increasingly severe competition for outstanding teachers."

The concert is sponsored by the Lobby 7 Committee.

## Vera Kistiakowsky Appointed to Faculty

(Continued from page 1) Defense Laboratory, Dr. Kistiakowsky was named the Sarah Berliner Fellow at the University of California at Berkeley for 1953-54.

After five years at Columbia University, she joined the faculty at Brandeis University in 1959 and was named adjunct professor in 1962.

Dr. Kistiakowsky is a member of the executive committee of the National Accelerator Laboratory Users' Organization and a member of the National Science Foundation Fellowships Panel for the National Academy of Sciences.

In 1965 she was a visitor at the Physical Institute, Erevan,



Dr. Kistiakowsky

under the auspices of the Scientific Exchange Program of the Atomic Energy Commission.

Dr. Kistiakowsky has been an outspoken advocate for women in science. In 1971 she was the chairwoman for the American Physical Society's Committee on Women in Physics. She also works on such issues in conjunction with the American Association for the Advancement of Science and the National Research Council.

The author of numerous technical papers, Dr. Kistiakowsky has also written two books on science for young people. She is a fellow of the American Physical Society and a member of Phi Beta Kappa, and Sigma Xi.

Dr. Kistiakowsky and her children, Marc L. and Karen M. Fischer, reside in Cambridge.

## Center to Show Data Service

The Marine Resources Information Center, Room 5-331, will give a briefing on the *Environment Reporter* on Wednesday, February 14, at 3 p.m.

A weekly notification and reference service, the *Environment Reporter* gives comprehensive coverage of current legislative, administrative, and industrial developments in pollution control and environmental protection.

The service consists of loose-leaf binders which have sections on current developments, federal laws and regulations, state air laws, state water laws, state solid waste-land use, and decisions.

## Registrar's Notice

Applications for postponed final examinations and advanced standing examinations must be returned to the Schedules Office, Room E19-338, by Friday, February 16.

## Credit Union Re-elects All

All officers, members of the Board of Directors, the Nominating Committee and the Credit Committee of the MIT Employees' Federal Credit Union were re-elected for two-year terms at the annual business meeting January 18.

Credit Union officers are: Henry J. Leonard, president; Barbara L. McCarthy, vice president; Herbert J. Arbo, secretary; and Philip J. Keohan, treasurer.

The Board of Directors includes: Herbert J. Arbo, Joseph R. Cullinan, Philip J. Keohan, Henry J. Leonard, William A. Mosher, Barbara L. McCarthy, Frank J. O'Brien, Ruth L. Dawson and George W. Vlachos.

Members of the Nominating Committee are: James J. Fandel, chairman, John T. Dargin, Richard A. Osborne and Paul L. Smith.

Members of the Credit Committee are: James G. Cronin, Robert R. Ragusa, Edward J. Cox, Jr., James J. O'Brien and Joseph P. O'Toole.

TECH TALK  
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Please address all news and comment to the editorial office, Room 5-111, Ext. 3-3277.





Diners throng Lobdell during a busy noontime

—Photo by Marc PoKempner

## 2 Dining Halls Modified To Lessen Overcrowding

The Institute Dining Service has made modifications in Lobdell and Walker dining halls in an effort to ease lunch-time overcrowding.

Eugene Brammer, Dining Service director, reports that Lobdell and Walker are servicing about 200 more cash customers at lunch now than before the closing of Ashdown House dining room last December.

Walker and Lobdell are serving pre-wrapped sandwiches and Italian subs for customers who want

to bypass regular lines. A self-service beverage stand has been set up in Walker and the cash registers have been moved to ease congestion. In the Student Center, a section of East Lounge has been set aside as an additional dining area.

The two dining halls serve lunch from 11 am to 2 pm. Despite this three-hour operation, Walker and Lobdell seem to be most crowded from 11:45 am to 12:30 pm. Overcrowding could be eased if lunch hours were staggered to coincide with non-peak times. Serving areas and dining halls are relatively uncrowded before 11:30 am and between 12:30 and 1:30 pm.

Persons who have complaints or suggestions regarding dining halls may call Steve Barlow, general manager of dining services, Ext. 3-2718, or Salvatore Lauricella, assistant director of dining services, Ext. 3-5137.

## Blood Drive Aims at Goal Of 2,500 Pints

The wheels have been set in motion for the Institute's 1973 Spring Blood Drive, to be held in the Sala de Puerto Rico from Monday, March 5, through Friday, March 16.

A corps of some 250 volunteer solicitors will begin canvassing the Institute next week to register donors for the Red Cross Bloodmobile visit. The goal is 2,500 pints—a goal the Institute hasn't quite met in the past.

Student organizers are seeking volunteer typists to fill out medical history cards for advance registrations. Anyone who can type and can spare a few hours should call Ext. 3-7911 to sign up. The cards should be ready for processing February 12.

A meeting of solicitors is scheduled for Wednesday, February 7, at 3pm in Room 407 of the Student Center.

# Institute to Offer Administrators New Program in Management

A two-phase program in administration for members of the MIT administrative staff will begin Thursday, February 22, as part of general career development plans now under study at the Institute.

The pilot program, to be held in two sections in spring and fall 1973 will enroll about 20 administrators and will focus on theories and techniques in the use of human and fiscal resources in administration. Members of the Institute's senior administration and Sloan School of Management faculty will serve as discussants.

Applications for the pilot program will be available at information seminars to be held during the next two weeks, and candidates selected as members of the first group will be notified Friday, February 16. Eligible to apply are members of the administrative staff (including DSR administrative staff and both Lincoln and Draper administrative staff),

exempt administrative staff, and library and academic administrative staff.

Information seminars will be held in the Vannevar Bush Room, Room 10-105, at noon Thursday, February 1; Friday, February 2; Tuesday, February 6; and Thursday, February 8. Staff members who are interested in becoming potential applicants are strongly urged to attend one of these information meetings.

Final selection of participants in the pilot program will be based upon an attempt to establish both vertical and horizontal diversity among the selected group. Criteria which will be used in this selection process will include among others: areas of work responsibility, present office/position assignments, and sex. Candidates will be selected by a panel chosen from the members of the Institute's Personnel Policy Committee.

Among topics the program will cover are: managerial style, organizational psychology, planned change and problem-finding, individual and group behavior, career planning, budget systems, financial planning, and management information systems. As part of the fiscal section of the program, a number of sessions will focus on the role of the university, its resources, and the implications of its non-profit orientation.

Members of the program planning group are: Mr. Laurence H. Bishoff, Dean James D. Bruce, Mr. William H. Combs, Mr. James J. Culliton, Mr. John A. Currie, Mr. Leonard V. Gallagher, Mr. Richard E. Higham, Mrs. Lynn Hodges, Mr. Paul E. Johnson, Professor David A. Kolb, Mr. John A. Mims, Dean Richard A. Sorenson, Mrs. Carol E. VanAken, Mr. Robert K. Weatherall.

With the group as associates are Ms. Sandy Morgan and Mr. William Dickson.

## Barringer Takes Engineering Post

Charles E. Barringer has been appointed Assistant Dean of the School of Engineering, effective February 1, Dean Alfred H. Keil has announced.

In his new position Mr. Barringer will provide staff support and will have responsibilities in areas of resource management and planning in the Office of the Dean of Engineering.

Mr. Barringer has been Administrative Officer of the Department of Mechanical Engineering since February, 1969, where he has had primary responsibility for the non-academic affairs of the department.

A 1959 graduate of Principia College in Illinois, Mr. Barringer taught junior high school science and mathematics for two years near Chicago.

In 1961 he joined the personnel office at Lincoln Laboratory where he was first exposed to the management of engineering programs. His special assignment was developing logistics support for Project PRESS, then being started on Kwajalein Island in the central Pacific.

In 1963 Mr. Barringer went to Cornell University as assistant manager of the Arecibo Ionospheric Observatory in Arecibo, Puerto Rico, now the world's largest radar/radio telescope.

Mr. Barringer later was named assistant to the director of Arecibo with responsibilities for public relations. As a result of his work he was named in *Outstanding Young Men of America*, 1967.

