

## Medical Writings Yield Clue to Medieval Supernova

By ROBERT C. DI IORIO  
Staff Writer

The discovery in an Arabic text of a physician's eyewitness account of the dazzling supernova that occurred in 1054 has led an MIT physicist to conclude that medical writings from the medieval Islamic world have been overlooked as a source of what was known about astronomy in ancient times.

Brecher, an associate professor of physics, not only has pointed to a valuable new source for students of ancient astronomy, but has provided the answer to a question that has baffled scientists for years.

Why, scholars have wondered, have no accounts of the July 4, 1054, supernova, giving rise to the presently observable Crab Nebula, been found in European and Middle Eastern writings? The event was recorded by several astrono-

mers in China and Japan. Could it be that no one in the Western Hemisphere saw the supernova which was visible in daylight for 23 days and at night for six months?

Attempts to answer that question have led to some dubious theories, Professor Brecher said in an article in the June issue of *Nature*, the British scientific journal. One historian of science, he said, concluded that "the failure of medieval Europeans and Arabs to

recognize such phenomena was not due to any difficulty in seeing them, but to prejudice and spiritual inertia connected with the groundless belief in celestial perfection." But since those astronomers accurately reported a supernova that occurred in 1006, only 48 years earlier, Professor Brecher has never considered that a convincing explanation. Others have suggested that the whole of the Middle East and Europe were

clouded out for six months, "an even more dubious proposition," as Professor Brecher put it.

Professor Brecher says a more accurate answer to why no European or Arabic reference to the 1054 supernova has been found is that scholars have been looking in the wrong place. There have been exhaustive searches of the astronomical literature of the time, but

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## Retirement Raised to 70 For Faculty

The mandatory retirement date for tenured members of the MIT faculty will be raised to 70 years of age, as of next January 1.

In a memorandum to the faculty and staff earlier this month, Chancellor Paul E. Gray said amendments effective January 1, 1979, to the federal Age Discrimination in Employment Act will prohibit mandatory retirement because of age before 70. Application of the Act to tenured faculty members was deferred by Congress until July 1, 1982. However, MIT will not make use of that exemption.

"We reject the idea that tenured faculty members should be treated differently from Institute staff members and other employees in the opportunity to choose whether to continue at MIT between 65 and 70," Chancellor Gray said.

"Hence, it will be our policy that tenured faculty members who are now scheduled to retire during the years 1979, 1980 and 1981 will be

(Continued on page 3)

## Superconducting Magnet Meeting Planned Here

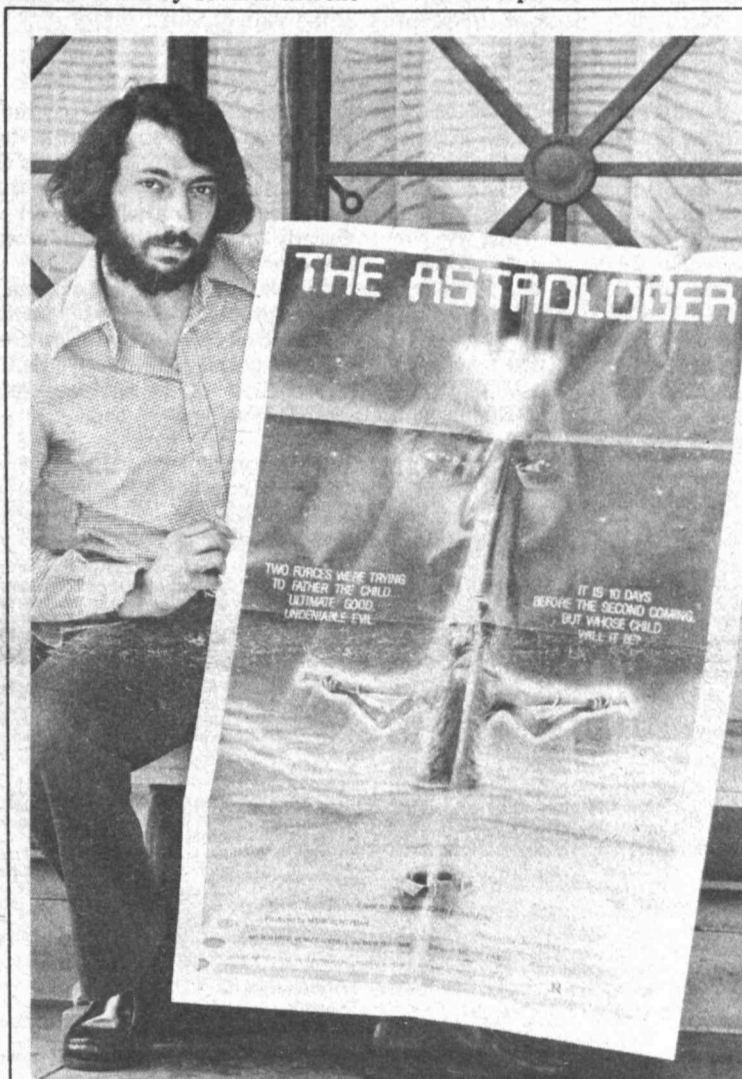
A conference on the design of superconducting magnets for applications in magnetohydrodynamics (MHD) power generation will be held October 18-19 at MIT.

Host for the conference will be the Superconducting MHD Magnet Technology Group of MIT's Francis Bitter National Magnet Laboratory, which is serving as the prime contractor for the US Department of Energy (DOE) in an extensive cooperative plan to engage industry in developing skills necessary to build commercial power plant superconducting MHD magnets by the 1990s.

Speakers will include representatives of government and of industry, university, and national laboratories working in the field. They will review the US national MHD program, the cooperative program between the US and the USSR, and specific technical areas now being investigated. Representatives from DOE will include Richard V. Shanklin, acting director of the department's MHD Division, and George Rudins and Marshall Sluyter, contract officers in the division.

In charge of the conference are Dr. D. Bruce Montgomery, associate director of the Magnet Laboratory and one of the world's leading magnet designers, and John E.C. Williams, head of the Laboratory's Advanced Development Group.

Persons interested in attending the conference should contact A.M. Dawson, Room NW14-2524, x3-5547.



What careers are open to the holder of an SB in physics from MIT? Mark Buntzman, '71, has gone into moviemaking, and has produced his first feature, a science fiction film called *The Astrologer*. Mr. Buntzman stars in the movie as well (that's his face in the poster he is holding). *The Astrologer* (rated R) will open in test markets, among them Jacksonville, Fla., in August.

## Sloan School Announces September Convocation

A three-day convocation for alumni and alumnae of the Alfred P. Sloan School of Management will be held September 28-30, Dean William F. Pounds has announced.

The program, which is held every three years, is expected to attract more than 300 Course XV graduates and their spouses. Approximately 5300 persons have received the SB, SM and PhD degrees in management science since 1952, when the school was established as the School of Industrial Management.

The convocation excludes the Sloan Fellows and Senior Executives, who have their own Convocation.

The program, which has as its theme, "Business-Government and National Economic Strategy," will include speakers, panel discussions and seminars.

Among the participants will be two internationally-known MIT economists, Dr. Lester C. Thurow, professor of economics and management, and Dr. Robert H. Solow, Institute Professor and professor

of economics, and William I. Spencer, president and chief administrative officer of Citibank, N.A., and Citicorp.

MIT President Jerome B. Wiesner will also address the graduates.

A panel chaired by Professor Thurow will be made up of five Sloan School graduates who are senior officials of major companies. They are: Richard A. Crowell (SB '62, SM '64, PhD '67), senior vice president of The Boston Company, Inc.; John F. Fort III (SM '66), president of the Simplex Wire and Cable Company; Stanley M. Proctor (SB '43), president of the Stanley M. Proctor Company and an MIT Corporation member; Denis M. Slavich (PhD '71), manager of investments and economic services for the Bechtel Corporation; and Erskine N. White, Jr. (SM '49), executive vice president of Textron, Inc.

A highlight of the convocation will be a reception Friday evening, Sept. 29, at the Hyatt Regency Hotel in Cambridge.

## Huge Magnetic Field Detected in Pulsar

By WILLIAM T. STRUBLE  
Staff Writer

Neutron stars, which are believed to form when a large star burns up its fuel and collapses, contain the mass of a star in a sphere only 10 miles in diameter, and they are so densely packed that a spoonful of material from the center would weigh a billion tons.

And, according to theory, these neutron stars can have incredibly strong magnetic fields of about a trillion gauss or more. By comparison, the earth's magnetic field is about 0.5 gauss.

Neutron stars are also called pulsars because they emit radio and X-ray signals in a very precise periodic fashion as if they were fulfilling the role of lighthouses in our galaxy. Most X-ray pulsars are probably members of a binary system with a companion star hotter than our sun. Astrophysicists believe that hydrogen from the companion star spirals into the neutron star, fueling a "hot spot" that emits X-rays with a periodic signal corresponding to the rotation of the neutron star.

Recent observations and studies

(Continued on page 3)

## Local Water Quality Control A Failure, MIT Report Says

A provision of the Federal Water Pollution Control Act designed to bring about water quality improvement at the local level has been a costly failure, according to an MIT research report.

The author of the report, Thomas D. Lustig, says that the federal government has spent close to \$300 million to fund area-wide planning agencies throughout the nation, but that little of a practical nature has been accomplished.

"The agencies have generated voluminous plans," he said in an interview, "but the likelihood of their improving water quality is

not great. Although they may have laid some groundwork and discussed ideas, the purpose of the federal act's provision was to do more than merely plan—it was to get something done. But I doubt much will be accomplished."

Lustig, now a lawyer practicing real estate and land use law at Nixon, Hargrave, Devans & Doyle in Rochester, N.Y., did the research for his PhD thesis in water resource engineering at MIT. He received the degree this June. The research was undertaken as part

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## Supervisory Development Pilot Program Completed

A pilot MIT Supervisor Development Program, coordinated by the Office of Personnel Development, was completed in June. Those supervisors who completed the program are:

Ronald J. Byrnes, Physical Plant; Kreon L. Cyros, Office of Facilities Management Systems; Timothy F. Dempsey, Jr., Information Processing Services; Patrick J. Frazier, Housing and Food Service; Kate S. Herzog, Aeronautics and Astronautics Library.

Phyllis-Lou K. Jackson, Career Planning & Placement; Michelle Lamarre, Medical Department; William M. Lyons, Campus Patrol; James F. McTaggart, Physical Plant; Priscilla Mead, Office of Personnel Development.

Frank H. Palmer, Physical Plant; Donald T. Severson, Magnet Laboratory; David C. Van Hoy, Libraries; Linda E. Ward, Center for Advanced Engineering Study; Kenneth H. Wolff, Medical Department.

Participants were identified with the assistance of members of the Academic Council. The program emphasized the supervisor's needs

for clarity in understanding MIT policy, as well as the related human relations skills required for effective policy implementation.

Program content included such

(Continued on page 8)

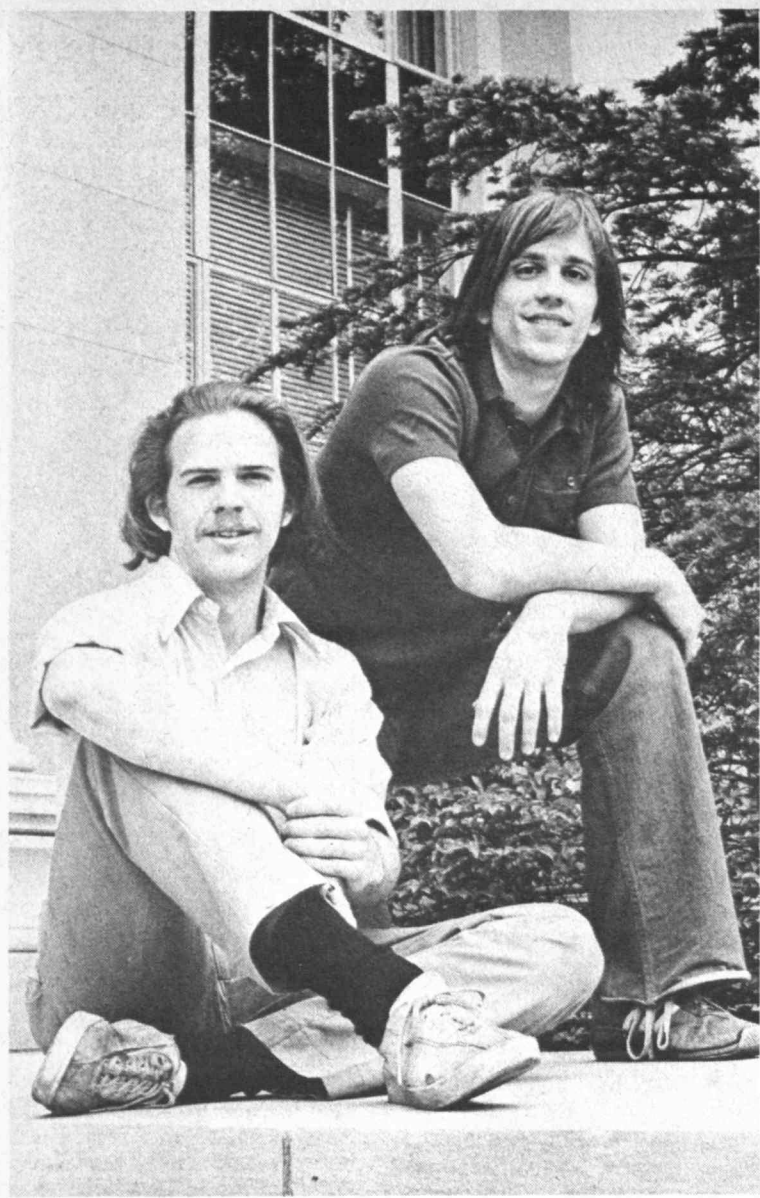
## Coronary Risk Seminar Today

Dr. Samuel W. Stein, assistant medical director in the Medical Department, will lead a discussion on risk factors that can lead to coronary heart disease at a program at noon today

(Wednesday, July 26) in the Bush Room (10-105). The discussion will follow showing a film, "Our Way of Life," produced by the American Heart Association. The program, sponsored by the Health Information and Education Office of the Medical Department, is open to all members of the community and their families.



Dr. Stein



WITH DRAMATIC AMBITIONS, MIT students James Walker (left) and Robert Hull return for their second summer with the New Jersey Shakespeare Festival.  
—Photo by Calvin Campbell

## MIT Students Invited Back To NJ Shakespeare Festival

With an eye toward careers in professional theater, two MIT students have packed their bags and headed for their second summer season as interns with the New Jersey Shakespeare Festival in Madison, N.J.

Robert J. Hull of Broomall, Pa., who will be a senior in linguistics and philosophy at MIT next fall, and James L. Walker of Wilmington, N.C., who will be a senior in mathematics, both spent last summer at Madison as Shakespeare interns.

While they view their attendance at MIT as a solid, educational experience Mr. Hull and Mr. Walker say their first love is acting.

"There's just something about being on the stage . . . it's hard to describe," says Mr. Walker.

Mr. Hull says acting is "a chance to experience a world that someone else has created." He is also gearing his efforts toward writing plays.

Both students were active in drama in high school. When they arrived at MIT as freshmen, they signed up with the MIT Shakespeare Ensemble, a group of some 25 students who present two full-scale productions a year. The Ensemble has also performed outside of MIT at the Boston Public Library, the Isabella Stewart Gardner Museum, local high schools and the Phillips Exeter Academy in Exeter, N.H.

When he auditioned for the Ensemble as a freshman, Mr. Walker was told Shakespeare is the best learning ground an actor can have.

"But," he said, "now that I understand what theater is all about, I appreciate the Ensemble much more."

In his three years with the group, Mr. Walker has played Sir John Falstaff in "Henry IV Part I," Don Armado in "Love's Labour's Lost," and most recently, Tybalt and the Apothecary in the Ensemble's spring production of "Romeo and Juliet."