Mr. Barringer returned to MIT



Mr. Barringer

in 1965 as assistant administrative officer of the then-new Center for Materials Science and Engineering. He helped establish record-keeping and fund allocation systems for the center and developed the Consolidated Salary Expense Analysis report now used widely in the Institute.

During his tenure in mechanical engineering, Mr. Barringer also served on the supervisory audit committee of the MIT Credit Union, and was a member of the Institute's negotiating committee with the R.D.T.E.U. in 1970.

Mr. Barringer is advisor to the Christian Science Organization on campus. Most recently he has been assistant coordinator of operations for IAP '73.

Mr. Barringer and his wife, the former Elinor Schulz have three children and reside in Acton.

## Stanford Dean to Speak At First Career Seminar

The MIT Office of Career Planning and Placement will present a series of career seminars for MIT students during the first half of February.

Dr. Alfred D. Kirkland, assistant dean of the Stanford school of engineering, will discuss the potential for the master's degree in engineering in the first in the series Tuesday, Feb. 6, in Room 9-150.

Four Black MIT alumni, all professional engineers, will lead an informal discussion on their career experiences, at 4 p.m. Thursday, Feb. 8, at the Black Student Union, Walker Memorial. Participants will be Arthur R. Blackwell, '51, Aerospace Corp., Los Angeles; Ernest M. Cohen, '64, Foxboro Co., Foxboro, Mass.; Herbert L. Hardy, '52, Polaroid Corp., Cambridge; and Robert P. Pinckney, '52, MIT Draper Laboratory, Cambridge. Black students, undergraduate and graduate, are invited to attend.

At 4 p.m. Tuesday, Feb. 13, Room 4-145, Joel S. Spira, president, Lutron Electronics Co., Coopersburg, Pa., will discuss "Life in a Small Company."

For those interested in careers in hospital administration, Dr. B. Jon Jaeger, chairman, Depart-

ment of Health Administration, Duke University, will lead a seminar in that field at 4 p.m. Thursday, Feb. 15, also in Room 4-145.

## Questionnaires Due Feb. 5

February 5 is the due date for questionnaires seeking reaction to the freshman pass-fail grading experiment to be returned to the Mathematics Undergraduate Office, Room 2-108.

The questionnaires were distributed to all members of the faculty and to a sampling of the freshman and junior classes by the Freshman Pass-Fail Grading Committee.

## E. A. Brudno, '63, Listed as POW

Lt. Edward A. Brudno, MIT '63 and a prisoner of war since 1965, is among those listed for release within the next 60 days by North Vietnam.

A native of Wollaston, Lt. Brudno studied aeronautics and astronautics at MIT and was in the Air Force ROTC. He went on active duty in the Air Force following his graduation.

## Chamber Music Group, 'Secolo Barocco,' to Play

The Secolo Barocco, a chamber music group from Paris, will present a free concert at Kresge Auditorium at 8pm February 9, 1973.

Sponsored by the music faculty, the concert is part of MIT's 1972-73 Chamber Music Series.

The program will offer music by Antonio Vivaldi, Johann Sebastian Bach and Johann Christian Bach, and includes Vivaldi's Concerto in D Major P. 204, Concerto in G Minor P.360 and Concert P.402; J.S. Bach's Sonata in G Major and Sonata in G Minor and J.C. Bach's Quintet in D Major.

Founded in 1965, the group is made up of five noted musicians who are also members of the Orchestre de Paris. They are Michel Debost, flute; Jacques Chambon, oboe; Jacques-Francis Manzone, violin; Joel Fernand Pontet, harpsichord; and Amaury Wallez, bassoon. Their repertoire includes duos, trios, quartets (with or without harpsichord) and quintets. The MIT performance is part of the group's first North American tour.



# THE INSTITUTE CALENDAR

January 31  
through  
February 9

## Events of Special Interest

### APO Book Exchange

Tues, Feb 6, through Fri, Feb 9, 9am-5pm, Bldg 10 Lobby.

## Seminars and Lectures

### Wednesday, January 31

#### Automated Electron Microprobe Analysis (63)

Open House demonstration of Earth and Planetary Science's recently installed computerized facility. 9am-5pm.

#### Aspects of Liquid-Liquid Phase Transition Phenomena in Multicomponent Polymeric Systems

Dr. Lee P. McMaster, Union Carbide Corp. Chemical Engineering IAP Lecture Series (42). 1pm, Rm 12-102.

#### Electrical Properties of Rocks and Applications of Geo-Electrical Measurements, Both Practical and Impractical

Prof. T. Madden. Earth and Planetary Science Discussion Series (69). 2pm, Rm 54-425.

#### Invariance, Symmetry and Scaling

Profs. Sergio Fubini and Roman Jackiw. Lecture Series in Physics (274). 3pm, Rm 26-414.

#### Sea Grant Research at MIT\*\*

Dr. Ira Dyer, head, Dept of Ocean Engineering. Lincoln Lecture Series. 3:30pm, Lincoln Lab Cafeteria.

#### Some Properties of Truncated Turbulence Signals in Bounded Shear Flows

Dr. James M. Wallace, Max Planck Institute für Stromungsforschung, Göttingen, Germany. Interdepartmental Acoustics Seminar. 4pm, Rm 5-134. Coffee, 3:30pm, Rm 1-114.

#### Realization Theory for Continuous-Time Multilinear Systems

Dr. G. Marchesini, Laboratorio di Elettrotecnica Industriale, University of Padova, Italy. Decision and Control Sciences Seminar. 4pm, Rm 37-212.

### Thursday, February 1

#### Fluorescence Technique for Nitric Oxide and Sulfur Dioxide Detection\*

Jaime A. Woodroffe, doctoral student, mechanical engineering. Doctoral thesis presentation. 3pm, Rm 5-234.

#### Adaptive Dual Control of Stochastic Systems

Dr. Edison Tse, Systems Control, Inc, Palo Alto, Calif. Decision and Control Sciences Seminar. 4pm, Rm 37-212.

### Friday, February 2

#### New Businesses in Old New York

Ken Patton, administrator of Economic Development Administration, New York City. Seminar on Urban Economic Development. 2:30-4pm, Bldg E40. Coffee, 2pm.

### Monday, February 5

#### Liquid-Liquid Oxygenators

Prof. Borivoje Mikic, mechanical engineering. Harvard-MIT Program in Health Sciences and Technology/Interdisciplinary Program in Biomaterials Sciences Seminar. 4pm, Rm 37-212. Refreshments.

### Tuesday, February 6

#### Development and Demonstration of an Oil Skimmer\*

Ralph Bianchi and Ed Johanson, JBF Scientific Corp. Ocean Engineering Seminar. 3:30pm, Rm 3-446.

#### Atmospheric Circulation with the Earth's Rotation\*\*

Mme. Anny Cazenave and Kurt Lambeck, Observatoire de Paris, Dept of Meteorology Seminar. 4pm, Rm 54-100. Tea, 3:30pm, Rm 54-923.

#### Statistical Estimation with Special Reference to Nuisance Parameters

Prof. George Barnard, University of Essex, England. Applied Mathematics Colloquium. 4pm, Rm 2-338. Tea, 3:30pm, Rm 2-349.

#### The Potential for a Master's Degree in Engineering

Dr. Alfred D. Kirkland, assistant dean, School of Engineering, Stanford University. Career Seminar. 4pm, Rm 9-150. Cider and doughnuts.

#### The Solar Neutrino Puzzle

Dr. John N. Bahcall, Institute for Advanced Study, Princeton University. Astrophysics Colloquium. 4:15pm, Rm 37-252. Coffee, tea, 4pm.

### Roxbury Comprehensive Health Center

Dr. David M. French, professor and chairman, Boston University School of Medicine. Community Fellows Program Seminar. 5-6:30pm, Rm E40-169.

### Wednesday, February 7

#### Recent Advances in Oral Surgery\*\*

Dr. Robert B. Shira, dean, School of Dental Medicine, Tufts University. Oral Science Seminar. 3-5pm, Rm E18-301.