Mr. Hull has played Grumio in "The Taming of the Shrew," Berowne in "Love's Labour's Lost" and Mercutio in "Romeo and

Juliet." He has already been cast for the part of Claudio in the Ensemble's fall production of "Much Ado About Nothing."

As interns with the New Jersey Shakespeare Festival, the students will be doing walk-ons for the most part and, if lucky, an occasional minor role. They will also be responsible for odd jobs at the Festival, such as lighting, carpentry, clean-up, etc.

In residence at Drew University, the Festival accepts some 50 interns a year for an intensive summer program that includes classes in voice, movement, technique and calisthenics designed for acting. The program usually invites only a handful of interns to return for a second season.

To pay for living expenses, Mr. Hull and Mr. Walker will be supported, in part, by a grant from the MIT Council for the Arts. As interns, they will receive no pay for their efforts. However, their experience will expose them to professional actors and professional theater, something both agree they cannot get from the classroom.

## Cuccurullo Prints At Faculty Club

Linda Cuccurullo, an art and architecture cataloguer at MIT's Rotch Library, will exhibit her photographic works at the Faculty Club beginning Friday, July 28.

In her first public exhibition, Ms. Cuccurullo will feature her black-and-white landscapes along with some portraits and color photographs.

Ms. Cuccurullo develops and prints all her black-and-white photos and does her own matting and framing. She describes herself as an amateur photographer, but admits that people are asking her to sell some of her work.

Ms. Cuccurullo got interested in photography only four years ago, when she took a course with the MIT Student Art Association. "It was just for recreation then," she explains, adding, "I'm much more serious about it now."

The Cuccurullo exhibit will be on display in the Faculty Club lounge through August 31.

## Press Issues Translation Of Maffei Book on Space

By SHARON BASCO  
MIT Press

*Beyond the Moon* by Paolo Maffei, now in its seventh printing in Italian, has recently been published by the MIT Press in a translation by D.J.K. O'Connell.

*Beyond the Moon* invites us to take an imaginary journey—beyond the moon to the sun and planets, to the stars and galaxies, to the outer limits of the known universe and of human knowledge. All that is required for this trip is curiosity and a willingness to absorb the concepts and findings of modern science as they are presented clearly and simply along the way.

Traversing ever greater reaches of space and returning to the time when the universe may have begun its evolution, the book—chosen in this translation as an alternate for three book clubs, including the Book-of-the-Month



## Book Explores Water Resources

Is there enough water in the United States to support a massive effort to produce synthetic fuels from coal and oil shale?

That is the question posed in *Water in Synthetic Fuel Production: The Technology and Alternatives* by Ronald F. Probst, David Goldstein and Harris Gold, just published by MIT Press.

The answer reached by Professor Probst of the MIT Department of Mechanical Engineering and his co-authors: A relatively

high level of synthetic fuel production can be supported in the principal coal and shale regions of the United States, except in the most arid areas and where water is already largely allocated to other uses.

The book also explores a second water problem associated with synthetic fuel production: How and where to get rid of the large quantities of dirty water that are left after the fuel is produced.

Club—examines along its route the structure and internal processes of the sun, the planets and their satellites, the comets and asteroids, Alpha Centauri (the nearest star), double and multiple stars, white dwarfs, red giants, neutron stars, novae and supernovae, the Magellanic Clouds, the Andromeda nebula . . . well, we could go on and on into infinity—and Maffei takes us there.

Maffei incorporates into our space journey such recent material as the findings of the space probes that landed on Mars and explored the vicinities of other planets. Over 130 astronomical photographs, drawings, and diagrams enhance the sense of realism for those voyaging on the power of their imaginations.

Paolo Maffei is professor of astrophysics at the University of Catania and director of its astrophysical observatory. He is the discoverer of two infrared galaxies, which were named Maffei 1 and Maffei 2. The translator, D.J.K. O'Connell, was formerly director of the Vatican Observatory.

### CABLE TV SCHEDULE

## X3-3625

July 26 - August 15, 1978

Day	Time	Program
Wednesday, July 26	10am	"IMPRESSIONS OF CHINA" MIT Provost Walter Rosenblith speaks about his three weeks in China.
	11am	MITV PRESENTS: The Greater Boston Songfest
	12noon	VIDEO CLUB PRESENTS: Carl Sagan speaking about mankind and extraterrestrials
Thursday, July 27	10am	"SEXISM IN SCIENCE" from the Black Rose lecture series
	12noon	BASEMENT VIDEO PRESENTS: David Cort and his time machine
	1pm	VIDEO CLUB PRESENTS: Look-around—comedy from Baker House
Friday, July 28	10am	DANIEL PATRICK MOYNIHAN speaks in Kresge Auditorium. Recorded Dec., 1977.
	11:30am	VIDEO CLUB PRESENTS: "The Physicist"—a play about insanity
	1pm	BASEMENT VIDEO PRESENTS: "SEABROOK"—scenes from the occupation and interviews of MIT student participants
Monday, July 31	10am	"THE APPLICATIONS REVOLUTION PROMISED BY COMMUNICATIONS SATELLITES." Recorded 3/9/78.
	11:30am	"ILLUSION," "PAPER CYCLE," and "MISCELLUS SACCUS" by Brian Railla
	12noon	RHETORIC AND JOURNALISM with Ed Diamond and guest Barbara Moore. Discussion of the legal, informational, and moral considerations of journalists.
	1pm	VIDEO CLUB PRESENTS: Look-around—comedy by David Bell
Tuesday, August 1	10am-12noon	WORLD CHANGE & WORLD SECURITY by McGeorge Bundy, President of the Ford Foundation. Recorded in Kresge 3/15/77.
	12-12:30pm	MIT FILM/VIDEO SECTION PRESENTS: "Boston Marathon '78"—Katy Furze; "Fish Pier"—Don Schaeffer; "Breaking Glass"—Ellen Kozak; "Baby in the Subway"; and "20th Century Painting on Videodisc"—Michael Naimark
	12:30pm	CYCLE OF LIFE: by John Barnett. Sculptor Vince Ricci uses a dancer's body to mold and cast his sculptures.
	1pm	BASEMENT VIDEO PRESENTS: Jazz coffeehouse
Wednesday, August 2	10am	DANIEL PATRICK MOYNIHAN (See 7/28, 10am, for details)
	11:30am	VIDEO CLUB PRESENTS: (See 7/28, 11:30am, for details)

Day	Time	Program
Thursday, August 3	10am	"THE APPLICATIONS REVOLUTION PROMISED BY COMMUNICATIONS SATELLITE" Recorded 3/9/78.
	11:30am	"ILLUSION," "PAPER CYCLE," and "MISCELLUS SACCUS" by Brian Railla
	12noon	RHETORIC & JOURNALISM (See 7/31, 12noon, for details)
	1pm	VIDEO CLUB PRESENTS: Look-around—comedy by David Bell
Friday, August 4	10am-12noon	WORLD CHANGE & WORLD SECURITY (See 8/1, 10-12noon, for details)
	12-12:30pm	MIT FILM/VIDEO SECTION PRESENTS: (See 8/1, 12-12:30pm, for details)
	12:30pm	CYCLE OF LIFE: (See 8/1, 12:30pm, for details)
	1pm	BASEMENT VIDEO PRESENTS: Jazz coffeehouse
Monday, August 7	10am	"IMPRESSIONS OF CHINA" (See 7/26, 10am, for details)
	11am	MITV PRESENTS: The Greater Boston Songfest
	12noon	VIDEO CLUB PRESENTS: (See 7/26, 12noon, for details)
Tuesday, August 8	10am	"SEXISM IN SCIENCE" from the Black Rose lecture series
	12noon	BASEMENT VIDEO PRESENTS: David Cort and his time machine
	1pm	VIDEO CLUB PRESENTS: Look-around—comedy from Baker House
Wednesday, August 9	10am	DANIEL PATRICK MOYNIHAN speaks in Kresge Auditorium. Recorded Dec., 1977.
	11:30am	VIDEO CLUB PRESENTS: (See 7/28, 11:30am, for details)
	1pm	BASEMENT VIDEO PRESENTS: (See 7/28, 1pm, for details)
Thursday, August 10	10am	"THE APPLICATIONS REVOLUTION PROMISED BY COMMUNICATIONS SATELLITES." Recorded 3/9/78.
	11:30am	"ILLUSION," "PAPER CYCLE," and "MISCELLUS SACCUS" by Brian Railla
	12noon	RHETORIC & JOURNALISM (See 7/31, 12noon, for details)
	1pm	VIDEO CLUB PRESENTS: Look-around—comedy by David Bell
Friday, August 11	10am-12noon	WORLD CHANGE & WORLD SECURITY (See 8/1, 10-12noon, for details)
	12-12:30pm	MIT FILM/VIDEO SECTION PRESENTS: (See 8/1, 12-12:30pm, for details)
	12:30pm	CYCLE OF LIFE: (See 8/1, 12:30pm, for details)
	1pm	BASEMENT VIDEO PRESENTS: Jazz coffeehouse
Monday, August 14	10am	"IMPRESSIONS OF CHINA" (See 7/26, 10am, for details)
	11am	MITV PRESENTS: The Greater Boston Songfest
	12noon	VIDEO CLUB PRESENTS: (See 7/26, 12noon, for details)
Tuesday, August 15	10am	"SEXISM IN SCIENCE" (See 7/27, 10am, for details)
	12noon	BASEMENT VIDEO PRESENTS: (See 7/27, 12noon, for details)
	1pm	VIDEO CLUB PRESENTS: (See 7/27, 1pm, for details)

## INSTITUTE NOTICES

### Announcements

**Academic Midway**—Any group, not previously notified, wishing to participate in the academic midway Wednesday of Residence/Orientation Week (Sept. 6) please leave a message for Mary Rorabaugh at the FAC office, x3-6771, by Aug. 4.

**Conversation Exchange\*\***—The MIT Wives' Group has compiled a list of international women interested in exchanging foreign language conversation for English conversation. Contact: Karen Devine, x3-2916.

### Club Notes

**Beginning sailing instruction\*\***—every Wednesday 5:15pm at MIT Sailing Pavilion.

**MIT Bridge Club\***—ACBL duplicate open pairs game Thursdays, 7pm, Rm W20-473. Info: 494-8593. Admission 25.

**Hobby Shop\*\***—Mon-Fri, 10am-6pm, Rm W30-031. Fees: \$10/term for students, \$15/term for community. Info: x3-4343.

**MIT Juggling Club\***—Thursdays 7:30-11pm Rm 407 Student Center; Sundays 1-4pm Kresge Oval. Visitors welcome.

**Summer series racing\*\***—Racing skipper rating required, Tuesdays and Thursdays 5:15pm. Novice racing, provisional rating required, Mondays 5:15pm throughout the summer.

**MIT Women's Rugby Club\*\***—Practice every Friday 5:30-7:30pm. Games alternate Saturdays. Any woman with athletic card welcome. Info, call Sharon x3-6825.

### Religious Activities

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

**Catholic Liturgy Service\***—10am Sundays through August 13, Little Theatre, Kresge Auditorium. Noon mass, Tuesday, August 15, Little Theatre.

**Interdenominational**—Worship and holy communion, Wednesdays, 5:05pm, Chapel, sponsored by Lutheran-Episcopal Ministry.

**MIT Islamic Society\***—weekly Friday prayers, 1pm, Kresge Auditorium, Rehearsal Room B.

**Christian Service\***—Sundays, 10:30am, Chapel. Singing, preaching, sometimes testimonies. Prayer following. All invited.

### New UROP Listings

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

**Computer Systems Design**  
This project will involve the design and implementation of data collection terminals for use in a job shop environment at Nimrod Press in Boston. The student(s) invited to participate in this project will be responsible for designing and constructing prototypes for the data collection terminals, connecting the terminals through multiplexors or other devices to the control microcomputer, and assisting in the development of control software for the terminals. The student(s) will be encouraged to exercise their own creative ingenuity in developing a workable system, thus allowing plenty of room for experimentation. For credit only.

**Property Value Study**  
The Massachusetts Banking Department has been conducting a series of analyses on urban lending practices. The initial study was on issues of redlining and bank disinvestment. The Research Division of the Department is looking for a student to assist in the studies and ultimately, to use the data to provide a basis for developing reinvestment policies and programs. Strong analytical, quantitative, and report writing ability are essential.

### TECH TALK Volume 23, Number 2 July 26, 1978

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

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

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# Huge Magnetic Field Detected in Pulsar

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by astrophysicists of one such object, designated 4U0115+63, indicate that the star's magnetic field is just about what theory predicted. Their calculations are based on a measurement and an assumption, predicated on theory, that electrons in the star's magnetic field absorb energy at a certain frequency from X-rays emitted by the star.

This "absorption feature," which shows up as a dip in the star's X-ray spectrum, gives astronomers the only available means to measure the star's magnetic field.

The new finding was reported by Dr. William A. Wheaton of MIT's Center for Space Research technical staff at a June 28, 1978, meeting of the American Astronomical Society in Madison, Wis. The observations were made Jan. 16, 1978, with the High Energy Astrophysical Observatory (HEAO-1) of the National Aeronautics and Space Administration (NASA).

Four different X-ray experiments are aboard this observatory, which was launched Aug. 12, 1977. The experiment that discovered the absorption feature in 4U0115+63 is a collaborative project among Dr. Lawrence E. Peterson and Dr. James Matteson of the University of California-San Diego, and Dr. Walter H. G. Lewin, MIT professor of physics.

The HEAO-1 satellite is producing beautiful results," Professor Lewin said. "This latest discovery made by the hard X-ray detectors came as a pleasant surprise. We found the interesting absorption feature only days before the AAS meeting in Madison, where Dr. Wheaton was already scheduled to talk about the pulsar 0115+63."

"Eighteen months ago," Dr. Lewin explained, "my friend Professor Joachim Trümper from Munich and his co-workers were the first to announce the discovery of a similar observation of the pulsar Hercules X-1 made from high-altitude balloons. In analyzing our HEAO data from several pulsars, we at MIT and our collaborators at UCSD have been looking for the effect. Yet when we found it in 0115+63, at first we thought there might be something wrong with our detectors or perhaps with our computers here at MIT. We know better now."

Professor Lewin said his co-workers and students at MIT worked on the analysis around the clock for four days. This group included Dr. Brian Cooke, visiting lecturer from England, Drs. Francis A. Primini and Eugene Y. Tsiang, of the CSR technical staff, and students John P. Doty, Carl A. Dobson, Spencer K. Howe, and Allan Goldman.

"Whatever we tried," Dr. Lewin said, "we couldn't make the effect go away. We believe in it, and so we reported it in Wisconsin and also announced it in the International Astronomical Union circulars on June 30."

Professor Lewin is a member also of the X-ray astronomy group that operates MIT's orbiting X-ray observatory, the Small Astronomy Satellite (SAS-3), which also played a key role in this discovery. This satellite was also launched by NASA, which supports the research.

In early January, 1978, Lynn R. Cominsky, one of Professor Lewin's graduate students, was working in the SAS-3 control room at MIT with Dr. George W. Clark, MIT professor of physics. She noticed in the data a strong X-ray signal from an area of the sky where, about seven years ago, a bright X-ray source had been discovered by the Uhuru satellite (the first in the series of NASA's Small Astronomy Satellites). This "transient" source was then bright for a few weeks, but faded and had not been seen since. Ms. Cominsky, a co-author of the 4U catalogue, realized immediately that the bright source seen by SAS-3 was a recurrence of the same source, and

she and Professor Clark pointed the SAS-3 observatory at the object. They found immediately that the object was a 3.6-second pulsar.