#### Sensitivity Analysis in Nonlinear Programming Using Penalty Methods\*

Prof. Anthony Fiacco, George Washington University. Operations Research Center Seminar. 4pm, Rm 24-317. Coffee.

### Thursday, February 8

#### The Production System: An Overview of Manufacturing and Its Environments

Prof. Nathan H. Cook, mechanical engineering. Productivity, Automation and Manufacturing Seminar Series. 4pm, Rm 37-212.

#### Determination of the Size and Shape of Synaptic Vesicles and Chromaffin Granules by Light Scattering

Dr. Stephan Morris, University of Cambridge, England. Nutrition and Food Science Seminar. 4pm, Rm 16-310.

### Friday, February 9

#### Measures to Conserve Energy

Charles A. Berg, deputy director, Institute for Applied Technology, US Dept of Commerce, National Bureau of Standards. Mechanical Engineering Seminar. 3pm, Rm 3-270. Coffee, 4pm, Rm 1-114.

#### Electro-Optic Imaging Device for Real-Time Optical Processing\*

Dr. Julius Feinleib, ITEK Corporation. Materials Science Colloquium. 4pm, Rm 9-150. Refreshments, 3:30pm.

#### A Pulsed High-Beta Fusion Reactor Based on the Theta Pinch\*

Dr. Sibley Burnett, CTR Research Division, AEC. Plasma Dynamics Seminar. 4-5pm, Rm 26-214.

## Community Meetings

### Women's Forum

Panel of three practicing women engineers from Watertown Arsenal, Polaroid and MIT. Mon, Feb 5, 12n, Rm 10-105.

## MIT Club Notes and Meetings

### Auto Club\*\*

Meeting with slides of US and Canadian Grand Prix. David Ammen, top competitor in C/Sedan Alfa, may speak. Tues, Feb 6, 8pm, Student Center West Lounge.

### Hobby Shop\*\*

Monday-Friday, 10am-6pm, Rm W31-031. Fees: \$6/term for students; \$10/term for community. Call X3-4343.

### Karate Club

Beginning and intermediate classes in Goju style for MIT students only. For information call X3-2018.

### Lecture Series Committee\*\*

Membership meeting. Thurs, Feb 8, 7-10pm, Student Center Mezzanine Lounge.

### MIT Club of Boston

James R. McIntyre, Counsel to Senate, former Mayor of Quincy, State Senator, will discuss "Changing Character of the Urban Fringe." Thurs, Feb 8, 12n, Aquarium Restaurant, 100 Atlantic Ave, Boston. Lunch \$3.60 at door. Reservations: Mrs. Crossley, X3-3878.

### MIT/DL Duplicate Bridge Club\*\*

Every Tues, 6pm, Student Center Rm 473.

### Student Homophile League\*

Meeting and coffee hour. Every Sun, 4-6pm, Rm 14E-307. All men and women welcome. For gay help (anonymous) at MIT, call student gay tutor, 492-7871, anytime.

### Student Information Processing Board Meeting\*

Every Monday, 7:30pm, Rm 39-200.

### Technique

Staff meetings. Every Saturday, 11am, Student Center Rm 451.

### Tiddlywinks Association\*

Every Wed, 8-12pm, Student Center Rm 491.

## Social Events

### Second Annual Student Center Committee Rock Revival\*\*

Starring Al Payola from WERS fame. Free punch, beer, munchies, Oldies Contests. Admission 75 cents per couple. Open to entire MIT community, especially secretaries and staff. Mon, Feb 5, 8:30pm, Lobdell.

### Hillel Party\*

Sat, Feb 10, 8pm, Talbot Lounge, East Campus. Admission: 50 cents.

### Friday Afternoon Club\*\*

Music, conversation and all the cold draft Budweiser you can drink. Every Friday, 6pm, the Thirsty Ear in Ashdown basement. Admission: men \$1, women 50 cents. Must be over 21.

### Muddy Charles Pub\*\*

Join your friends for music, beer, wine, snacks, conversation at the Muddy Charles Pub, 110 Walker. New hours: Monday-Friday, 11:30am-2pm and 4-7:30pm; Saturday, 7-12pm. Starting January 1, nightly specials will include: Mondays, all wines 25 cents; Tuesdays through Thursdays, free pretzels and chips. Call GSC, X3-2195.

### SCC Pot Luck Coffeehouse\*

Live entertainment every Friday and Saturday, 8:30pm to 12m. Student Center Mezzanine Lounge. Free coffee, cider, doughnuts. Sponsored by Student Center Committee. Volunteers to perform or otherwise help out, call Paul Mailman, dorm X9626, or Doug Fried, dorm X8767.

## Movies

### The Exterminating Angel\*

Film Society. Fri, Feb 9, 7:30pm and 9:30pm, Bldg E21. Tickets \$1.

## Music

### Alexander's Feast\*

Concert of medieval and renaissance music. Wed, Feb 7, 11:55am and 12:55pm, Bldg 7 Lobby.

### Noonhour Concert Series\*

Soprano and violist Sally Smith and lutinist Hopkinson Smith. Thurs, Feb 8, 12n, Chapel.

### Seccolo Barocco Chamber Music Group\*

French group will present program of Vivaldi, J.S. Bach and J.C. Bach. Fri, Feb 9, 8pm, Kresge. Free.

### Mike Johnson Concert\*

Folk concert with wide variety of styles. Sponsored by United Christian Fellowship. Fri, Feb 9, 8pm, Sala de Puerto Rico.

## Theater and Shows

### The Importance of Being Earnest\*

Oscar Wilde play performed by MIT Dramashop. Directed by Joseph Everingham. Feb 8, 9, 10, 16, 17, 8:30pm, Little Theatre. Tickets \$2.25. Reservations, X3-4720.

## Dance

### Folk Dance Club\*

International folk dancing. Every Sun, 7:30-11pm, Sala de Puerto Rico (exceptions to be posted).

## Exhibitions

### Paintings and Collages by Adja Yunkers\*

Hayden Gallery, Jan 12-Feb 10. Open 10am-4pm, Mon-Sat. Free.

### Music Library Exhibit

Photographs of early instruments up to 1600. Daily, Rm 14E-109.

### Hart Nautical Museum\*

Exhibits include "Ocean Engineering Summer Laboratory Projects 1971 and 1972," and "Tugs and Towing." Bldg 5, first floor.

## Athletics

### Varsity Squash\*

Bowdoin. Wed, Jan 31, 7pm, duPont Squash Courts.

### Varsity Wrestling\*

Boston College. Wed, Jan 31, 7pm, duPont Gym.

### Wrestling\*

MIT Quadrangular w/ Dartmouth, Merchant Marine, Holy Cross. Fri, Feb 2, 11am and 2:30pm; Sat, Feb 3, 1:30pm.

### Freshman Squash\*

Tabor Academy. Fri, Feb 2, 4:15pm, duPont Squash Courts.

### JV/F Fencing\*

Essex Catholic HS. Fri, Feb 2, 5pm, duPont Fencing Rm.

### Varsity Hockey\*

Hobart. Fri, Feb 2, 7pm, Skating Rink.

### JV/F Hockey\*

Emerson. Sat, Feb 3, 2pm, Skating Rink.

### Varsity Squash\*

Amherst. Sat, Feb 3, 2pm, duPont Squash Courts.

### Varsity Swimming\*

Massachusetts. Sat, Feb 3, 2pm, Alumni Pool.

### Varsity Fencing\*

Baruch. Sat, Feb 3, 7pm, duPont Fencing Rm.

### Freshman Squash\*

Brooks School. Mon, Feb 5, 3:15pm, duPont Squash Courts.

### JV/F Hockey\*

Browne and Nichols School. Wed, Feb 7, 3pm, Skating Rink.

### F/V Basketball\*

Amherst. Wed, Feb 7, 6:15pm and 8:15pm, Rockwell Cage.

### Varsity Swimming\*

Amherst. Wed, Feb 7, 7pm, Alumni Pool.

### Varsity Hockey\*

Tufts (host). Wed, Feb 7, 7pm, Skating Rink.



## Religious Services and Activities

The Chapel is open for private meditation from 7am to 11pm every day.

### Campus Crusade for Christ/College Life\*

Family time, fellowship and teachings from God's Word. Every Fri, 7-9:30pm, Rm 1-132.

### Christian Bible Discussion Group\*

Every Thurs, 1pm, Rm 20B-031. Call Prof. Schimmel, X3-6739, or Ralph Burgess, X3-2415.

### Christian Science Organization\*\*

Every Tuesday, 7:15pm, Rm 8-314.

### Hillel Services\*

Mon-Fri, 9am Minyan, Rm 7-108. Fri, 8:15pm, Chapel. Sat, 9am, Chapel. Mon-Thurs, services w/elderly in Mattapan, leave Hillel Office 5:20pm. Note: for Hillel sponsored classes and activities during IAP, see IAP Guide or visit Hillel Office, 312 Memorial Drive, X3-2982.

### Islamic Society\*

Prayers, every Fri, 12:15pm, Kresge Rehearsal Rm B. Discussions on the Qur'anic interpretations of various aspects of life, every Sat, 4pm, ISC Lounge, Walker 2nd floor, coffee served.

### Protestant Worship Service\*

Every Sunday, 11am, Chapel.

### Roman Catholic Masses\*

Weekly masses in the Chapel: Sunday, 9:15am, 12:15pm, 5:15pm; Wednesday, 5:05pm; Friday, 12:05pm.

### Vedanta Society\*

Services, every Fri, 5:15pm, Chapel. Followed by discussion hour, 6pm, Lobdell Dining Room.

### United Christian Fellowship\*

Christians for dinner, food, fellowship. Every Wed, 5pm, Walker (at sign of the fish). Followed by singing, praying, sharing meeting, 6pm, Rm 14E-303.

### Zen Society\*

Meditation meetings. Monday through Friday, 8-9am, Chapel. Call 492-4945.

## Announcements

Representatives from the International Studies Center in Grenoble, France, will be in the Student Placement Office, E19-455, to talk with students interested in studying in France, Wed, Feb 7, 10am-5pm.

### High School Studies Program

Teachers needed for HSSP beginning Feb 10. For applications and more information, call X3-4882, or stop by Student Center Rm 467.

## Dining Service Specials

### Wednesday, January 31

Lunch: chop suey w/rice. Dinner: corned beef brisket w/cabbage.

### Thursday, February 1

Lunch: beef stew w/noodles. Dinner: roast sirloin of beef au jus.

### Friday, February 2

Lunch: baked bluefish. Dinner: dixie fried chicken w/gravy.

### Monday, February 5

Lunch: macaroni beef and tomato. Dinner: beef salisbury steak w/onion gravy.

### Tuesday, February 6

Lunch: chicken croquettes w/gravy. Dinner: herb roasted leg of lamb w/mint jelly.

### Wednesday, February 7

Lunch: baked stuffed frankfurters w/tomato sauce. Dinner: green pepper steak w/rice.

### Thursday, February 8

Lunch: chili con carne w/corn chips. Dinner: roast turkey w/dressing, gravy.

### Friday, February 9

Lunch: macaroni and cheese. Dinner: rolled stuffed flounder w/tomato sauce.

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 February 7 through February 16 to the Calendar Editor, Room 5-111, Ext. 3-3279, by noon Friday, February 2.

## New UROP Listings

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

### Electrical Engineering Department

Opportunity for an undergraduate with some EE background who is interested in biomedical instrumentation. Work would involve physiological measurements and EEG data analysis for patients with neurological disorders. Experience at the Boston Veterans Administration Hospital and/or MIT. Contact Prof. Timothy Johnson, 35-212, X3-6175.

### IBM Cambridge Scientific Center Cambridge

The research people at the IBM Cambridge Scientific Center, Technology Square, would like to meet both undergraduate and graduate students interested in projects (for credit only) in the areas of (1) Buffer memory modeling; (2) Analytic models of program scheduling rules; (3) paging in a multi-programming system; (4) Program behavior and its relation to dynamic scheduling; (5) CP-67 simulation; (6) Information system performance measurement methodology; (7) Computer networks and communications projects; (8) Relational memory applications and (9) System performance measurement and analysis.

### Department of Transportation Cambridge

The Transportation Systems Center is conducting a study of the noise environment of the Blue, Orange and Red Lines of the Boston MBTA. The objective of the study is to determine the most effective use of noise abatement funds based on a survey of existing conditions. The study will consist of (1) a survey of the noise levels within cars, on station platforms and at wayside sites using simple portable equipment; (2) Identification of principle sources of noise and paths of propagation; (3) display on charts and graphs of the collected data so that calculations of costs and effectiveness of appropriate abatement techniques can be carried out; and (4) participation in the formulation of a theoretical planning model of the MBTA noise environment and abatement techniques.

### Carroll Rehabilitation Center for the Visually Impaired Newton, Ma

Opportunity for two undergraduates to participate in an ongoing research project involving the measurement of stress as it occurs in relation to blindness. As part of a research "team" measuring stress by use of the EKG and radiocardiography, the students will assist in the computer analysis of the data collected. Students should have experience with computer analysis.

### Itek Corporation Lexington

The Itek Physics Group has proposed two project areas for undergraduates: (1) High Energy Laser System / studies and experimental program relating to high energy lasers, beam directors, target tracking; and (2) Coherent Optical Processing, Electro-Optic Image Modulation—studies and experimental program on longitudinal photo conductivity in single crystals, piezoelectric effects, spectral sensitivity, modular parameters, diffraction efficiency, and construction of an electrically addressed modulator.

### Education Development Center Newton

Opportunity for an undergraduate to assist in the preparation of a research report on the EDC curriculum reform projects sponsored by the National Science Foundation over the last 15-16 years. This would begin with a look at the PSSC (Physical Science Study Curriculum) program, the incorporation of ESI (EDC's former initials), and proceed to the science/math/social science projects now underway.

### Seashore Trolley Museum Kennebunkport, Maine

The museum which is staffed and operated largely by unpaid volunteers, deals with diverse problems in the areas of technology, long range planning and public relations. The museum offers study material for undergraduates interested in technological, social and economic history in the area of transportation as well as the area of looking at the social impact of the museum on the local community. Contact Henry Brainerd, DL2-322, X8-2467 Draper.

### Applicon, Inc. Burlington

Opportunities for undergraduates interested in software for computer graphics. The Design Assistant 700 TM uses a PDP-11 with 1 or 2 scopes, hardcopy output devices and a digitizing table. The inhouse software development group has a number of projects currently underway and would like to meet undergraduates interested in the same topic.

## Foreign Study Opportunities

### UNDERGRADUATE AND/OR GRADUATE

Massachusetts State Federation of Women's Clubs International Affairs Scholarships 1973.

Two scholarships are offered: a \$1000 scholarship for study abroad to a college student or graduate student who is a resident of Massachusetts; and a \$500 scholarship for a foreign student for study in Massachusetts.

Application forms and information may be obtained from: Mrs. Orrin Fuller, Chairman, International Affairs Scholarships, 92 Phinney's Lane, Centerville, Massachusetts 02632. Completed application forms must be sent to the Chairman by March 15, 1973. A personal interview at an appointed time will be required. See Prof. Locke or Paula Kelly, Room 10-303, Ext. 3-5243 for additional details.

## New Subject Listing

### 12.141 REMOTE SENSING OF THE EARTH

Prereq: —  
Year: U (1)  
2-0-7

A review and discussion of methods and motives for studying the earth's surface from airplanes, balloons and spacecraft. The application of remote sensing techniques to problems of geology, geophysics, resources, ecology and environment preservations. The course will be taught as a seminar with one two-hour per week session. Students will be expected to prepare one discussion session and one term paper on a topic of interest. Graduate credit can be arranged.

T.B. McCord, T.R. McGetchin

Organizational meeting will be held on Tuesday, February 6 at 12:30 in Room 54-322. If you are unable to attend the organizational meeting but are interested in the course either call or stop by Professor McCord's office (X3-3389, Room 24-422).