With another SAS-3 instrument, the X-ray astronomy group determined the position of the source with great accuracy. This information enabled scientists at McGraw Hill Observatory to identify the source optically as a faint blue star. The McGraw Hill facility is operated jointly by MIT and Dartmouth College. The MIT scientists involved in the optical identification were Claude R. Canizares, associate professor of physics, and Dr. Jeffrey E. McClintock, a CSR staff member.

By measuring the Doppler shift of the pulsed X-radiation, the star's orbit of 24.3 days was determined by Dr. Saul A. Rappaport, associate professor of physics at MIT.

Thereafter, HEAO was stopped to focus on the source. The HEAO-A-4 instrument, which observes X-rays from 15 to 150 KeV, scanned the range of X-ray energy and found the absorption feature at 20 KeV. The feature is believed to be the result of electrons spiraling in the star's strong magnetic field—hence the name, cyclotron radiation. The electrons absorb the X-rays by being boosted to higher but discrete energy levels.

The pulsar 0115+63 is thus the second neutron star to show a "cyclotron line." From it, the astrophysicists have calculated this star's magnetic field to be  $1.5 \times 10^{12}$ —or a trillion and a half—gauss. The highest continuous magnetic field generated by man is 301,000 gauss, produced by a special magnet in MIT's Francis Bitter National Magnet Laboratory.

## Bradt, Lewin to Receive Awards for HEAO Work

MIT's Dr. Hale Bradt and Dr. Walter H.G. Lewin are among eight scientists who have been named to receive Exceptional Scientific Achievement Medals from the National Aeronautics and Space Administration for their work on NASA's High Energy Astronomy Observatory (HEAO-1) satellite.

The medals will be presented by NASA Administrator Robert A. Frosch in ceremonies Aug. 3 at the Marshall Space Flight Center, Huntsville, Ala.

Dr. Bradt, of Belmont, Mass., and Dr. Lewin, of Winchester, Mass., are both professors of physics in the Department of Physics at MIT as well as research staff members in the MIT Center for Space Research.

Dr. Bradt is co-principal investigator with Dr. Herbert Gursky of the Harvard-Smithsonian Center for Astrophysics in Cambridge for one of the four scientific experiments carried aboard HEAO-1 while Dr. Lewin is co-principal investigator with Dr. Laurence Peterson of the University of California at San Diego for a second. Drs. Gursky and Peterson also will receive medals at the Aug. 3 ceremonies as will scientists associated with the remaining two HEAO-1 experiments: Drs. Elihu Boldt and Frank McDonald of NASA's Goddard Space Flight Center, Greenbelt, Md.; Dr. Gordon Carmire of the California Institute of Technology at Pasadena; and Dr. Herbert Friedman of the Naval Research Laboratory, Washington, D.C.

Also at the ceremonies Aug. 3, one of eight Group Achievement Awards will be made to American Science & Engineering, Inc., Cambridge, for AS&E's work on the scanning modulation collimator for which Drs. Bradt and Gursky are co-principal investigators. AS&E's award will be accepted by Phil Gray.

The experiment for which Dr. Bradt is co-principal investigator uses two scanning modulation collimators to locate to high accuracy



Nancy Schrock demonstrates the use of a sewing frame in the Boles Room in Rotch Library. She is sewing signatures of a book to be restored. Some of the books restored at a recent workshop are to the left. To the right are others in process.

## Restoration of Rare Books Is Specialty of MIT Librarian

Five books published in the 18th and early 19th century from MIT's rare book collection were repaired and rebaked at a restoration workshop recently by Nancy Schrock, visual collections librarian in the Rotch Library.

Ms. Schrock's interest in book preservation began five years ago, when she worked with the paper conservator while rare book librarian for the Winterthur Museum in Delaware. Winterthur has one of the few conservation schools in the country. Later, a course in the principals of library conservation at the Newberry Library in Chicago aroused her interest in binding and bookmaking.

Arriving at MIT (where her hus-

band is associate professor of chemistry) in 1976, she was able to arrange a weekend apprenticeship in binding and restoration which she has kept up to the present. Her first work was with cloth bindings, but she is now doing more with leather, leading to her attendance at the three-day workshop taught by Bernard Middleton, a leading English book restorer, where the five books from MIT were rebaked. The books, which included *The Elements of Euclid Explain'd*, Oxford, 1700, and *Mr. Wingate's Arithmetic*, London, 1726, were all leatherbound volumes.

"An important part of the restorer's work," says Ms. Schrock, "is a knowledge of the history of bookmaking, enabling the binder to select structures and materials compatible with those used in the book originally. This requires a knowledge of the binding techniques used at the time of publication." Ms. Schrock uses chemically neutral papers and wheat starch paste for paper repairs, actually laying in new paper if the original has been destroyed. Tears are repaired with an overlay of Japanese tissue, attached and strengthened with paste.

The repair of bindings requires choosing and dyeing materials, cloth or leather, to blend with those used for the original binding. The original is preserved as much as possible. One method requires lifting the cover from the boards, rebaking the spine, and relaying the original over the new material. The join is almost invisible.

Ms. Schrock's work and her attendance at the workshop reflect a commitment to the preservation of old and rare books at MIT. A Preservation Task Force recently surveyed the conservation needs of the Institute Libraries, and Helen Slotkin, Institute archivist, and head, Special Collections, has been designated Preservation officer.

## Fencer Mark Smith, '78, Wins NCAA Scholarship

Mark Smith (Jamaica, N.Y.), a 1978 MIT graduate and one of Tech's greatest fencers, has been named recipient of a National Collegiate Athletic Association Postgraduate Scholarship for Division III institutions. This is the second N.C.A.A. scholarship in a row to be awarded to an MIT athlete in the "other sports" category.

Smith has been a superior competitor during his four-year varsity fencing career. In his freshman year he was instrumental in helping the team to win the "Iron Man" Trophy for the second year in a row. During his sophomore year he won all of his dual meets, setting an impressive precedent for the men's fencing team.

He changed weapons in his junior year and significantly improved the level of sabre fencing at MIT, leading the team on to win the Vitale Trophy in the 1977 New

England Intercollegiate Championships. He also fenced sabre at the N.C.A.A. Division I Championships that year, and contributed enough victories to enable the team to win sixth place nationally. That year he also won the E.C.A.C. Individual Foil Championship, winning all bouts in the final round.

Mark Smith brought an excellent intercollegiate sports career to a close with several exceptional performances. He became the first native-born MIT fencer to win All-American status at the N.C.A.A. Division I Fencing Championships. At that same event he also won the Foil Fencer of the Year Award, conferred by vote of one's competitors. Smith is the first fencer to win an award in each weapon at the New England Intercollegiate Championships (Foil-1976, Sabre-1977, Epee-1978). On the strength of his overall collegiate performance,

## Retirement Raised to 70 For Faculty

(Continued from page 1)

free to choose whether they wish to continue to age 70. Similarly, faculty members with administrative responsibilities will not be required, because of age, to retire before 70 from their administrative positions."

Some 35 faculty members, now scheduled to retire in 1979, 1980 and 1981, will be affected by this decision.

Retirement options now will range from early retirement beginning at age 55 to mandatory retirement at age 70. The "normal retirement date" will continue to be considered July 1 coincident with or following the 65th birthday, with full annuity and the possibility to continue in part-time service.

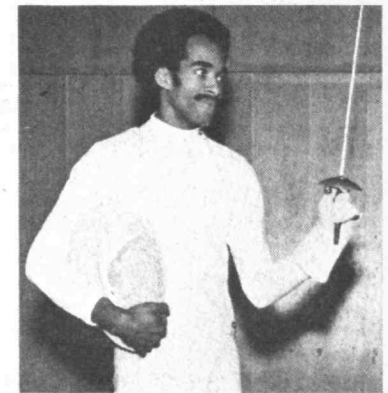
Chancellor Gray noted that advancing the retirement age for faculty members would diminish opportunities for appointing men and women who have recently completed advanced study to faculty ranks.

"In order to increase the opportunities for appointment of junior faculty and staff, the Institute will continue its efforts to make early retirement attractive and will encourage retirement at age 65 as the 'normal retirement date,'" Dr. Gray said.

While there continue to be uncertainties in interpretation of the law, it is now intended that people who stay on beyond 65 will have their health insurance converted without material change to Medicare/Medex III as at present, and their group life insurance coverage will continue to be progressively reduced between age 65 and 70. Also, individual and Institute retirement contributions to the Retirement Plan for Staff Members will no longer be made after the "normal retirement date."

Chancellor Gray noted that the Act forbids involuntary retirement before age 70, solely for reasons of age, "but does not preclude termination, retirement or reassignment for other reasons and within the bounds of Institute policy."

In a comment apart from his memorandum, Dr. Gray has further observed, "We respect the basic purpose of the law to afford individuals freedom of choice in decisions whether to continue employment between 65 and 70. And while we will continue to treat age 65 as the time of normal retirement for everyone employed at MIT and encourage retirement at that age, we recognize the positive opportunities in the Act. Like most organizations, in rigorously enforcing our own policy of retirement at age 65, we have lost the full-time services of many vigorous, effective and contributing men and women, many of whom may now choose to continue."



Mr. Smith

he has been invited to work out with the International Fencing Squad, the core of our Olympic competitors.

Smith was also recently named recipient of MIT's top athletic honor, the Class of 1948 Award. This award is presented to the senior who is judged "Athlete of the Year" on the basis of his performance in intercollegiate athletics.

Mark Smith will continue his education in electrical engineering at Georgia Tech.

# THE INSTITUTE CALENDAR X3-3270

July 26  
through  
August 20

## Seminars and Lectures

### Thursday, July 27

**Super Conducting Properties and Stability of Amorphous Lanthanum-Gold Films\*** — Dr. Joanne Share Manning, University of North Carolina. Magnetic Laboratory Solid State Seminar, 3pm, 3rd Floor Conference Room 3-213, NW14. Tea served at 2:45pm.

**Screening for Novel B-Latham Antibiotics\*** — Dr. Kazuaki Kitano for the Takeda Chemical Industries Ltd., Osaka, Japan. Arranged by the Industrial Microbiology and Biochemical Engineering Group, 4pm, Rm 66-144.

### Monday, August 14

**Analysis of Viscous Flow Problems by Finite Element Method\*\*** — Dr. Masahiro Ikegawa, mechanical engineering research laboratory, Hitachi Ltd, Tsuchiura-shi, Japan. Aeronautics and Astronautics Special Seminar in Computational Fluid Mechanics, 2pm, Rm 33-206. Coffee will be served.

## Community Meetings

**Our Way of Life\*** — Wed, July 26, Medical Department will present a program on the risk factors that can lead to coronary heart disease, it will focus upon those aspects of our American lifestyle that contribute to heart attacks. Also a film produced by the American Heart Association will be shown, and a discussion will be led by Samuel W. Stein, MD, internist and Assistant Medical Director for the Department, Noon, Rm 10-105.

**Technology Wives Organization Weekly Exercise Class\*\*** — An hour of serious exercise led by professional Marilyn de Kleer. Every Monday, through August 28, 8pm, Exercise Room, 2nd floor, DuPont Gym. Info: Call Marilyn de Kleer 494-9056.

## Social Events

**Disco Dance Party\*\*** — Sponsored by the Chinese Students' Club, Music by D.J. Leo. Sat, July 29, 8pm, Baker House. Admission \$2 members; \$2.50 nonmembers.

**Community Players Picnic\*\*** — Sponsored by the MIT Community Players. A picnic for members and members of the MIT community interested in theatre. Sun, July 30, 3-8pm, Pavilion of MIT Pool. Admission \$2, pays for hamburgers and franks, bring beverage, dessert or salad. For reservations call Steve Ivester 242-4783.

## Movies

**Double Feature\*\*** — LSC movies. Fri, July 28: *Bad Day at Black Rock*, a suspenseful explosive drama set in a small western town, starring Spencer Tracy as a one-armed detective, 7pm; *Gaslight*, an eerie psychological thriller, starring Charles Boyer and Ingrid Bergman (Academy Award for Best Actress), 9pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

**Harold and Maude\*\*** — LSC movie. Delightful, offbeat comedy starring Ruth Gordon and Bud Cort, music by Cat Stevens, Sat, July 29, 7 & 9:30pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

**The Day the Earth Stood Still\*\*** — LSC movie. Klatuu Berado Nicto. Interesting sci-fi thriller about a warning to the Earth that it better shape up or get blown up, featuring Gort the Robot. Fri, Aug 4, 7 & 9:30pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

**Brewster McCloud\*\*** — LSC movie. A zany Harold and Maude-ish comedy, starring Bud Cort, directed by Robert (MASH) Altman, who says it's his favorite film. Sat, Aug 5, 7 & 9:30pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

**Sleuth\*\*** — LSC movie. A brilliant mystery revolving around the psychological conflict between Sir Laurence Olivier and Michael Caine. Fri, Aug 11, 7 & 10pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

**The Sound of Music\*\*** — LSC movie. The most successful musical film ever made. Beautiful photography great music; starring Julie Andrews. Sat, Aug 12, 8pm, Rm 26-100. Admission: 75¢ w/MIT or Wellesley ID.

## Music

**Summer Music at MIT\*** — Sponsored by the Department of Humanities, Electronic and Computer Music; new compositions from the Computer Music Seminar, Barry Vercoe, director, associate professor of music. Works of Chowning, Davidovsky, and Vercoe. Thurs, July 27, 8pm, Kresge Auditorium, free.

## Exhibitions

**MIT Faculty Club\*\*** — Exhibition of works by Boston artist Irene Morey, in oils, acrylics, pastels and conte crayons. Portraits, still lifes, landscapes and florals. On view daily, through July 31.

**ART of the State 1978\*** — Through July 30, an exhibition of paintings, drawings and prints by finalists and recipients of the 1978 Artist Fellowship Program, Massachusetts Arts and Humanities Foundation, held jointly at Hayden Gallery, 160 Memorial Drive, Camb, Sun-Fri, 10am-4pm, and Boston University Art Gallery, School of Fine Arts, 855 Commonwealth Avenue, Boston, Mon-Sat, 10am-4pm; Sun, 2-5pm.

**MIT Historical Collections\*** — Permanent exhibition Mon-Fri, 9am-5pm, Bldg N52, 2nd floor. *Katharine Dexter McCormick*, '04; *Vannevar Bush*, '16; Bldg 4 corridor. **The New Technology Exhibit** 2nd floor balcony of Lobby 7. **Energy Exhibit**, Bldg E40, 1st floor. **Solar Energy**, Bldg 8, main corridor. **Center for Space Research, Astrophysics Exhibit**, main corridor, Bldg 4. **Bldg 6 Dedication Exhibit**.

**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.

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

**Musical Caricatures\*** — Music Library, Rm 14E-109. Numerous cartoons of various aspects of music, especially pictures of famous composers and conductors.

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 Aug 16 through Aug 30 to Calendar Editor, Rm 5-113, x3-3270, before Noon, Friday Aug 11.

# Medical Writings Yield Clue to Medieval Supernova

(Continued from page 1)

the astrological literature has been dismissed by many scholars as the work of snake-oil-selling hucksters, Professor Brecher said.

And the literature of the healers, "the people who put on leeches and bled plague victims as therapy," has not—until now—been thought of as a likely repository of astronomical information.

The eyewitness account of the 1054 supernova is that of Ibn Butlan, a Baghdad physician who lived in Cairo for three years until late 1052 or early 1053, when, probably because of a famine, he left for Constantinople. His original report was reproduced by Ibn Abi Usaybia in the biography of Ibn Butlan which he includes in a biographical encyclopedia of physicians, composed around 1242.

Professor Brecher was referred to that text by Alfred E. and Elinor Lieber of Jerusalem, who had learned of his interest in the astronomy of the ancients through an article in *Newsweek* magazine. The *Newsweek* piece reported the publication of a special December, 1977, issue of *Technology Review*, the science journal published by the MIT Alumni Association. The special issue, devoted to what ancient people knew about astronomy, was edited by Professor Brecher. It mentioned the puzzle over the lack of Western and Mid-

dle Eastern references to the supernova.