## Student Employment

### MIT Library Student Staff

Returning staff members sign up for Spring Term shifts on Monday, February 5, 7 pm, Student Center Library Conference Room. People on the fall term waiting list report at 7:45 pm. (See announcements in any MIT Library for details.)

### MIT Library Student Employment

Any full-time MIT student who wishes to apply for a position in the libraries may place his/her name on the spring term library staff waiting list on Monday, February 5, between 9 am and noon in the Student Center Library. Available hours will be assigned according to the sequence of names on the list.

## Other Opportunities

### Jackson Laboratory, Bar Harbor, Maine

The summer program for college, graduates, and medical students provides an opportunity to participate full-time in the research program of a member of the Jackson Laboratory's scientific staff.

The core of the program is participation in biomedical research. The staff members work with genetically defined laboratory mice and rabbits in problem-oriented research in genetics, embryology, physiology, biochemistry, immunology, endocrinology, cell biology, and psychology as applied to biomedical investigations in cancer, diabetes, cystic fibrosis, muscular dystrophy, neurological disorders, metabolic development, reproduction, behavior and animal health. Each of the animals used in this research carries inherited biological, biochemical or behavioral traits of unique value to research workers.

The program runs from June 10 to August 16. Participants work independently on research projects with guidance from a staff sponsor.

Students, unless they are married, are required to live adjacent to the main laboratory. No tuition is charged. The board and room fee is \$350. Students are required to purchase accident health insurance for about \$15. Additional expenses can be modest since student life is quite informal.

The application deadline is February 19. Applications may be obtained from the Jackson Laboratory, Bar Harbor, Maine 04609.

For further information contact the Office of Preprofessional Advising and Education, 10-186, extension 3-4158.



# National Conference at MIT to Weigh Energy Crisis

(Continued from page 1)

C. Koopmans of Yale who will speak on "Ways of Looking at Future Economic Growth, Resource and Energy Use."

Professor Robert Dorfman of Harvard will discuss the theory and practice of effluent control in an invited paper to begin the second day of the conference Tuesday morning, Feb. 13.

Edward Berlin of Berlin, Roisman and Kessler, Washington law firm, will open the final day of the conference with an invited paper dealing with the ability of regu-

latory and legislative institutions and systems in the U.S. to adapt to new and innovative energy conservation policies.

The final afternoon session Wednesday, Feb. 14, will begin with an invited paper by Dr. George N. Hatsopoulos, president of the Thermo Electron Corp., Waltham, Mass., dealing in detail with what has been called the entropy crisis. Dr. Hatsopoulos' company has been a research leader in energy conversion systems, including steam systems for possible use in automobiles.

One sub-session Monday morning will deal with modelling of energy systems, under the chairmanship of Professor Hendrik Houthakker of Harvard. A second on solar energy will be chaired by Dr. Paul F. Donovan of the National Science Foundation.

Of two Monday afternoon sub-sessions, one will be on the economics of energy with Dr. Robert J. Deam of the University of London as chairman. The other will address electricity demands in the U.S. and elsewhere and will be chaired by Dr. Paul P. Craig of

the NSF.

Tuesday morning, Dr. Paul W. MacAvoy of MIT will chair a sub-session on natural gas production, supplies and pricing, while David Wood of the U.S. Office of Emergency Preparedness will be chairman of a session on energy decision making uncertainty.

Tuesday afternoon, one sub-session, headed by MIT Professor Morris A. Adelman, will focus on energy supplies, particularly oil and coal, while a simultaneous session chaired by Professor Jesse Denton of the University of Penn-

sylvania, will concentrate on sulphur emission taxes.

Professor White will chair a Wednesday morning session on problems of regulatory agencies while MIT Professor Herbert H. Richardson will conduct a simultaneous session on energy transportation problems.

The final session Wednesday afternoon will be chaired by Professor Lester Lees of the California Institute of Technology and will center around conservation issues raised in Dr. Hatsopoulos' concluding invited paper.

## New Instrument

# Molecule Microscope 'Looks for the Leak'

Two MIT physicists Tuesday described a new microscope that "sees" with neutral molecules instead of light or charged particles.

They presented their paper at the annual meeting of the American Physical Society being held in New York this week from January 29 to February 1.

The report on work in progress was made by James C. Weaver, research associate in physics, and John G. King, professor of physics at MIT. Their paper, one of 737 presented at the APS meeting, was titled: "The Molecule Microscope: A New Instrument for Biological and Materials Science."

The device the researchers describe in their paper is a preliminary version of a tool they believe will offer new ways of obtaining information about the surface composition and permeability of such objects as cell membranes and tissues.

"The molecule microscope uses neutral molecules instead of the light or charged particles used in existing microscopes," the researchers write. "Since neutral molecules interact with the surface molecules of the sample through the same chemical forces that control the organization of the biological material, we obtain a new and different view not hitherto available.

"Notice that light or electrons do not tell us directly where more

water, for example, passes through a sample, but that making a picture using the very water molecules that come through the sample does tell us. This is the potential power of the molecule microscope; it offers the possibility of looking directly at a sample by using molecules that have a role in the biological or materials science system. A homely analogy: a leak in a roof might be found by looking for holes in it (using light), but the most direct way is to see where the water comes through on a rainy day."

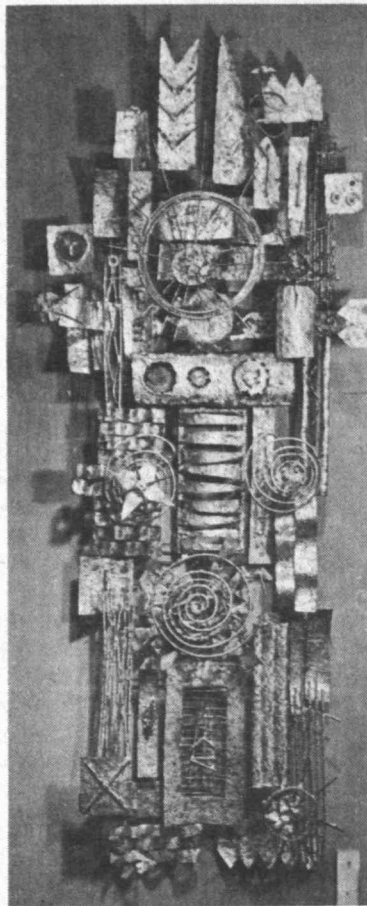
In the molecule microscope, a thin tissue sample is placed in contact with water at atmospheric pressure, while the space above the sample is pumped out to create a vacuum. Water molecules penetrating the sample can thus travel through vacuum in straight lines for comparatively long distances without being deflected before reaching the detector.

The detector of the stream of neutral molecules, located in the vacuum, consists of a sharp point at high voltage which ionizes molecules passing close to the tip. The ionized molecules are then accelerated to an ion amplifier and produce a signal proportional to the flux of molecules from the sample.

Between sample and detector is a plate containing a pinhole, which defines the area on the sample from which molecules reach the detector. By moving the pinhole back and forth in two dimensions, the flux of evaporating water molecules can be sampled at various points on the sample. Thus the detector signal varies as the pinhole is scanned, and permits the making of a TV-like picture of the sample which is brightest where most water goes through, providing a direct view of the sample's permeability.

The researchers' first instrument is limited in resolution to one-hundredth of an inch, but, they write: "Ultimately, using a molecule microscope design different from the simple one described here, but still using neutral molecules, a resolution of the order of 100 angstroms will be possible."

They conclude: "All forms of molecule microscopy have in common the ability to map surfaces according to spatial variations in their emission of neutral molecules. We believe that the intrinsic difficulty in working with neutral molecules is offset by the possibility of new kinds of information of interest in biology, chemistry, and materials science."



"Ikon"—brass on copper, 70" high

Sculptor C. Fayette Taylor employed animal forms and severe geometric shapes that combine his interests in nature and technology in his recent one-man show at the Thomas Crane Public Library in Quincy.

Professor Taylor, a nationally recognized authority on airplane engines, retired from the MIT Department of Mechanical Engineering in 1965.