The Liebers—she is a physician and he is an economic historian—have a deep interest in what ancient people knew about medicine. They recalled a reference to celestial phenomena in the Ibn Butlan biography. Acting on that suggestion, Professor Brecher obtained a copy of the text from the Widener Library at Harvard and enlisted the aid of A.I. Sabra, a professor of the history of science at Harvard, who translated and helped interpret the Arabic text.

The piece in *Nature*, appearing over the names of Professor Brecher and the Liebers, points out that Ibn Butlan "was not a professional astronomer or astrologer but, in the tradition of Hippocrates and Galen, he, like other physicians of his time, was concerned with the presumed connection between cosmic and telluric happenings and diseases and other natural catastrophes affecting the life and health of man."

It is that tradition that has en-

thused Professor Brecher about the usefulness to astronomy of ancient medical, meteorological and other writings. He is currently working on a Latin and a Hebrew text from such writings.

Here is Ibn Butlan's account, as quoted by his biographer:

"One of the well-known epidemics of our own time is that which occurred when the spectacular star appeared in Gemini in the year 446 H. [12 April 1054-1 April 1055 AD]. In the autumn of that year 14,000 people were buried in [the cemetery of] the Church of [St.] Luke, after all the [other] cemeteries in Constantinople had been filled. Then, in the mid-summer of the year 47 [447 H.: 2 April 1055-20 March 1056] the Nile was low and most people in Fustat [old Cairo] and all the strangers died, except those whom Allah willed to live. The epidemic spread to Iraq and affected most of the population, and the land was laid waste in the wake of contending troops, and this continued until the year 454 H. [15 Jan. 1062-3 Jan.

1063]. In most countries people fell ill with black-bile ulcers and swelling of the spleen. The arrangement of the rise and fall of the fevers [the periodicity of the fever] was altered and the order of crises was upset, so that the science of prognosis had to be changed.

"As this spectacular star appeared in the sign of Gemini which is the ascendant of Egypt, it caused the epidemic to break out in Fustat when the Nile was low, at the time of its appearance in the year 445 H. [23 April 1053-11 April 1054]. Thus Ptolemy's prediction came true: 'Woe to the people of Egypt when one of the comets appears threateningly in Gemini!' Then, when Saturn descended into the sign of Cancer, the destruction of Iraq, Mosul and the Jazira was completed; Diyar Bakr, Rabia, Mudar, Fars and Kirman, the lands of the Maghrib, Yemen, Fustat and Damascus/Syria were upset; the affairs of the kings of the world were disturbed; and wars, famine and epidemics abounded. And this confirmed the

wisdom of Ptolemy in saying: 'When Saturn and Mars are in conjunction in the sign of Cancer, the world will be shaken.'"

Professor Brecher says he has been unable to locate the predictions attributed to Ptolemy in his works or in other writings wrongly attributed to him. He thinks they may have been taken from some commentary on Ptolemy's work.

As for the eyewitness report, Professor Brecher says it "adds nothing new to our knowledge of the position, brightness, time variability or other astronomical information which we would like to know about the supernova explosion of 1054.

"However, it suggests that medieval writings from the medieval Islamic world, with their astrological (and astronomical) association, might provide a valuable new source for ancient astronomy. In any case, if the present report hardly justifies the claims of astrology, it restores our confidence in medieval Arab astronomy."

# Local Water Quality Control A Failure, MIT Report Says

(Continued from page 1)

of the Environmental Impact Assessment Project in the MIT Laboratory of Architecture and Planning.

Lustig traveled thousands of miles, crossing the country and interviewing almost 100 politicians, administrators, bureaucrats and other people involved in water quality management in 15 of the 176 designated agencies.

The focus of his investigation was Section 208 of the Federal Water Pollution Control Act Amendments of 1972.

Under Section 208, governors and the Environmental Protection Agency designated regional planning agencies to develop a water quality plan to clean up waterways and prevent further pollution. The federal government, through the EPA, funded the agencies and was responsible for overseeing their work. A total of 176 agencies were designated, and given at least two years, some starting in 1974 and others later, to complete a water quality management plan which could be readily implemented.

The funds allocated to the agencies varied greatly, depending on their jurisdiction and the complexity of the problems they faced.

Some were in metropolitan areas, for example, and others were essentially concerned with rural areas.

The most pervasive failure, Lustig found, was the inability of the agencies to develop plans that could or would be implemented. His report cites several causes for this, including the inability or unwillingness of the EPA to do more. The language of his report put it this way:

"The disturbing conclusion about EPA's administration of the 208 program is that the federal agency concentrated too much on the form of the 208 plan and not enough on its ability to solve problems.

"This occurred despite the fact that EPA had the ability to obtain compliance, either through actual or only perceived mechanisms. There was too much emphasis on whether every planning element was addressed and on whether the progress reports were suitable, and too little on whether the plan would achieve something."

This bureaucratic weakness was compounded, Lustig said, by Congress' goal and EPA's insistence that the plan address every conceivable water quality

problem instead of concentrating on the most serious problems. The result was a plan which mentioned everything but solved nothing. The agency's resources were spread too thinly to cure even the most serious water quality problems.

Still another problem, he found, was the absence of a secure promise of federal funding for implementation of water quality plans. "Without the federal government's assurance that they would pay for implementation, agencies had little incentive to propose solutions whose cost would have to be borne by local governments, most of which had other priorities and strong pressures to reduce spending," Lustig explained.

Lustig's report also cites difficulties faced by local agencies in gaining acceptance for water quality projects, which resulted in their failure to confront key problems.

"Many agencies knew at the outset that towns would reject a plan that required any action," the report states, "and so couched their controls as recommendations or voluntary programs. In other words, the plans were designed so that they would be approved."

As an example, Lustig reported

that one agency believed that animal corrals constituted a possible source of stream pollution. But it backed off from requiring that the corrals be set back from waterways because it knew this would have been opposed by ranching interests in the area.

Lustig's report takes note of some successes in the program, in which agencies identified and went on to help solve problems. But these instances were relatively few.

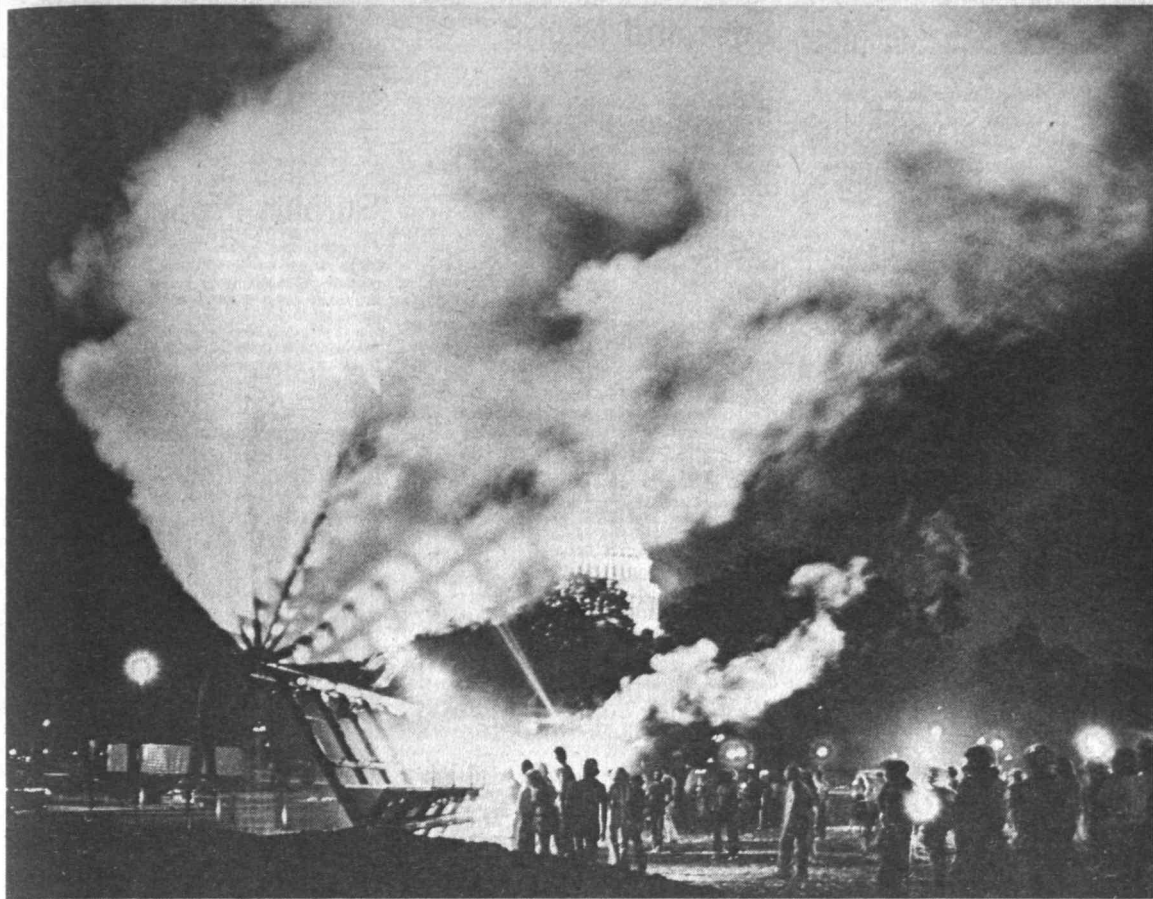
The Section 208 planning period is now ending, and Lustig's report states that the mistakes made "are mostly incurable, though some may be remedied during the management and continuing planning phases which are just beginning."

What is most important, the report states, is that the lessons learned "be applied to future environmental planning programs."

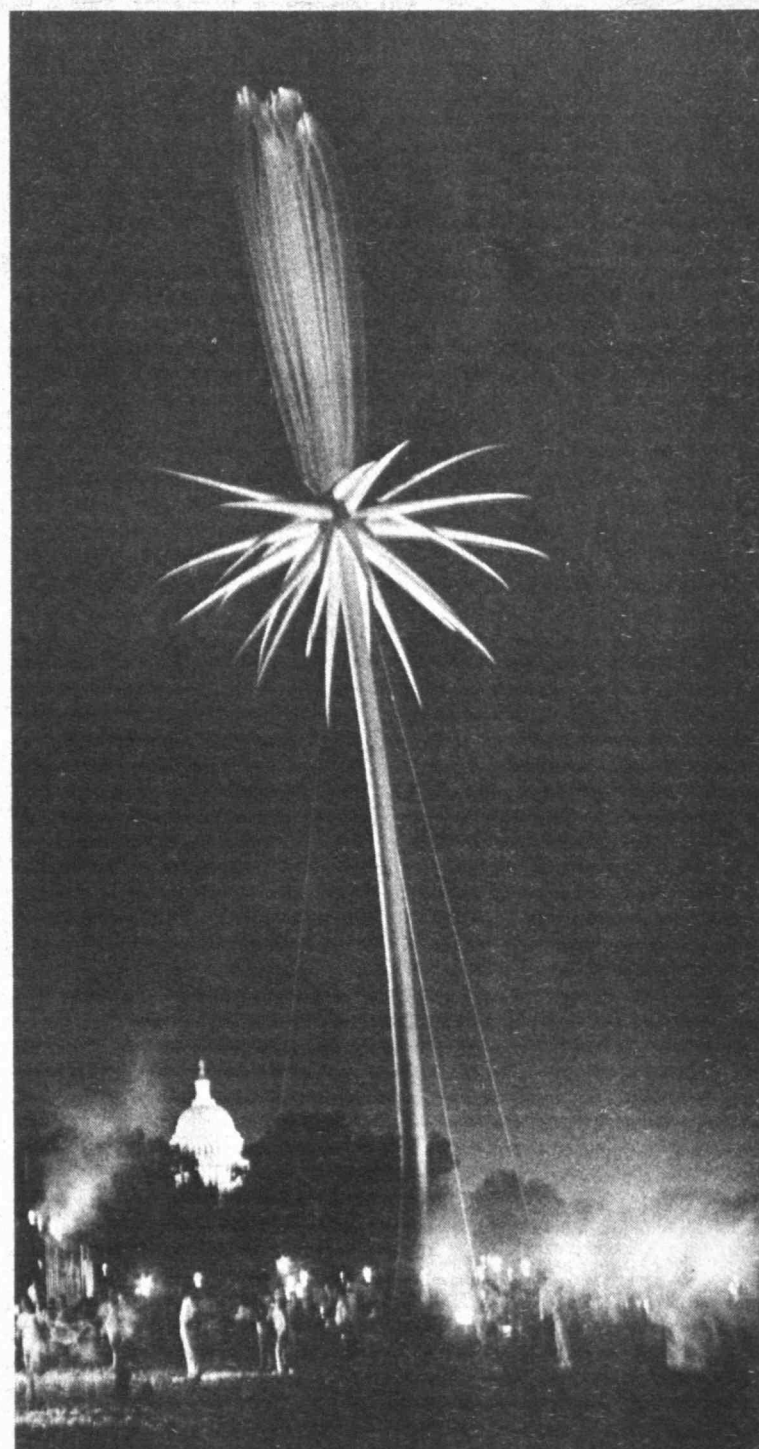
"The principal faults in 208 planning," the report concludes, "had little to do with the technology of cleaning water, and much to do with the political, financial, and administrative impediments inherent in environmental planning."

# Centerbeam 1978

Photos by Calvin Campbell



Thousands of people—young and old alike—are exploring "Centerbeam" on the Mall in Washington, D.C. A group exhibit from MIT's Center for Advanced Visual Studies, "Centerbeam" opened to the public on June 22 and will be on display through September. The sculpture and its associated events—such as inflatable flowers, sky operas and laser and steam performances—is a collaborative effort of some 21 artists with technical assistance from MIT scientists and engineers. The exhibit premiered last summer in Kassel, Germany.



## Music Seminar to Give Electronic Concert

New compositions from the MIT Computer Music Seminar, Barry Vercoe, director, will be featured in concert at Kresge Auditorium, Thursday, July 27, at 8pm.

The new electronic works will be the product of a three-week seminar at the MIT Experimental Music Studio, where visiting composers from throughout the country gathered together to gain a working knowledge of one of the world's most advanced computer

music labs.

The MIT lab is unique because it permits communication between man and machine in modes close to ordinary musical language. Using a PDP-11/50 computer, which has been specially programmed to behave like a musical instrument, composers can quickly learn to produce an almost unlimited array of notes, sounds and arrangements.

The system is so new, according

to Dr. Vercoe, the potential variables are yet to be explored. Dr. Vercoe is associate professor of music in MIT's Department of Humanities.

Whole music scores can be written in either alphabetic, numeric or traditional notation. Rhythm, timbre and pitch can be controlled to a degree approaching those aspects of traditional performance.

The July 27 concert will feature many newly written works. Participants of the Computer Music Seminar are Charles Ames, Department of Music, State University of New York at Buffalo; Professor William Benjamin, School of Music, University of Michigan; Dr. Alexander Brinkman, Eastman School of Music, Rochester, N.Y.; Robert Ceely, New England Conservatory of Music, Boston; Professor Paul Dworak, Department of Music, Carnegie-Mellon University, Pittsburgh, Pa.; Robert Gross, Rochester, N.Y.; Dr. Homer Lambrecht, University of Minnesota; Tod Machover, Philadelphia, Pa.; and Professor Edie Smith, Music Department, Orange Coast College, Costa Mesa, Ca.

Many of the visiting composers will take their MIT experience back to their academic and/or professional environment. Mr. Machover will be a composer in residence at the Pompidou Center in Paris later this fall.

The concert will also include four pieces by contemporary composers of electronic music. Synchronisms #2 for Flute, Clarinet, Violin, Cello and Electronic Sounds was written by Pulitzer Prize Composer Mario Davidovsky in 1964. April Showers (flute), Steve Umans (clarinet), Marcus Thompson (violin) and Lisa Lancaster (cello) will perform.

Dr. Vercoe's Synapse for Viola and Computer, written in 1976, will be played by violist Marcus Thompson, also on the MIT music faculty.

The program will include another computer piece, *Stria*, by John Chowning, head of the Stanford University Center for Research in Music and Acoustics, and a work by Colgate University music professor Dexter Morrill, titled "Studies for Trumpet and Computer."

## Byron Lichtenberg to Begin Spacelab Mission Training

Byron K. Lichtenberg, the MIT graduate student named by the National Aeronautics and Space Administration to an international group of five scientists who will serve as payload specialists during the first Spacelab mission scheduled for the latter part of 1980, will begin his training August 7 in Huntsville, Ala.



Mr. Lichtenberg

The European payload specialists were selected by the European Space Agency from among thousands of applicants in its member states. Mr. Lichtenberg, 30, a vestibular researcher, and Dr. Michael L. Lampton, 37, of Berkeley, Calif., a space scientist at the University of California, were selected by NASA after a rigorous screening process.

The Marshall Space Flight Center is responsible for the payload specialists' training activities as part of its overall management responsibility for the Spacelab mission. The European Space Agency will manage training activities there.

Among the experiments aboard Spacelab will be a project led by Dr. Laurence R. Young, director of the Man-Vehicle Laboratory at MIT, who proposed Mr. Lichtenberg for the payload specialist position. Mr. Lichtenberg, a Hertz fellow, has been working on the project—which will investigate space motion sickness and the effects of weightlessness on vestibular function—as part of his graduate work at MIT. He expects to receive his Ph.D. in the fall.

Mr. Lichtenberg, 30, is an Air Force veteran. He received the Distinguished Flying Cross twice during a tour of duty in Vietnam. He is a pilot in the Massachusetts Air National Guard flying F-100 Super Sabres.

He holds the BS degree from Brown University and received the SM from MIT in 1975.

Mrs. Lichtenberg is the former Lee Lombard of Farmington, Conn. They have two daughters.

Mr. Lichtenberg, a doctoral candidate in biomedical engineering, said the first phase of the training at NASA's Marshall Space Flight Center in Huntsville is an orientation period from Aug. 7-11.

"We'll also do some preliminary work with the experiments scheduled to fly aboard Spacelab, and I'll come home with an armful of books and do a lot of reading until October. Then we go to France and Germany for more work."

One American and one European will be selected from the group of five to fly aboard the Earth-orbiting space laboratory and operate the instruments involved with the experiments.

The payload specialists who are not chosen to fly in space will act as backup specialists, participating in ground-based mission activities at NASA's Johnson Space Center in Houston, Texas, during the flight. This choice will be made some months before the flight.

# CLASSIFIED ADS X3-3270

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

## For Sale, Etc.

B 10 spd 20" bike, exc cond, \$50. George x5365 Lincl.

Couch & 2 arm chairs, \$50 ea; \$100 for all 3. Call Alan 623-1044 or x3-3770.

Fil sz matt, gd cond, \$25. Call 492-4969.

5 white lined 48"x72" curtain drapes, almost nw, \$20. Call 492-9158 eves.

Cat scratch post, \$5. Call J. May x8-2843 Draper.

Baby seat, fits all bikes, \$8; 3 spd B bike, 19" whls, \$25. Call Doris Audunson 643-8662.

Matching: Whirlpool washr lg capacty, top load, white, 4 cycl, ask, \$250; Whirlpool dryer, 4 spd elect, white, ask, \$200, both is than yr old, exc cond. Call Rita x3-6220 or 536-6298 eves & make offer.

Tbles, chairs, qu sz beds, sofa, refrig, wash mach, etc. Call 527-3754.

Lv country, dble bed & matt, \$45; K tble & 4 chairs, \$35; bureau w/5 draws, \$35; books, \$10. Call x3-7032 or 266-2192.

Beds, sofa, chest, desk, B&W TV, clock radio, rugs, humidfr, dine set for 6. Call 734-8532.

Nw trntble, usd stereo recvr & spkrs, gd cond, \$180 or best. Call Daniel Friedman x3-2157 days or 924-8161 eves.

Secretary, exc cond, \$75. Call x3-3145.

21" Zenith color TV, remote contrl, nls deflection yoke w/prtbl stand, \$40 or best. Call 782-8798.

Metal desk, exc cond, \$35; snlg bed, \$10; drsr, gd cond, \$20; wood bookshlf, \$5; lamp, \$4; tble lamp, br nw, \$5; 12" B&W TV, \$45; dine tble, \$6; wood chair, \$5; elect blanket, \$7; K facilities, best; hairdry, br nw, \$8; army sleep bag, br nw, \$5. Call Al x3-5150 or 494-0067.

Nw 7,000 BTU Fedders, usd 1, \$262. Call Meme x3-6937.

2 wk old poly sleep bag, usd 1 x, 2 heavy for hike, \$15. Call x3-4599.

Sears 15" color TV, \$150; Sears br nw prtbl dryer, apt sz, \$140; Sansui rcvr, \$80; Garrard trntble, \$25; also 71 Dodge Demon, blue 70 k, exc cond, \$975. Call Susan, x3-6771, 731-1896 eves.

Qu sz firm matt & box sprng + frme, gd cond, \$50. Whitney x3-5540.

Fiat top carrier, \$13; green plant hangr, ceramic, \$2; grape fruit & orange press, \$1.50. Call Susan x3-2285.

Philco 20 cu ft refrig, \$30; elect stove 2 ovens, \$100. Call Claudia x3-2776.

Alter Locke, solid rock maple china cab hutch w/glass dr top (46"x20"dx6"h), 2 draw, felt slivr & linen draw; tble 36x54 w/12" leaf, wood grade formica top & 4 chairs, mint cond, \$650. Call x3-6104.

Dynaco FM-5, \$80; ESP-9 headphones, \$80, lk nw; Scotch 207 tapes, br nw, \$3.80/reel. Call 646-3436.

Viscount grand prix 21", 10 spd; Kobe Chappall, 20", 10 spd, both exc components, exc cond; pr tablas, decor, funct, \$85. Call Mike x3-6289.

316 diving weights, \$2 ea. Call x3-7004.

Br nw Smith Corona Super 12 elect typewriter w/cart & elect return, usd 4x, \$185. Call Linda x3-7791.

Kryptonite bike lock, exc cond, extr key, \$18. Call Judith x3-5685.

Moped-Motobecane w/shocks; 10 spd Viscount bike; Sony csst deck; BSR trntble w/adj weight; Maratz IMP 4 G spkrs; Bogen recvr FM. Call Miguel x3-7010, 10-7pm.

12" dia B&W TV, \$40 or best; pr 10" oval car spkrs, \$10. Call Sandy x3-5857.

Ross Eurotour F bike, 3 spd & reflectors, light & rack, exc cond, \$40. Call Charlie x8-3012 Draper.

Almst nw sofa, \$125 or best; tw sz boxsprng & matt \$30 or best. Call 536-8128 or 236-4220.

Bike Motobecane w/10 spd 19 1/2" super mlg L63L, nw cond, \$150. Call x3-5353 or 661-1003 eves.

Kroehler sofa, nds cleaning or reupholstr, 3 cushion club sty, no stuct defects, ask \$75 or best. Call 661-3262 eves aft 6pm.

Lounge chairs, lamps, cab, TV, night tbles, move-all pr to go, pres nego. Call Steve 862-6222, x191 before 5pm or 267-5571 aft 7pm.

Wood drsr, fairly gd cond, sturdy, 5 drws, \$15. Call 864-6841 eves or wkends.

Hammond B-3 organ, vry gd cond. Call 266-5911 or 267-4517.

Superflex skate board w/pure juice whls. Call Frank x5-6663 Dorm.

12x12' 6 man sleep tent w/bag & spikes, \$75; 1' x2 1/2' fiberglass cool, \$25; Kodak Teleinstamatic 608, \$18. Call Dan or Frank x5-6663 Dorm.

Deluxe waterbed, king sz, all access, \$160 or best. Call 661-2680 eves.

Love seat, nrly nw, 5' contemp, tan, \$125 or best. Call 661-2680 eves.

Moving sale, Sat, July 29, 10am-5pm, rain or shine, 9 Garnet St, Watrtwn (off Irving St) Victorian hall tree, qu bed, mny books (educ, mysteries, misc), 9x12 blue rug, tbles, refrig avail 8/25, drsr, lamps, oak rockr, curtains, mirrors, 2 TV's, plant poles, etc.

Moving mst sell, tw bed, \$20; cinderblcks & shlvng wood, set of 4 chairs, \$2 ea; casual chairs, \$5 ea; antique radio, \$15; plants, assort hseware & K wares, cheap. Call 628-0838.

Victorian golden oak, drsr, 20x42x33'h w/4 drws, comply refinishd, vry nice shape & details, \$95. Call 862-0312.

Crib w/mattress, 3 mos old, \$55; 12' Sharp B&W TV, 2 mos old, \$55; tble w/4 chairs, almst nw, \$40; leaving country. Call 661-6401.

Old 3 spd bike, nds work, free, you move. Call x3-2982 lv msg.

Dina 400 amp, 200 W per chan, factory wired, \$350; OHM C2 spkrs, 3 yr wrty left, \$350; RCA 19" B&W prtbl tv w/stand, \$75; Disc washer Anti-Static gun, nw unused, \$10. Call x8-3200 Draper or 354-6742.

Fl sz refrig, free, 5'. Call x5598 Lincl.

G 20" bike, \$25; 10 gal fish tank w/stand filtr, light, \$25; pr G78-14 snows w/rims, gd tread, \$40 for 74 Chevelle. Call Norman x8-2583 Draper or 665-2042.

Refrig, gd run cond, approx 61"hx27"dx28" w, \$75. Call x3-4629 or 924-7124.

Technics preamp, amp, SU-80, 92 w per chan, mo old. Call x3-1791.

Nwly re-cond Gabler upright piano, \$550 or best. Call Judith x3-5117.

Raleigh Grand Prix, 10 spd, several yrs old, barely usd, exc cond, \$100. Call 235-7919 eves.

Childlife swing set, nw frme, 3 plc jingle-end w/access, \$135. Call 862-6966.

Sm armless swivel chair; 9x12 sculpture rug; tall narrow tble w/draw; occas arm chair, brwn; 14 cf, Coldspot Sears, refrig; old prtbl Singer sew mach, exc cond; pink vinyl hassock; qu sz bed & chifionier; canning jars 1/2 & pint, qrt; old prtbl Underwood typwrtr, ndw reprs. Call 232-0484.

Elect frypan, \$5; Corningware 10 cup elect coffee pot, \$5; Gold-colored teapot, \$5; club chair, usble, nds re-uphlstr, \$4; 2 vnyl-uphlstrd sm stools, \$5 ea, both \$9; 2 chalkboards on A-frme, \$9. Call Betty 232-2993.

Acente big sar fiber fldd mummy sleep bag, rated to 20 degr, exc cond, ask \$45. Call Joel x3-7462.

Snlg bed, matt, boxsprng, frme & rollr, \$80; dble bed, matt, boxsprng, frme & rollr, \$25; dine tble w/6 chairs, \$60; brnt orng rug, \$50; brnt orng curtain westgate lavish, LR & K, \$40; Smith Corona man typwrtr, \$30; 2 desk w/chair, \$20 ea; 3 chests, \$15 ea. Call x3-4349.

Foreign stamp collection, mny loose issues, both cancelld & uncancelld, best appraisal. Call Lee x485 Lincl.

Fedders A/C, 6000 BTU w/extra filtr, 9' cord, \$100. Call Tony 492-2274.

Bike, L 3 spd, blue, Royal Scott, Eng, 4 yrs old, act usd 1/2 yr, exc cond, equip w/basket, mirror, beep horn, reflctr, lock & chain, sacrifice \$48. Wand x3-4711 Rm 56-344 or 643-2679 eves.

A/C, 5000 BTU, Fedders, \$50; 2 interior doors, 78"x30", \$2 ea. Call Roger x3-6472.

Moving, hsehold items, furn, K utensils, etc. Pls call 492-8573 eves.

Color slide file for 750 slides, \$2; computerworld newspaper, May 77 to date, compit, \$5; big bags boy's clothing, various ages, \$5; wood armchair, reversible cushion, \$8; 21" blue round wood tble, \$5; wood storge bx/bench w/removbl cushion, \$9. Willie x5536 Bincl.

Hsehold furnishings & furn, play-yard w/matt, \$30; tray tble w/storge rack, \$5; sm soffia, \$30; wood shlf, \$15; revlving chair, \$10; rock chair, \$20; 2 lamps, \$15 ea; B&G bike, \$30; W bike w/baby seat, \$20; BR carpet, \$10 LR rug, \$50; beige or blue curtains, \$50 ea, all fit well in Westgate low rise apt, plants. Call 494-8373.

Homemade pies, cakes, breads made to order, all natural ingredients. Call Aisha x3-1879.

Free dirt. Call eves 864-6379.

Moving mst sell, couch, desk, drapes, Nrly nw snlg matt & odds-n-ends. Call 354-1305.

Mahngy coffee tble w/glass top, exc cond, \$45; lg, beaut frmed Chagall print in green & red, \$45; dble bed matt, box sprng, & antiqud wood frme, \$40; Corning ware percolator coffee pit, \$4; Camel cord wool coat, 3/4 lngth, sz 8, \$20. Call 723-7209.

Prtble Remington Classic Quiet Write Typwrtr, exc cond, \$25. Call x3-7115.

20" red conv Huffy bike w/train wheels, gd cond, \$25. Call Doug x3-3516.

Park spot nr Coolidge Corner. Call David x3-5980.

General Motors Audiovox, FM/AM, car radio (not stereo), \$60. Call Don x7811 Lincl.

5 boxes bentwood #1 red cedar shingles; \$38/box or \$180 for all 5. Call x3-7421 or 655-2013 eves.

Maple bed, drsr, desk, \$60 ea; night tble, \$30; hutch, \$180; chairs, sleep sofa, washr, dryr, color TV. Call 527-5544.

Moving, mst sell, refrig/frzr, 10 cf, \$90; Fedders, A/C, \$25; firm matt & box sprng, usd only 4 mo, \$70; sm 3 drwr drsr, \$12, also shlvs, chairs, sm tbles, TV cart/recrd holdr, cab, cheap. Call 482-0858 aft 5:30pm.

Imperial Deluxe x-firm Simmons matt box sprng & harv frme, \$100 or best. Call Anette 731-4443.

Prtble Motori Quasar 19" color TV, modular Solid State, 2 yrs old, exc cond, \$200. Call JK x8-3235 Draper.

Toaster oven/broil, exc cond, \$25. Call 492-7387.

Bike, G & yng M, exc cond. Call Hedy x3-7719.

10x12 Hexrex cabin tent, exc cond, \$65 or best; Blackdecker cordless elect lawn mower, \$35 or best. Call Dave x3-2336.

Leaving country, mst sell, dble bed, \$40, dine tble, \$50; cutains, \$20 & \$3, dinnerware, \$10, humidfr, \$8. Call Michel or Claire 494-8398.

Sofa, bed in white vnyl & office desk w/file drawer 8x8 rug, all for best. Call x3-5353 or 661-1003 eves.

Beaut Qiana wedding gown, \$200 sz 5 or 7 petite, beaded bodice, match veil, \$35. Call 963-2861 or x3-2777.

M Itoh 27" 10 spd bike w/lock & chain, \$50; Sylvia 19" prtbl TV, \$10. Call Martin x3-6734.

Mst sell beaut dark red vnyl Barcaloung, swivel, rocker, fl lounge. Call 566-0366.