Of the 27 pieces in the Quincy show, Diane Baltozer of *The Patriot Ledger* wrote, "The most

# Blend of Nature And Technology

Library Shows 27 Works  
By Sculptor C. Fayette Taylor



"Pelican"—collection of Mr. and Mrs. Charles Letson, Naples, Fla.

powerful of Taylor's animals is 'Heron,' thinly outlined in copper-plated steel. The open wings are light, suggesting feathers, yet there is, in the thrusting spread of wings and taut, bent legs, a magnificent power so often attributed to machines rather than nature.

"Other of Taylor's natural subjects are treated in the abstract, and it is in these that his engineering background merges with his artistic, nature-oriented temperament. 'Autumn II,' for instance, is a brass and copper wall

piece that suggests tumbling leaf-shapes, their veins very obviously melted, twisted nails."

Of his Quincy show, Taylor says, "I gave it no title. I don't feel that the show represents explicit feelings. My greatest joy is in building a variety of objects."

Taylor has had numerous one-man exhibits, including shows in Florida, Massachusetts, Rhode Island, and New York. He has contributed to group shows in Boston and elsewhere, and is represented in numerous private collections.

Some recent work is on display at the Harvard Square Branch, of the Harvard Trust, and the First National Bank, Boston. "Upward Bound," (1970) a hanging sculpture of brass tubing about 30 feet across, is in the Charles F. Hurley Building plaza in Government Center, Boston.

Three of his works are exhibited at MIT: an untitled stainless steel wall sculpture in the Faculty Club cocktail lounge; an untitled brass wall sculpture located in the headquarters of the chemistry department; and "Hydraulic Experiment," an assembly of water wheels behind glass, in the Parsons Laboratory lounge.

One of Taylor's favorite works was purchased recently by the Denver Art Museum for its outdoor sculpture garden. Entitled "Spirasphere," it is a contemporary six-foot-tall structure of stainless steel spirals on a bronze frame. "The spirals are flexible," explains Taylor, "and move with the wind."

Taylor's studio is in his home at 24 Monmouth Court, Brookline. He displays work at the Horizon Gallery, Newton; Rockport; Weeden Gallery, Boston; Concord, N.H.; Naples Gallery, Naples, Fla.; and North Truro Art Gallery, Truro.



"Goat"—in Boston Savings and Trust Co.

# Ruggers Get New Coach

For the first time in several years, the MIT Rugby Club will have a coach when the indoor practice season begins in February.

He is William Thilly, an assistant professor in nutrition and food science and a former member of the team, who has returned to MIT following a year at the University of Wisconsin.

Coach Thilly, an experienced rugby tactician, plans to revive the powerful 1-2-3 plays which earned the Rugby Club a 9-1 record in the 1969 fall season. His efforts will be abetted by the team captain, Roger Simmonds, a graduate student in urban planning, and a small but seasoned corps of veteran players.

The Club plans to field as many teams as possible in the upcoming season and will welcome members at all levels of experience. The Club is especially seeking new members with experience in—and enjoyment of—contact sports.

Indoor practices are scheduled for Tuesdays and Thursdays at 8 p.m., beginning Tuesday, February 6, in Rockwell Cage.

Interested members of the community may call Will Smith, 862-1502.



# CLASSIFIED ADS

## For Sale, Etc.

Dynaco FM3 stereo tuner, \$80; Sears vac clnr, \$20; new Rover 2000 TC muffler X7856 Linc.

Lthr belt, \$2; deluxe car headrests, \$8; bridge books, \$.50-\$1; lg vanilla flavoring, \$.50; K hangers, free; term paper manual, free; Tums, \$.25/box. Jim, X3-4177.

Heathkit model AA 111 28 watt stereo amp, no preamp, \$20. Al, X5371 Linc.

Garrard trntbl, fair cond, \$5. Karen, X3-3315.

Skis Blizzard metal 185 cm, gd cond, \$40; ski boots, f 7, Streif lace up, like new w/Allsop bt tree, \$25. Kosta, X3-2367.

AR trntbl, 3 yr old, runs peft, new ADC 90 QE cart, dustbg, \$60. Mark, 787-1197.

Lvng MIT forces sale of hse furn: beds, tbls, rugs, port dishwasher, v reas prices. 665-3131.

Mod 3 pc LR set, br & bl tweed, like new, \$200. X7284 Linc.

Qun sz bed, v comf, \$150. 492-4434.

Polaroid color pack 2 & acces, \$18 or best. Thomas, X3-2714.

Amp, prof model, like new, \$125 inc cover; 2 pole lamps, gd cond, \$4.50 ea; 2 office metal desks w/glass tops, gd cond, \$60 ea. Mary, X8-3423 Draper.

Ski pants, 4 pairs name brand, fem 14, \$10 ea. X3-7062.

Wool plush gold rug, 5'11" x 11'4", \$30; bl luxu lamp, rectnglr flourescent, \$25. 262-2543.

Sgl box spring & mattress, exc cond, \$45 or best. Mike, X3-4598.

Lange ski boots, fem 7N, perf cond, \$45. Jeanne, X7829 Linc.

Super-Takumar, 150mm f/4, case, hood, caps, exc cond, \$80; close-up lens, \$5. Harry, X3-2105.

Stereo system: Dynakit FM stereo tuner, pre amp and power amp, 2 Electro voice spkrs, best offer takes all. Prado, X426 Linc.

Book sets—Dickens, Dumas, Scott, Cooper; dbl bed, \$35; brn upols chr, \$35; flr lamp, \$10; alarm clock, hair dryer, Norelco tape recdr, \$15; phone set; 4-sec wicker cab, lg framed mirror, \$10; more. 868-3283.

Pr tubeless tires, 7.00 x 13, 1k new, on rims, 1 w/new tube, \$9.50 & \$7.50; pr child ballet shoes, 4, \$1; pr wd skis, 6', \$16; pr Austrian ski shoes, 8 1/2, \$12. X3-2728.

Nikon F: lens F1.4, 50mm (new), body (used), exc cond, \$195. Shaw, X3-5608.

Assrtd eng slide rules, cheap; SB-301 ham recvr with CW crystal, \$200, will haggle. X3-3161.

Scott LT 110 FM stereo tuner, Rec-o-kut N33H trntbl w/EFL S-1000 tone arm; yr choice of 3 cart. Barbara, X7613 Linc.

Conn B flat plastic clarinet, seldom played, \$100; lumber, 22 board ft of 2 x 8s, nego; formica walnut end tbl, \$10. Sandy, X3-2574.

Leather goat, 14-16, fur trim, nego; blue braided rug, 3 x 6; assrtd posters & cassettes. Pat, X8790 or Dorm X8-819, lv msg.

TEAC A-6010 tape deck, new heads, \$425 inc dust cover. 266-2819

Embroid sheepskin maxi coat, best; 18th cent automan flint lock, rosewood & silver work. Ilyas Bayar, X3-5239.

Thayer baby carr-stroller-carbed, exc cond, \$40. Joe, X7671 Linc.

Pure wool rugs, 2, nat grey, best qual, 13.5x14', 18x14', \$150 ea, or best; Presto humidifier, used once, was \$80, now \$50 or best. Susan, X3-7769.

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 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. The deadline is noon Friday.

Eico integrated amp, fac wired, exc cond, 20/20 RMS, \$65. Jack, X3-5259.

Head std skis, 220cm, Tyrolia heel, gd cond, \$25. X5430 Linc.

Mummy bag, stuff sack, 1 lb down, gd to 32°, \$30. Paul, X3-6805.

Woman's Canadian fig skates, 6 1/2, \$10. X8-3501 Draper.

Broilking broiler-ven, \$17; woman's fig skates, sz 8, \$10; Kodak cam, \$5. X8-4095.

Sansui amp/tuner, exc cond, \$160 or best. Doug, X3-1722.

Toshiba tape recdr, 5" reels, AC-DC, 1 7/8—3 3/4 ips, \$40 or best. X8-4464 Draper.

CCM, Man's hockey skates, 11, exc cond, recently sharpened, \$15. Kathy, X3-4905.