## Vehicles

'64 Dodge Dart, white, runs wl, snows, PS & PB, auto, nw btrry & mflr, some rust, \$450 or best. Call Nick 354-8402 or Christos 495-5866.

'66 Ply, gd mech cond, \$220. Call Marian x3-4710.

'67 Dodge Polari, 4 dr, fair cond, PS & PB, A/C. Call 272-4129.

'67 Olds Cutlass, PS & PB, exc cond, no rust, West Coast car, service record, \$700. Call x3-6624.

'68 Chevy Impala, gd driving but nds repair, best. Call Doris x3-3124.

'68 Saab 96, gd run cond. Call Tim x3-6458.

'70 Ply Duster w/318 V-8, 3 spd, w/ maint, some sm dents, otherwise bdy in vry gd cond, ask \$1,200. Call 482-0858 aft 5:30pm.

'70 Pontiac Bonneville, PS & PB, mny opt, gd cond, \$750. Call Dorothy x3-3604.

'70 Saab 99E, 66K, nw exbst, brke pads, clutch, rns vry wl, nds amateur bdy work, \$500. Call 665-1328.

'70 VW Bug, exc mech cond, nw tires, rebble trans, \$600 or best. Call 494-8438.

'70 VW Bug, \$500 or best. Call Lou x3-4719.

'71 Ambassador (AMC), 70K, gd cond, PS & PB, auto, 4 dr, 8 cyl, vnyl rf, A/C, AM/FM, nw snows, nw parts, \$900. Call Shuichi x3-1691 or 623-5827.

'71 Chevy Vega, eng nds work, best. Call Alex x3-3679.

'71 Datsun 240Z, 78K, but vry gd cond, \$2,000. Call 492-2696 or x3-5733.

'71 Pinto, auto, 62K, rns wl but nds work, best. Call Mary x3-2391.

'71 Pinto Runabout, 86K, 1 ownr, 2000cc eng, std trans, nw exbst, nw alternator volt reg, exc tires, \$475. Call Donald x5559 Lincl.

'71 Renault 16, exc bdy, best. Call 861-7984.

'71 Toyota Corolla 1200, 89K, runs but nd some work, \$200 or best. Call Steve x3-7014 days or 646-4934 eves.

'71 Vega-Solid, dependbl trans, looks gd, gd nlg, white 2 dr coupe, avail July 31, \$350 or best. Call 661-2680 eves.

'71 VW Conv Superbeetle, 86K, AM/FM, runs vry wl nd some work, \$800. Call x8-1650 Draper.

'71 VW 411 wg tires, mech & int gd cond, bdy has minor rust, lots of rm, ask \$1,250. Call Pam x3-2003.

'72 BMW Motorcycle, exc cond, 21K, gd tires, vetter fairing, saddlebags, truck horns, highway lights, crashbars, \$2,000 or best. Call K. May x8-2843 Draper days or 492-1403 eves.

'72 Capri 2000, 4 spd w/sunfr, perform camshft, extr rad, rad snows, \$800. Call Al 648-2156.

'72 Gran Torino, 2dr hdtpt, no dents, clean, 4 nw tires, new diehard batt, 60K+, sm V-8, auto, brwn w/br vinyl roof, tan int, \$1500. Call Karen, 726-2894.

'72 Saab 99E, auto, 60K, white 2dr, \$1,950 or best. Call Dennis x8-3346 Draper.

'72 Toyota Corona nw brks, clutch & mufflr, 4 spd stand, AM/FM stereo, some rust, 80K. Call Luciel x3-6492.

'73 Audi Fox, nwstd bltd rad, vry wl maint, 64K, no rust, \$2,100 or best. Call Nat x3-1549.

'73 Ford Maverick, 2 dr, 6 cyl, 70K, PS & PB, vry gd cond, mst sell, \$1100 or best. Call x3-6409 or 484-2897 eves.

'73 Pontiac Grand Prix, exc cond, some bdy damage, + extras, \$2,500. Call x3-6275.

'74 Audi, auto, stereo, top shape, 27K, best. Call 265-0774, 5-8pm.

'74 Olds wgn, custom cruiser, 3 seats, PS & PB A/C, AM/FM stereo, stl bldd tires, 55K, exc cond, lv country mst sell, best. Call Roberto x3-6750 or 494-8373.

'74 VW Dasher, 4 dr, wl main, gd eng, AM/FM, Mich, \$2,350. Call 661-6189 aft 5pm.

'75 Harley, 700mi, exc cond, 125cc. Call Lany x3-3501.

'75 MG Midget Reblt eng, nw clutch, exc cond, 2,300mi, \$2,800. Call Bill x3-1416.

'75 Ply Gran Fury Custom. Call Gerry x3-6034.

'75 Ply Valiant, 6 cyl, PS, disc brks, elect r/window defrost, 40K, \$2,000. Call Mike x8-1357 Draper.

'76 Chevette Rally 1.6, custom inter & exter, 4 spd, AM/FM, \$2,500. Call Ken x5421 Lincl or 643-7125.

'76 Gran Prix, PW, PS, A/C, AM/FM stereo, lots more 30K, mst sell, \$4,395 firm. Call 233-3822 284-3424, aft 5pm.

'77 Ford Granada, silvr w/red vinyl interior, PS & PB, auto, 6 cyl, only 14K, ask \$3,950. Call x3-2772.

'78 Buick Opel Deluxe, auto, r/w window defrost, 4 dr, AM/FM, Call 663-6828 or x636 Lincl.

Dirt bike CZ w/mny extra nw parts, mst be seen to appreciate, best. Call Chuck x8-3705 Draper.

## Housing

Back Bay sublet, mo of 8/1, river view, studio apt. Call Stuart 266-8498.

Bedford, immac renov 2-3 BR hse on quiet 1/2 acre wooded lot, gar, brzwy, bsmnt, strm wndws, fp, ww, nw K w/dshwasher & self clean ovens, avail 8/18, no pets, \$420/mo, yrs lease. Call 275-9360.

Burl (Fox Hill), 6 rm Garson, 3BR, nw K, gar, deck, 1/2 acre tree lot on conservation land, \$3,900. Call 273-2509 or x7357 Lincl.

Camb, 2 BR LR w/frpl, DR, pantry, K, patio, gar, garden, Peably sch dist, \$350/mo + ht & util. Call Carol x3-6051.

Camb betwn Harv & Ctrl Sq, 2 BR lux apt, LR, K, B, hall, A/C, avail 8/2-8/31 w/opt to renew, \$300/mo incl ht. Call Nick 354-8402 eves or Christos 495-5866.

Harwich Ctr, Cape Cod, 1/4 acre, 1 ml from warm watr beach, 2 BR hse slps 6, LR w/frplc, DR, K, B, screen porch, across from 2 park w/tennis crts, baseball field, picnic area & bandstnd, avail till Labor Day, \$250/wk; \$950/mo. Call 876-4673 eves.

Studio apt nr Cntrl Sq, 15 min walk to MIT, park, \$175/mo. Call Tom x3-7731.

Chestnut Hill 1880 slate rf Victorian hse, lg, sun, compitly renov, nr Heath Sch, 7BR, 3 w/frplc, panel DR, library, mod eat-in K, 3rd fl suite w/sep entr, nr T, shop. Call Jessie x3-3141.

Lex, beaut furn 3BR, library-den, fam rm, 2 1/2 BA, patio, dead end st, exc schools, piano & TV, 10 mo-yr starts 9/1/78, \$675/mo. Call 861-8734.

Popham Beach, ME, oceanfrnt cott, slps 6, lg sandy beach, avail late Aug & Sept. Call Jeff x8-4042 Draper.

Needham, nr Wellesley line (Babson), spac 3 BR Cape, 1 1/2 B, snlg car gar, empty furn, \$600/mo + util, no pets, avail Sept 1, '78 for 1 yr. Call 449-4922 aft 7pm.

Londonderry, NH, 2BR, 1 1/2 B townhse condo, all appl, country set w/pool & tennis, no pets, \$350/mo + util. Call Linda x7526 Lincl.

Nashua, NH, nw 7 rm Gambrel, frpl fam rm, 3 BR, eat-in-K, 2 B. Call x7734 Lincl.

Newton Ct, spac 6 rm apt & atic in 2 famly resid area, park for 3, nr T, \$510/mo, incl ht avail Sept 1. Call Bill X8-4354 Draper.

Madison, NH, Eidelweiss nr major White Mts ski area chalet, 3 BR, furn, winterizd, ww, frplc, deck porch on side & frnt chalet, Mt view, loc on wooded hill side w/handy access to all 4 seas activities, \$32,900 firm. Call 527-3810.

Stoddard, NH, lakefront summer rentals, screen porch furn, all conveniences, avail Aug 26-Sept 2. Call Earl x8-1130 Draper.

Porter Sq nr Harv mod 2 Br apt, ww, A/C, all modf, 1-car pkg, avail immed or Sept 1, \$275-\$285/mo + ht & elec; also 4 BR apt, Mt. Auburn St, Wat, ideal for sharing. Call 729-9130.

and will particularly involve working closely with the senior officers under whose overall and often close supervision the program descriptions will be developed. Particular stress will be placed on an ability to conduct effective interviews and carry out extensive research under the minimal supervision. Equally important will be an ability to shape and describe often highly technical concepts, and the academic programs based on them, in terms that will be comprehensible and exciting to potential sponsors of the programs, including alumni and friends as well as officers of foundations and corporations who will frequently not have strong technical backgrounds and who must be effectively convinced of the significance and urgency of financially supporting the proposed programs. A78-39 (7/12).

**Admin. Staff, Administrator of Management and Supervisory Training Programs** in the Office of Personnel Development to assist in all aspects of program budgeting; participate in interviews and selection of applicants; research and assist in development of new programs; coordinate schedules, guest speakers, special events, etc.; assist in planning for programs and services; prepare evaluations and follow-up on program reports; participate in meetings. A Bachelor's degree or equivalent required, as well as organizational and administrative experience. Excellent communications and interpersonal skills, knowledge of concepts and approaches in organization and personnel development, small group process and program evaluation also required. A78-37 (7/12).

**Admin. Staff, Director of Conferences and Seminars**, in the Center for Advanced Engineering Studies to handle all budgetary and financial responsibilities; perform logistical and planning functions; obtain approvals and prepare necessary forms associated with on-campus meetings; assist in theme development and programs for meetings; make preparations for off-campus meetings; maintain mailing lists; prepare related budgets and graphics material; assist in the development of a management data processing system. A Bachelor's degree in Business Administration and at least 3 years experience in related work areas required. A78-41 (7/12).

**Sponsored Research Staff, Technical Asst., Temp.**, in Nuclear Engineering to assist in development of new radiopharmaceuticals research centering on aspects of protein analysis by gel electrophoresis, dialysis and column chromatography. Position requires a Bachelor's degree in biochemistry or chemistry. Temporary for 3 to 6 months. B78-137 (7/26).

**Sponsored Research Staff** in the Laboratory for Computer Science Data Flow project to participate in hardware design and supervise construction of data flow computers. Position requires competency in all aspects of digital systems engineering including logic design and in solving engineering problems of interconnection, power distribution and packaging. Ability to work with formal specifications and to document carefully also necessary. A Bachelor's or Masters degree in Electrical Engineering is desirable. B78-136 (7/26).

**Sponsored Research Staff, Technical Asst.** in the Biology Department to assist in tissue culture research using HeLa and mouse Friend erythroleukemia cells, as well as other cells. Will maintain and supply cell cultures for use by other researchers; oversee functioning of a tissue culture room; conduct experiments on culture conditions; participate in research as time permits. A Bachelor's degree in chemistry or biology required. Tissue culture experience preferred. B78-141 (7/26).

**Sponsored Research Staff, Asst. to the Director** in the Sloan School to assume responsibility for office administration and research; prepare budgets; coordinate proposal writing; provide administrative support to staff and researchers. Will also assume responsibility for large scale computer modeling systems; negotiate new licenses; maintain ongoing liaisons with existing licensees; coordinate documentation of new systems. Several years of administrative experience required. General knowledge of computer systems desirable. B78-142 (7/26).

**Sponsored Research Staff, Meteorologist/Scientific Programmer** in Meteorology to work with a research team on elements of the development, programming and analysis for a large numerical model of stratospheric circulation and chemistry. Develop numerical procedures and apply meteorological analysis techniques to model calculations performed on vector-oriented ILLIAC-IV Computer. Use batch and interactive terminal systems. Substantial experience in scientific programming, particularly with large projects on vector-oriented machines required, as well as experience in use of interactive systems and networks (such as the ARPA network). Advanced degree or equivalent professional experience, in meteorology or geophysical fluid dynamics also necessary. B78-138 (7/26).

**Sponsored Research Staff, Electrical Engineer**, at the Bates Linear Accelerator to design, procure, install and maintain AC & DC power systems. Bachelor's degree in electrical engineering with 5 years experience or equivalent required, as well as experience with electrical machinery. Knowledge of high power solid-state components, circuit theory including feedback and transient analysis also required. Familiarity with computer process controls, solid state instrumentation and utility power characteristics and rates helpful. Position based in Middleton, MA. B78-146 (7/26).

**Sponsored Research Staff, Electronics Engineer**, in the Laboratory for Nuclear Science to design, test, install and maintain electrical hardware used for data acquisition in nuclear and high energy physics experiments. Bachelor's degree in electrical engineering and familiarity with minicomputers, including architecture, hardware modules and interface circuit requirements necessary. Five years experience in the design of analog and digital instrumentation and controls plus experience in trouble-shooting complex systems also necessary. Knowledge of NIM/CAMAC systems, nuclear instrumentation and experience designing microprocessors desirable. B78-145 (7/26).

**Sponsored Research Staff, Biophysicist** in the Research Laboratory of Electronics with strong experience in techniques of molecular beams, mass spectrometry and signal processing, with interest in physiological experiments to study properties of surviving tissue. Ph.D. required. B78-149 (7/26).

**Sponsored Research Staff, Systems Programmers** in the Laboratory for Nuclear Science to develop, install, modify, service, maintain and document operations system software; analyze systems requirements; assist users in identifying and resolving problems; provide basic information to users; attend conferences, seminars and classes; interface with vendors. An Associate's degree or equivalent combination of education and experience required. Overall knowledge of operating system principles and system software techniques also required, as well as considerable experience in systems programming or minicomputer programming. B78-147 (7/26).

**Sponsored Research Staff, Organic Chemist** in the National Magnet Laboratory to synthesize <sup>14</sup>C fatty acids and phospholipids as well as <sup>3</sup>H NMR studies of these compounds. Ph.D. in organic chemistry required. A strong background in synthetic organic chemistry and experience with nuclear resonance techniques also required. Experience in the synthesis of fatty acids and phospholipids desired. B78-148 (7/26).

**Sponsored Research Staff, Technical Asst./Economist, Temporary**, in the Energy Laboratory to work on resource allocation optimization as it affects solar research and development programs. Basic graduate training in economics required as well as training in operations research required. Governmental experience in planning and developments also required. Temporary, 6 months. B78-144 (7/26).

**Sponsored Research Staff** in the Electric Power Systems Engineering Lab to contribute to the mechanical, thermal and cryogenic aspects of the design, construction and testing of experimental superconducting generator; develop assembly methods; supervise, coordinate and trouble shoot during construction; participate in test program. At least 10 years experience in the design, construction and testing of large, complex mechanical and cryogenic equipment and a good working knowledge of cryogenics and commercial superconductors required. B78-80 (7/26).

**Sponsored Research Staff** in the National Magnet Laboratory to design magnetic field coils for a tokamak fusion reactor study. A Bachelor's or Master's degree in electrical engineering or physics, experience in the use of large digital computers for the solution of engineering problems required. Some experience in calculation of magnetic fields desirable. B77-112 (7/26).

**Sponsored Research Staff, Programmer**, in the Sloan School to develop and support a highly interactive economic modeling system with extensive data analysis facilities; act as liaison. Knowledge of FORTRAN and econometrics is required. Experience with 370 Assembler, AED, VM/370, or TROLL is helpful. B78-131 (7/12).

**Sponsored Research Staff, Biochemist** in the National Magnet Laboratory to synthesize phospholipids labeled with <sup>14</sup>C and <sup>3</sup>H at specific sites on the molecule; incorporate same phospholipids into vesicles and liposomes to form model membranes and to form binary and ternary systems of phospholipids with other membrane components; study these systems using high resolution nuclear magnetic resonance techniques. Ph.D. in biochemistry or related field required as well as background in nuclear magnetic resonance studies of membranes. Experience in lipid synthesis, isotopic labeling and membrane biochemistry also required. B78-132 (7/12).

**Sponsored Research Staff, Sr. Microwave Systems Engineer** in the National Magnet Laboratory to develop detailed microwave system design; participate and supervise fabrication of complex high power microwave hardware; assist in development of specifications for system and sub-system components. Bachelor's degree in electrical engineering or equivalent required. At least 8 years experience in microwave system and component design, including high power amplifiers and related control systems, also required. B78-133 (7/12).

**Sponsored Research Staff** in the Research Laboratory of Electronics to operate apparatus including vacuum systems, electronic instrumentation and data acquisition and handling systems for studies of desorption of molecules from biological material. Will also develop and prepare written materials for instructional Physics laboratory. A Bachelor's Degree and appropriate current experience required. B78-134 (7/12).

**Sponsored Research Staff** in the Research Laboratory of Electronics to manage PDP-11 computer; handle improvements; implement programs; assist new users; maintain adequate documentation for system programs and enhancements. Bachelor's degree in electrical engineering or computer science required. Competence in language programming and familiarity with higher level language also required. Experience using mini computers, PDP-11 programming experience, familiarity with digital logic and/or electronics and real time I/O programming helpful. B78-135 (7/12).

**Spon. Research Staff**, in Nutrition and Food Science to carry out neurochemical assays of neurotransmitter and related enzymes; perform radioimmunoassays of neurohormones; examine behavioral changes in rats and other experimental rodents. Position requires a Master's degree in biochemistry or a related discipline. B77-221.

**Exempt, Principal Operator** in the Physical Plant Dept. to assume responsibility for scheduling, directing the operation of, and monitoring the performance of all building HVAC systems; supervise routine activities in the control room; guide off-shift personnel; maintain communications with other Physical Plant segments. Will also be responsible for emergency situations; coordinate actions of console operations and/or field mechanics in the resolution of operating problems. Associate's degree in engineering or science or its equivalent required. Technical and practical familiarity with operation of control systems, good English grammar, oral communication and supervisory skills also required. B78-36 (7/26).

**Exempt, Technical Supervisor** in the Physical Plant/Telecommunications Dept. to supervise the installation and maintenance of the Dormitory Telephone System, and other Institute owned and maintained switching systems; supervise maintenance of radio and telecommunication equipment; coordinate and monitor the implementation of telecommunications equipment services and support services; direct part-time student employees. Associate's degree, or equivalent experience, and telecommunications systems experience required. At least 2 years supervisory experience also required. E78-35 (7/26).

**Exempt, Admin. Asst., part-time** in the Urban Studies and Planning Office to work with students; develop job contacts; approach alumni in reference to job opportunities; place special program students; interact with the MIT Placement Office. Good typing, interpersonal skills and knowledge of Urban and Regional Planning required. Career counseling and guidance experience helpful. Half-time position E78-31 (7/12).

**Exempt, Admin. Asst., part time**, in the Technology and Policy Program, School of Engineering will devise and implement administrative procedures related to an interdepartmental graduate degree program; answer inquiries for general program information; assist students in obtaining financial assistance, monitor student progress; coordinate admissions process; manage accounting and purchasing functions. Knowledge of academic administration procedures, communications and interpersonal skills required. 25 hrs./wk. E78-32 (7/12).

**Technical Assistant V** in the Haystack Observatory to observe and operate radio telescope and related equipment; operate antenna and real-time control through HP-100 series computer; perform routine adjustments and tune microwave receiver equipment; occasionally assist with data processing. Will be trained to make observations independently as well as assist visiting scientists in obtaining their data. Will also act as "Duty Officer;" log or document observations. A good working knowledge of electronic and microwave equipment required. Willingness to work a variety of hours also required. Knowledge of astronomical and/or computer equipment helpful. Position requires overtime work. B78-367 (7/26).

**Technical Assistant V — Veterinary Technician** in the Division of Laboratory Animal Medicine to assist in treatment and surgery of laboratory animals. A Bachelor's degree from an institution which specifically trains veterinary technicians is required as well as demonstrated ability to perform routine clerical diagnostic tests. B76-380 (7/26).

**Editorial Asst. V, part-time**, in the Urban Studies and Planning Dept. to prepare public relations materials; edit a newsletter; prepare and distribute monthly newsletters; prepare various booklets and brochures. Good typing and interpersonal skills required. Writing and editing experience, as well as capability in graphics and production also required. Knowledge of MIT helpful. 3 days/week, 10-4, 18 hrs./wk. B78-337 (7/12).

**Administrative Asst. V, part-time** in the Center for Advanced Visual Studies to type correspondence; answer phones; handle accounts; perform some editorial duties. Good typing and interpersonal skills and ability to independently solve problems required. Familiarity with the arts (arts administration, fund raising) desired. 20 hrs./wk., 9am-1pm, with flexibility to work additional hours when necessary. B78-369 (7/26).

**Secretary V** to an Institute Professor in the Physics Dept. to schedule appointments; screen phone calls, mail, inquiries and visitors; arrange meetings and conferences; type technical manuscripts, lectures and class work; maintain files and journal library; arrange travel and follow up vouchers. Will also have extensive contact with American Academy of Arts and Sciences; perform secretarial duties for its president; participate in special projects and meetings; occasionally handle large mailings. Excellent typing and shorthand skills, ability to set priorities and handle several duties simultaneously required. Willingness to work occasional overtime hours and to learn to operate Mag Card machine also required. B78-382 (7/26).

**Secretary V** to Deputy Director of a 2 year international energy study in the School of Engineering. Responsibility will include general administrative and secretarial duties; meeting and travel arrangements; supervision of clerical employees; distribution of project materials; coordination of publishing activities. In addition to excellent general secretarial skills, applicants should have some college training and at least 3 years' secretarial experience. Position requires overtime work. B78-389 (7/26).

**Sr. Secretary V** to the Dean, School of Humanities and Social Sciences to handle a full range of general secretarial duties including composing and editing correspondence, monitoring office accounts and assisting with accounting matters. Will also coordinate application process for a special fellowship program; do some library research; maintain administrative files for School. Excellent secretarial skills required as well as the ability to work independently. Shorthand skill desirable. B78-390 (7/26).

**Admin. Asst. V** in the Transportation Systems Division of the Civil Engineering Dept. to assist in the formulation and administration of Division policies; participate in meetings; act as liaison between staff and other personnel; plan and direct work of other office personnel; monitor budgets and reconcile accounts; coordinate admissions and faculty search processes; schedule appointments and courses. Ability to deal with public and make decisions independently, as well as administrative experience required. MIT experience helpful. 37.5 hrs./wk. B78-344 (7/12).

**Secretary III, IV** in the Lab for Nuclear Science to handle secretarial responsibilities for the Director of the Bates Linear Accelerator; schedule appointments; type correspondence and reports (some technical); file; arrange meetings. Excellent typing and shorthand skill required, as well as ability to work under pressure, communicate effectively and exercise good judgment. Secretarial experience and willingness to travel regularly to Middleton, Mass. also required. Secretarial school or college background preferred. B78-154 (4/12).

**Secretary IV/V** to an Executive Officer in the Provost's Office to perform secretarial duties; type reports; maintain special project files; handle requests for special funding; schedule meetings and appointments; occasionally reconcile accounts. Good typing skill with ability to operate IBM Executive typewriter required. B78-347 (7/12).

**Editorial Asst. IV** in the Center for Transportation Studies to describe for publication, scientific projects and Department activities and philosophies; assist in creation and publication of Department newsletter; organize and administer reading room; assist in coordination of admissions campaign; create new advertisement methods; respond to inquiries; handle billing for an account; file; maintain publication list. Writing, editing, typing and interpersonal skills required. Experience in writing, setting up newsletters and information packages also required. Familiarity with MIT, audiovisual equipment and processes desirable. B78-349 (7/12).

**Secretary IV** in the Linguistics and Philosophy Department to arrange travel, type correspondence, manuscripts and proposals; maintain records; answer phones and inquiries. Good typing and machine transcription skills required. Some familiarity with academic environment desired. B78-345 (7/26).

**Secretary IV** in the Humanities Dept., to the Chairmen and faculty of the Anthropology Program and the History Section to handle details for special seminars; type manuscripts; perform various other duties as required. Excellent typing and organizational skills required as well as shorthand or speedwriting and dictaphone transcription skills. Secretarial experience also required. B78-328 (7/26).

**Secretary IV, temporary**, in the Aero/Astro Dept. to type letters and reports; take shorthand dictation for correspondence and meeting minutes; maintain files and records. Good interpersonal and organizational skills required, as well as excellent typing and shorthand/speedwriting skills. Temporary 7/78-9/78, but may become permanent. B78-357 (7/26).

**Secretary IV** in the Laboratory for Computer Science to perform general secretarial duties and integrate them with the computer for the Programming Technology Group Leader; edit on 2 different word processing systems; receive post and file messages on computer network; file; schedule appointments; arrange travel; answer phones. Good secretarial skills required. Experience or willingness to learn how to text edit on the computer also required. Shorthand, college background and MIT experience desirable. B78-358 (7/26).

**Secretary IV/Administrative Asst. V** to the Special Assistant to the Provost, Provost's Office. Duties include much Institute-wide interaction with many persons including students, faculty, staff, and contact with governmental and private organizations and persons; also activities related to facilities use environmental education, undergraduate education, special projects and general secretarial functions. Applicant must have ability to work independently, be well-organized, and able to work well with a wide range of individuals and activities. Skilled shorthand and typing required. Non-smoking office. B78-371 (7/26).

**Secretary IV** in the Nutrition and Food Science Dept. to type technical and nontechnical material; answer correspondence independently and from verbal and written instructions; arrange meetings, exams, summer courses and workshops; secure information and reports from faculty; distribute annual dept. reports. At least 2-5 years secretarial experience and excellent secretarial skills required. B78-381 (7/26).

**Secretary IV** in the Sloan School Center for Computational Research in Economics and Management Science to provide support for contract and office administration as well as to handle some correspondence and manuscript typing. Good typing skills required. Secretarial experience preferred. B78-383 (7/26).

**Secretary IV** to the Director of Purchasing and Stores to take dictation, type correspondence; develop procedures and forms; set up and maintain filing system; schedule meetings and appointments; assist with analyses, record and report statistics; reconcile accounts; assist with implementation of purchasing office procedures and provide follow up and guidance to ensure compliance. Several years related experience and experience interpreting and working with computer printouts required. Excellent clerical, communication and organizational skills and knowledge of purchasing office procedures, routines and forms also required. B78-385 (7/26).

**Secretary IV** to two senior faculty members in Material Science and Engineering to type technical manuscripts, correspondence, course material; monitor research accounts; schedule meetings. Good typing skill and ability to set priorities required. Familiarity with Institute procedures preferred. B78-388 (7/26).

**Secretary IV** to two faculty members and a student research group. Will type technical reports, grant

proposals; arrange travel; maintain accounts; write and edit general correspondence. Typing skill, ability to work effectively with a variety of people required. B78-387 (7/26).

**Secretary IV** in the Biology Dept. to type scientific manuscripts, letters, sundry lists; edit manuscripts, letters; maintain lab materials records; answer and place telephone calls. Good typing and editing skills and good command of English language required. B78391 (7/26).

**Secretary IV** in the Division for Study & Research in Education to type manuscripts, correspondence, reports and proposals; arrange travel; answer telephones; schedule appointments. Secretarial experience required. Ability to transcribe machine dictation and good typing and organizational skills also required. Shorthand skill preferred. Non-smoking office. B78-392 (7/26).

**Secretary IV** to 2-3 faculty members in the Sloan School of Management Finance Division will handle various clerical and secretarial duties; prepare class materials; schedule meetings and seminars; handle all other general office procedures as necessary. Ability to type technical material, command of English language required. Previous secretarial experience preferred. Some college training desirable. B78-353 (7/12).

**Secretary IV, part-time**, in the Medical Department's x-ray/ECG office to transcribe positive x-ray reports; distribute reports; assist with clerical duties as necessary; occasionally administer diagnostic tests. Excellent typing skill, ability to transcribe medical terminology and a facility for detail required. 20 hrs./wk, afternoons. B78-329 (7/12).

**Secretary IV** for one faculty member and research lab in the Biology Dept. to type and edit manuscripts; monitor accounts; prepare grant applications; maintain library of journals; handle personnel business and problems; oversee purchase of lab supplies and equipment. Accurate typing and spelling skills and ability to transcribe machine dictation required. Two-five years' secretarial experience also required. B78-342 (7/12).

**Secretary IV** to three staff members in the Energy Laboratory to type correspondence and technical reports; arrange travel; schedule appointments; maintain files; transcribe machine dictation. Good typing skill essential, including technical; ability to establish priorities and handle several projects simultaneously under pressure required. B78-343 (7/12).

**Secretary IV**, in the Mathematics Dept. to type correspondence, course work and technical reports; arrange seminars; file; answer telephones; arrange travel. Good typing skill and 3 years secretarial experience required. Technical/statistical typing experience, good organizational skills preferred. B78-157.

**Secretary III/IV** in the Nuclear Engineering Dept. to two faculty members to type technical reports, proposals, class notes, manuscripts and correspondence from handwritten drafts; answer phones; file; arrange travel; handle mail. Additional responsibilities will involve duties related to financial aid administration. Good typing and communication skills, knowledge of general office procedures required. B78-359 (7/26).

**Secretary III-IV** to the Asst. Director, Laboratory for Manufacturing and Productivity, Dept. of Mechanical Engineering. Will answer general inquiries about the laboratory; type correspondence and reports; maintain supplies; handle routine accounting responsibilities. High school graduate or equivalent, at least 1 year secretarial experience required. Technical typing and shorthand skills helpful. Position requires occasional overtime. B78-364 (7/26).

**Secretary III/IV** to 3 faculty members in the Center for Cancer Research to type letters, manuscripts; handle other general office procedures including maintenance of grant records and general administrative records. Typing skills, ability to exercise initiative required. Familiarity with chemical and/or biological terminology and with MIT procedures helpful. B78-374 (7/26).

**Secretary III/IV** in the Office of Personnel Development to process applications for Tuition Assistance Plan; maintain files and college catalogue library; provide basic information about the Tuition Assistance Plan; type correspondence and reports. Good typing and organizational skills required as well as ability to work with figures and communicate effectively. Some general office experience necessary. Knowledge of MIT helpful. B78-336 (7/12).

**Sr. Library Asst. IV** in the Dewey Library to perform bibliographic searches; prepare purchase orders; maintain records; handle correspondence; assist in processing of new material. May also process gift material; maintain and provide reference service for special collections; occasionally assist at public service desk; type. Typing skills, knowledge of library records and basic bibliographic sources required. Library experience and knowledge of foreign languages desirable. College degree preferred. Occasionally will work weekend and evening hours. B78-366 (7/26).

**Sr. Library Asst. IV** in the Rotch Library to maintain and update records for serials and periodicals; claim and record missing serial and periodical issues; investigate and process title changes, new titles, cessations, etc.; prepare serials and periodicals for binding; maintain display area; provide holdings information; supervise student asst., assist in special projects. Good typing and organizational skills required, library experience in processing serials dept., foreign languages and college graduation desired. 25 hrs/week. Some evening work may be required. B78-375 (7/26).