Twin bed, gd cond. X3-2629, X3-5883.

Twin bed, wd frame & box spring, exc cond, \$20. Vilma Barr, 876-8606.

Sears 110lb barbell set & Sears dumbbell set, \$12.50. Ed Flack, X3-2180.

Pr 6.50 x 13 tires mntd on wheels for Valiant or Dodge Dart, v gd cond, \$8 ea; 12 volt car battery. X3-6909.

Mathias Thoma violin, asking \$300, w/ haggle. Andy Celantano, X3-3161, lv msg.

Aquarium, 10 gal, fly equipped w/ filter pump, other access, wrought iron stand, sev trop fish, \$30. X3-2408.

## Vehicles

'62 Rambler classic, auto, v gd running cond, extra tires inc snows, best offer. X3-7783.

'63 Ply Valiant, new batt, snows, R&H, 79K, rebuilt eng, \$125. Dorm X0-271.

'64 Volvo 122 S, r & h, gd mech cond, \$600 or best. Gundersen, X3-6085.

'63 VW w/sun roof, running cond, \$160 or best. X9495 Dorm.

'65 Chrysler convert, yel, new exhaust sys, \$375 or best. Lee, X269 Linc.

'66 Olds dynamic 88 4 dr hdtop, uses reg gas, new exhaust sys, tires, 1 ownr, \$395. Carl, X7124 Linc.

'66 Ply Barracuda, 4 sp std, 55K, new br & clutch, snows, all new tires, nds some work, \$400. X1346 Draper.

'66 BMW w/ new br & clutch, exc eng and trans, MIT engineer owned, \$525; '67 Camaro convert, exc running cond, \$750. Lynn or Uria, X3-4330.

'67 VW sq back, exc cond, low mi, \$795 or best. X8-4980 Draper.

'67 VW, rebld eng, guar, \$700. Bob, X3-2701.

'67 Dodge Coronet, 2 dr sedan, 6 cyl, auto, r & h, gd cond, \$500 firm. Al, X8-1216 Draper.

'67 Ford Mustang, r, snows, 65K, \$300. Mario, 492-0541.

'67 Cougar V-8 auto, AM-FM r w/reverb unit, snows, p st, exc run cond, perf body, eng reworked, new br & trans, many other new parts. \$700. Jacob, X3-4710.

'68 Volvo 144S, 74K, \$900. X3-7466.

'68 VW sq back, rebld eng, \$1000. Ray, X8-2004 Draper.

'69 Austin America, \$600 or best. Tom, X7872 Linc.

'70 VW bus, exc cond, \$1745. X3-2065.

'70 Mercury Montego MX, auto, p br & st, a.c., \$1800. X8-1535 Draper.

'71 Opel Rallye, 26K, R&H, gd cond, \$1000. Valerie, X3-3861.

'71 Mustang hdtop, V-8, p st, auto, radials, exc cond, orig owner, must sell, lvng country, \$2000 or best. Lise, X3-1539.

'72 Ford LTD convert, all power w/ a.c., bl w/ wh int, 15K, will sell for \$3500. X412 Linc.

'72 Camaro, 8 cyl, 4-spd, \$2,200. Dom, X8-4075 Draper.

## Housing

Allston 5 rm apt avail now, 1 blk to T & shopping, \$135, couples. Greg, X8-3333 Draper.

Camb, nr Cent Sq, lux 1 BR apt in new bldg, lg LR, DR, w-w, disp, elevtr, prkng, avail now, \$230. Leslie, 492-7520 evgs.

Fram, mod 1 BR twnhse apt, dish & disp, a.c., patio, \$225, avail Feb 1; also Lange buckle ski boots, 8 1/2N. X3-4101.

South end twnhse of fac fam has rm w/B, easy walk or bus to MIT, no hassles, \$20/wk. 266-4194.

Wareham, 4-rm sgl hse, furn, mod K&B, hdwd flrs, married cpl pref, avail now-6/1, \$100/mo. X3-2795 or 3-2769.

Westgate I, effic avail for sublet 3/1-5/31, \$138/mo. John Brown, X3-2280.

Westgate I, unfurn eff apt for sublet, 2/1/73-9/1/73, \$138 inc util, exc view. Parvez, X3-2453, X3-4598.

Jay Pk, Vt, lakeside ski lodge, 200 acres, all utils, plowed, \$180/wk. Denny, X3-5606.

## Animals

Can't keep 2 adorable kittens, free to gd homes, hse trained. Jan, X3-4351.

AKC mini schnauzer pups, 10 wks old, salt & pepper, champ sired, docked, cropped, shots, wormed. Hank, X326 Linc.

Cat, all wh, m, nds gd home, friendly, 13 mo, free. 354-5727.

Kittens plus acces free, f, bl w/wh paws, hsebrkn, v affec. R. Russell, X3-2817, lv msg.

Free: 2 kittens, 3 mo old, shots, m, orange, gray & wh. X3-1961.

Siamese kittens, blue & lilac point, CFA reg, \$15. Doty, X3-7729.

Collie puppies, AKC, sable, shots, wormed, eyes checked. X3-1861.

## Lost and Found

Lost: silver bracelet w/initials LSN. X3-6829 Linc.

Found: Roll of pen recorder data dated 1/18/73, nr McCormick on 1/22. X9501 Dorm.

Lost: Coffee urn, 6 gal, belongs to Coffee Ann from 9-150 Lobby. Janet, X3-1557.

## Wanted

Cheap metal file cabinet, 2 or 4 dr. C. Draffin, X3-4978.

Fem rmmate for spacious rm in 5 rm apt nr Cent Sq, on Western Ave, \$85 w/use of K, wash & dryer. X3-3228.

Apt, 1-BR, nr T, for Mar 1 or later, furn or unfurn, \$180 max. Joan, X8-4565 Draper.

Tires 6.95 x 14 and 7.00 or 7.35 x 14, regular. X3-3120.

Aquarium & equip, 50 gal or more, espec salt water aquarium. Martha, X3-5124.

Garage to store auto in Belmont area. X1366 Linc.

Rmmate for 5-BR hse, Winthrop, 2-story, quiet neighborhd, split rent, about \$55/mo + util. Victor, X3-2380.

Woman's fig skates, 6 1/2-7M, 7 1/2N X5708 Linc.

Fem rmmate for own rm in lg apt on T, Brk, \$100/mo. Jane, X3-6732.

Fem rmmate for Bcn St, Bos, apt, own furn studio in dbl studio setup, mod K&B, \$96/mo. Kathy, X3-4873.

Inexpensive drafting lamps. Ginny, X3-2380 or Dorm X9-869.

Fem rmmate, 23+, quiet, clean, non-smoker, own rm in 2-BR furn apt, nr MIT, Harv Sq, \$93/mo. X3-2920.

Fem rmmate for own rm in lg, sunny Camb apt on treelined st, 4 BR, \$80/mo. X3-6808.

Fem rmmate for own rm in Harv Sq hse, avail now. Cynthia, X3-6251.

Rmmate for lg apt bet H & Cent sqs, own rm. Peggy, X3-6239.

Rmmate to share 4 BR Camb apt w/3 MIT students, 5 min walk to MIT, own rm, share K, LR, B, furn, ht inc, \$69, avail Feb 5. Harold, X3-5607.

## Miscellaneous

Wl do gen or thesis typing. Ann, X3-1713.

Friday night parties for sgl adults over 30, wine, cheese, conversation, nice people. Arlene, X3-6010.

Income tax preparation by qualified person, apts at convenience, v reas rates. Steve X8-3531.

## Positions Available

The Office of Personnel Relations is seeking individuals from within the Institute to fill the following opening:

**Mover**  
Will handle and transport various materials and equipment (medium or heavy nature) to designated locations; also snow removal.

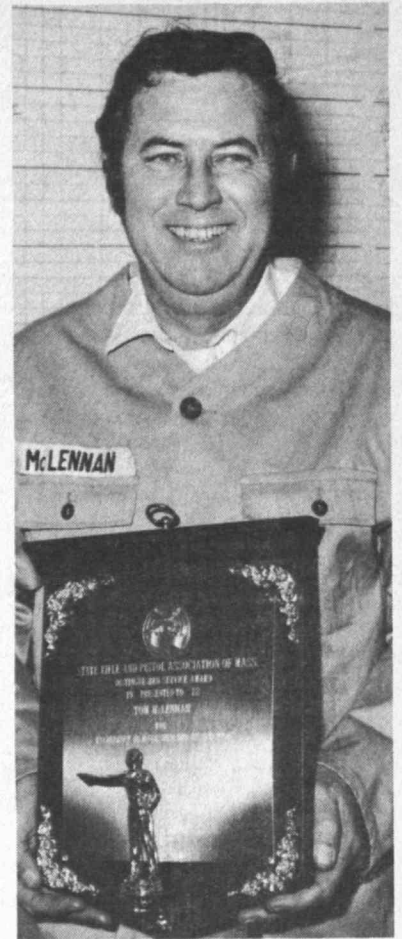
One year experience in general moving procedures, rigging, loading and unloading heavy equipment.

Ability to pass special physical examination.  
It is desirable to have had some experience in special handling of equipment such as oil filled transformers, etc.  
Massachusetts drivers license without restriction limitation.

HOURLY, extension 3-4268

**Technical Asst. IV** will engage in behavioral studies and assist in surgery to examine space perception and perceptual-motor coordination in kittens. Care for animals, order lab supplies keep records. Interest in research; education in experimental psychology or biology preferred.

Biweekly 3-4251



## Coach McLennan with award Pistol Coach, Team Honored For Service

Thomas P. McLennan, MIT pistol coach, has received the Massachusetts Rifle and Pistol Association distinguished service award for "excellence in marksmanship instruction." In addition, the MIT varsity pistol team was also honored for "outstanding service to the shooting sport."

In his seven years at MIT, McLennan fostered new interest in the sport of pistol. Records show that more than 20,000 individuals have utilized the pistol range in more than 40,000 man-hours. The range is used by the Rifle and Pistol Club, physical education classes and in community adult courses and has hosted Olympic and Pan American Team tryouts.

McLennan has coached eight MIT students to All American status. In 1971, MIT won the National Collegiate International Team Target Championship. Last year, McLennan's students were narrowly edged by West Point for the National Standard Pistol Title.

## Slides Found

One package of glass slides, mailed by an unidentified person or department at the Institute, has been returned to the Graphic Arts Mail Service from the Post Office because the mailing label was missing. Owner of the slides should call Donald Collupy on Ext. 3-4765 to claim the package.

## Lose an ID Card?

Institute identification cards of the following persons have been found in the Medical Department and may be claimed at the receptionist's desk on the second floor of Building 11:

Jeanne M. Annotte, Richard J. Casler, Martin Fuchs, Lawrence P. Goldstein, Alexandre Henry, Joseph Lassiter, Zemen Labne-Dengel, William C. O'Neill, Dorian Punj, Michael Sayers, Peter Schein, Linda Sharpe.





Charles O'Neal, director of the MIT Real Estate Office, discusses the model apartment with several interested visitors.

—Photos by Marc PoKempner



Joseph Collins, special assistant in the MIT Chairman's office, escorts one senior citizen on a tour of the model apartment.

## Cambridge Senior Citizens View Housing Model

An Open House, sponsored by the Cambridge Council in Aging, Cambridge Housing Authority and MIT, was held Monday, January 29, to give Cambridge senior citizens a look at a model efficiency apartment of the kind included in the "Turnkey" housing being built by MIT for the Housing Authority.

The MIT housing for the elderly is now under construction at three sites in Cambridge—at Clarendon Avenue in North Cambridge; on Hamilton Street in Cambridge-

port; and on Gore Street in East Cambridge.

A model apartment has been assembled in a former garage building at the East Cambridge site, on Cambridge St. near the corner of Lambert St.

Two additional Open House days, Wednesday, January 31, and Monday, February 5, also are scheduled.

Free transportation will be provided by MIT and the Cambridge Housing Authority for senior citizens from a variety of central lo-

cations throughout the city on the Open House days. Information about buses may be obtained by calling the Council on Aging, 876-6800, Ext. 310 or 311, 10am-4pm daily.

Charles Moore of 44 Clarendon Ave., chairman of the Cambridge Council on Aging, believes the elderly of Cambridge will be particularly interested in the unique design of the apartments.

"The design is the result of a series of consultations," he said, "held during the planning stages

between a group of senior citizens—a subcommittee on housing of the Cambridge Committee of Elders—and representatives of MIT and the architect, Benjamin Thompson Associates.

"Much time and thought was given to this project by the elders, by the architect, and by MIT. We hope senior citizens will attend the Open House in large numbers."

Catherine Hanley, 843 Ellery St., a subcommittee member now serving on the Council on Aging, said federal regulations gave de-

signers a difficult problem.

"The federal 'Turnkey' program under which the 684 units of public housing for the elderly is being developed requires that any single individual in this housing occupy an 'efficiency apartment,' i.e. without a separate bedroom," she said. "We think we have been successful in designing an apartment that is truly livable—with adequate privacy and good separation of living, sleeping, and cooking areas—within the federal regulations."

## IAP Winds Up Amid Bustle

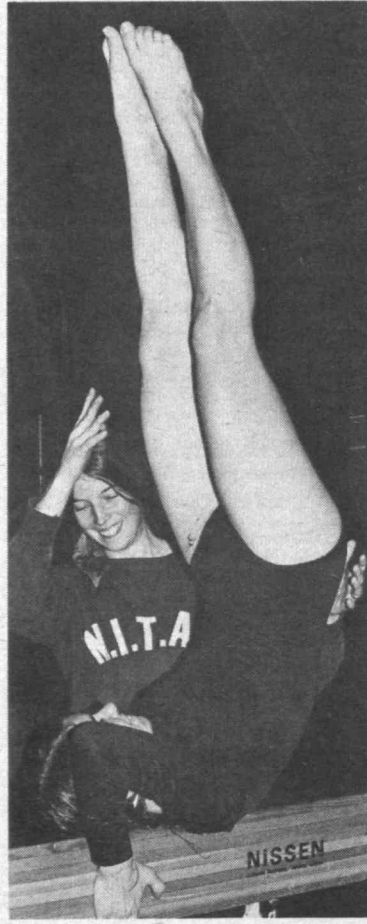
Photos by Margo Foote and Marc PoKempner



Corridor Physics Lab



Novice painter works on life study in acrylics



Balance beam gymnastics



Glass-blower produces a delicate vase



Would-be photographers in Creative Photography studio



Chinese dance workshop with Chiang Ching

## Funds Cut May Close Accelerator

(Continued from page 1)

overtake us. But unfortunately, this is not only the usual course in nature, but also in technology. And this is what has happened to CEA. In times more prosperous for Science, we might have had a somewhat longer lifetime, but the start up of the large new NAL (National Accelerator Laboratory) near Chicago is straining the high energy physics budget to a degree never known before."

In 1970, the funds of the Laboratory were reduced by 35 percent. Since that time, the staff has concentrated on the development and use of colliding beams. Counter rotating beams of electrons and positrons are smashed together so physicists may observe the products of the collision.

With 2.5 billion electron volts in each beam, the total energy of 5 billion electron volts is dissipated in particle collisions. If a single beam collided with a stationary target, it would have to be many thousands of times as energetic to provide that much energy in collision.

CEA physicists, in a first experiment with colliding beams of 2.0 billion electron volts each, showed that the production of a class of particles known as hadrons in these collisions was greater than expected. This is the highest energy at which such an experiment has been completed anywhere.

*Synchrotron Radiation.*

As any charged particle accelerates, it radiates energy. When moving in a circle, particles moving at speeds close to the speed of light radiate in the plane of the orbit. At the CEA, the electrons have so much energy that the radiation takes the form of x-rays of high energy, highly useful in astronomy, chemistry, solid state physics, biology and medicine. Several experiments in solid state physics and biology are underway at CEA.