**Clerk IV** in the MIT Press to input all orders, book and inventory updates and new accounts into computer system. Type; perform various clerical duties. Excellent typing skill required. B78-331 (7/12).

**Sr. Clerk IV** in the Research Laboratory of Electronics to assist in the processing of orders, packing slips, invoices, petty cash reimbursements. Good typing skills and aptitude for detailed work required. B78-354 (7/26).

**Sr. Clerk IV** in the MIT Press Journals Dept. to handle various clerical duties related to circulation: subscription fulfillment order processing, customer service billing, renewals. Good typing and organization skill required, as well as the ability to deal effectively with the public. College training preferred, but not required. B78-348 (7/12).

**Acctg. Clerk IV** in the Graphic Arts Service to perform all accounts payable functions; bill jobs; handle all related clerical duties. A thorough knowledge of accounts payable functions and procedures, good arithmetic and interpersonal skills, ability to operate calculator, and an interest in figures required. B78-327 (7/12).

**Clerk III** in the Medical Record Room to pull and file records; dispatch records; file material into records; assist with maintenance of patient index file; assist with purging of active files; answer phones; trace records. Office experience is required where individual has demonstrated success with varied clerical tasks. Speed, accuracy, ability to work well with others in a busy setting under pressure and ability to stand all day also required. 37.5 hrs./wk. B78-333 (7/26).

**Clerk III, part-time**, in Comptroller's Accounting Office to post apartment rents; prepare accounts receivable report; reconcile various statements; perform cash reconciliations; file; type; handle accounts payable and sales bookkeeping. Good typing skill and knowledge of bookkeeping required. 25 hrs./wk. B78-338 (7/12).

**Keypunch Operator III** in Physical Plant Administrative Services section to keypunch data onto Inforex keydata equipment; perform other clerical functions including typing as necessary.

High school graduate or equivalent, at least 3 years keypunching experience on IBM 129 or Inforex Key Data equipment required. B78-350 (7/12).

**Jr. Cashier II** in the Food Service to perform accounting related duties in a student residence; process checks; prepare reports for the dining accounting office; maintain a modest cash fund. Applicants must be able to do detailed work with accuracy. Accounting/bookkeeping experience is desirable. Academic year position (Sept.-May) 40 hr./wk. B78-247 (7/26).

**Hourly, Designer/Draftsperson** in the Physical Plant Dept. to develop architectural plans, evaluations and details of Institute remodeling and alteration work; develop jobs from preliminary estimating through design and drafting, keeping within budget limitations; perform some field supervision. Technical school graduation with 5-10 years experience required. Knowledge of electrical and mechanical systems and experience in school or institutional remodeling work helpful. H78-113 (7/26).

**Hourly, Sr. Technician Electronic** in the National Magnet Laboratory to assemble, test and operate high power microwave hardware; transform advanced technical concepts into designs, prototypes and experimental systems; integrate microwave hardware into thermocouple plasma experiment; direct technicians. Graduation from a 2-year day technical school or its equivalent, and at least 5 years microwave electronics experience required. Extensive experience in microwave measurements, trouble shooting, high voltage power supplies also required. H78-106 (7/26).

**Hourly, Tech. B., (Mech.) in Materials Science and Engineering** to assist faculty members and students on experimental research. Graduation from a 2-year day technical school or equivalent applicable experience required. Knowledge of welding and brazing, wire drawing, metal extrusion, general machine work also necessary as well as experience with rigging and heavy equipment. H78-73 (7/26).

**Hourly, Engineer, Third Class**, in the Physical Plant to operate turbine driven auxiliaries; AC and DC generation; switchboard and feed water controls. Mass. Third Class Stationary Engineer's license or higher grade required. Experience on high pressure boilers, oil and gas fired with automatic combustion controls also required. Must be willing to work any and all shifts. Some experience on turbine driven refrigeration equipment desirable. H78-103 (7/12).

**Hourly, Painter** in the Physical Plant. At least five years experience in all phases of painting trade: interior and exterior work; prepare and mix paint materials; match colors required. Thorough knowledge of various materials, tools, pieces of equipment and rigging used in the trade also required, as well as Painter Rigger's license and ability to work effectively on staging and ladders. H78-100, H78-101 (7/12).

**Hourly, Sheet Metal Worker**, in the Physical Plant. At least five years experience in fabricating and installing metal work from plans and specifications, ability to read prints and do layout work required. Working experience in all phases of metal work, ability to work on ladder and scaffolding and willingness to work an irregular schedule also required. Sheet metal experience desired. H78-99 (7/12).

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

**ADMINISTRATIVE STAFF:**  
A77-3, Systems Programmer, Information Processing Serv. (2/16)  
A77-86, Systems Programmer, Information Processing Serv. (1/11)  
A78-14, Asst. Dir., MIT Associates Program (4/12)  
A78-20, Admin. Staff, Alumni Association (5/3)  
A78-22, Admin. Staff, Student Financial Aid Office (5/10)  
A78-23, Admin. Staff, Sales Representative, MIT Press (5/31)  
A78-24, Admin. Staff, Application Programmer, Information Processing Serv. (6/7)  
A78-27, Admin. Staff, Auditor, Audit Division (6/7)  
A78-30, Admin. Staff, Design Manager, MIT Press (6/7)

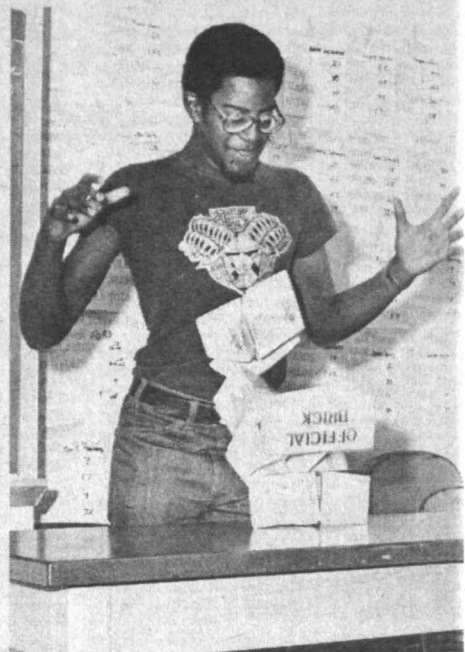
**BI-WEEKLY:**  
B77-655, Sec. IV, Chemical Engineering (11/16)  
B77-704, Computer Operator III-IV, Information Processing Serv. (7/12)  
B77-705, Computer Operator III-IV, Information Processing Serv. (7/12)  
B78-4, Sec. IV, Civil Engineering (1/8)  
B78-76, Sec. IV, Nutrition & Food Science (3/8)  
B78-129, Sec. IV, Biology (4/12)  
B78-139, Sec. IV, Physics (7/12)  
B78-143, Clk./Typist IV, Resource Planning Office (4/12)  
B78-160, Sec. IV, Center for Policy Alternatives (4/19)  
B78-166, Sec. III-IV, Student Financial Aid Office (4/19)  
B78-167, Sec. III-IV, Mechanical Engineering (4/26)  
B78-168, Sec. IV, Chemical Engineering (4/26)  
B78-178, Sec. IV, Provost's Office (4/26)  
B78-185, Account Rep. V, Administrative Computer Serv. (4/26)  
B78-194, Sec. III-IV, Electrical Engineering (7/12)  
B78-212, Sec. IV, Mathematics (5/10)  
B78-226, Library Asst. III, Part-Time, Music Library (5/31)  
B78-231, Technical Assistant IV, Center for Advanced Engineering Study (5/31)  
B78-233, Sec. IV, Physical Plant (5/31)  
B78-238, Sec. IV, Psychology (6/7)  
B78-244, Sec. III, Part-Time, Architecture (6/7)  
B78-257, Sec. III, Aeronautics and Astronautics (6/7)  
B78-275, Sec. IV, Harvard-MIT Division of Health Sciences & Technology (6/7)  
B78-282, Sec. IV, Part-Time, Humanities (6/14)  
B78-291, Sec. III-IV, Electrical Engineering and Computer Science (6/14)  
B78-293, Sec. IV, Medical Dept. (6/21)  
B78-302, Sec. IV, Resource Development (7/12)  
B78-306, Sec. IV, Research Laboratory of Electronics (7/12)  
B78-307, Sec. IV, Sloan School of Management (7/12)  
B78-314, Sec. IV, Libraries (7/12)  
B78-315, Sr. Clk. IV, Resource Planning (7/12)  
B78-316, Sec. III-IV, Chemical Engineering (7/12)  
B78-317, Sec. IV, Center for Transportation Studies (7/12)  
B78-318, Sec. IV, Mechanical Engineering (7/12)  
B78-322, Admin. Asst. V, Alumni Association (7/12)  
B78-323, Sec. III-IV, Medical Dept. (7/12)  
B78-324, Sec. IV, Medical Dept. (7/12)  
B78-325, Sec. IV, School of Humanities & Social Sciences (7/12)  
B78-326, Sec. IV, Division for Study & Research in Education (7/12)

**ACADEMIC STAFF:**  
C78-5, Asst. Eng. Librarian, Engineering Library (4/5)  
C78-6, Asst. Eng. Librarian, Engineering Library (4/5)  
C78-9, Asst. Science Librarian, Libraries (4/19)  
C78-12, Acad. Staff, Technical Instructor, Mechanical Engineering (6/7)  
C78-14, Acad. Staff, Librarian, Part-Time, Libraries Exchange & Gifts Sections (5/10)  
C78-15, Acad. Staff, Technical Associate, Biology (5/31)

(Continued on page 8)

Tech Talk, July 26, 1978, Page 7

# High Schoolers Tackle Engineering Via MITE



**"OFFICIAL BRICK" VS. CARD TOWERS**—Forty high school students taking part in the two-week Minority Introduction to Engineering at MIT were challenged to build a tower from data cards that would support the weight of a brick—dubbed "Official Brick"—keep in mind that each card, each fold in a card and each staple used to fasten cards added

one dollar to the "cost" of the tower. The program's aim is to stimulate interest among minority group youngsters in engineering careers. From the left: Karen Edwards, Bronx, N.Y.; Jay Bullock, Philadelphia, Pa.; Dierich Kaiser, Roanoke, Va.; and Gregory Skinner, Laurelton, N.Y.  
—Photos by Calvin Campbell

The challenge: Build a tower out of data cards strong enough to support the weight of the "official brick"—about five pounds.

The contestants: 40 high school youngsters from seven states and Puerto Rico taking part in the two-week Minority Introduction to Engineering at MIT.

The "real world" catch: Each card, each fold in a card and each staple used to fasten a card adds an imaginary dollar to the cost of

the tower, so students have to make trade-offs between strength and cost.

The IBM Tower Contest was just one of the activities in the busy two-week program, July 10-21, sponsored by MIT, the US Air Force and the Engineers Council for Professional Development. It is designed to stimulate interest in engineering careers. Students also attended lectures in math, mechanics, design, civil engineer-

ing, biomedical engineering and electrical engineering and computer science.

They also learned about Air Force ROTC programs for engineers and took trips to some of the high-technology companies in the Boston-Cambridge area.

A major event of the program was the testing of bridge models built by the students as part of their exposure to design and structure. Each student received an identical kit of parts—bits of wood, fiberboard, string, glue, etc.—and had to design a bridge strong enough to carry a maximum load of sand before exceeding a deflection of one-eighth of an inch.

The MITE program at MIT is coordinated by Dr. Ernest G. Cravalho, Matsushita Professor of Mechanical Engineering in Medicine and associate director for medical engineering and medical physics in the Harvard-MIT Division of Health Sciences and Technology. Working with Professor Cravalho is Richard Willemann, a teacher at Wellesley Junior High School, who has been director of the MITE program for two years.

## Supervisory Development Pilot Program Completed

(Continued from page 1)

matters as hiring, terminations, layoffs, salary administration, performance appraisal, conflict resolution, motivation, affirmative action, leadership style, and communications processes. The policy components of the program were presented by Claudia Liebesny, director of the Office of Personnel Services, with assistance from Susan A. Lester, employment officer, Michael J. Parr, assistant manager of labor relations, and Kerry B. Wilson, wage and salary administrator. Instructors for the human relations components of the program, from the Office of Personnel Development, were Drs. F. Adam and Maureen M. Yagodka, co-directors, and Joan F. Rice, consultant trainer.

Other presenters during the program were Clarence G. Williams, special assistant to the president and chancellor for minority affairs, who discussed the MIT grievance procedure; Melvin H. Rodman, M.D., medical director;

Alfred Koumans, Jr., M.D.; and Mrs. Jacqueline A. Buck, chief social worker, who discussed the role of the Medical Department in relation to supervisors and employees. During one session a panel presentation on management practices was made by Jay K. Lucker, Weston J. Burner, and William R. Dickson, directors of the Libraries, Information Processing Services, and Physical Plant, respectively.

Participant evaluation data has not yet been fully analyzed. However, all participants rated the program as "good" or "excellent" and all stated that they would recommend the program to other MIT supervisors. Some specified that the program would be particularly helpful for new supervisors; some for upper level supervisors; and some for supervisors in academic areas. After certain revisions in format, the program will be offered again in the fall. For further information, please contact Joan R. Rice at x3-4078.

C78-17, Acad. Staff, Research Associate (7/12)  
C78-18, Acad. Staff, Nurse Practitioner/Physician Asst. (7/12)  
C78-19, Acad. Staff, Archival/Manuscript Specialist, Libraries (7/12)  
C78-20, Acad. Staff, Archival/Manuscript Specialist, Libraries (7/12)  
C78-21, Acad. Staff, Archival/Manuscript Specialist, Libraries (7/12)

EXEMPT:  
E77-54, Exempt, Eng. Asst., Center for Material Science (7/12)  
E77-56, Estimator/Scheduler, Physical Plant (11/79)  
E78-2, Audiologist, Medical Dept. (1/25)  
E78-19, Eng. Asst., Earth & Planetary Science (5/3)  
E78-24, Exempt, Food Production Supervisor, Food Service (6/7)  
E78-27, Exempt, Admin. Asst., Libraries, Microreproduction Lab. (6/14)

HOURLY:  
H77-89, HVAC Designer/Draftsperson, Physical Plant (10/5)  
H78-23, Machinist A, Nutrition & Food Science (3/8)  
H78-35, Technician A, Energy Lab. (4/5)  
H78-64, Sr. Technician, National Magnet Laboratory (5/31)  
H78-91, Technician B, Material Science & Engineering (6/7)  
H78-92, Technician B, Industrial Hygiene, Environmental Medical Serv. (7/12)  
H78-96, Technician A, Haystack Observatory (7/12)

SPONSORED RESEARCH STAFF:  
H77-53, Spons. Res. Staff, Res. Lab. of Electronics (4/12)  
H77-79, Postdoc. Res., Physics, Lab. for Nuclear Science (5/4)  
H77-91, Sr. Accelerator Physicist, Lab. for Nuclear Science (5/18)  
H77-97, Chemical Engineer, Energy Laboratory (6/1)  
H77-137, Experimental Physicist, Bates Linear Accelerator (8/31)  
H77-161, Elec. Engineer, Mechanical Engineering (9/7)  
H77-201, Prog./Data Analyst, Earth & Planetary Science (10/26)  
H77-209, Res. Scientist, Energy Laboratory (11/30)  
H77-211, Computer Systems Design, Lab. for Computer Science (12/7)  
H77-212, Prog. Language Design, Lab. for Computer Science (12/7)  
H77-213, Computer Software Design, Lab. for Computer Science (12/7)  
H77-228, Plasma Physicist, Res. Lab. of Electronics (1/4)  
H77-230, Computer Software Designer, Lab. for Computer Science (1/11)  
H78-18, Theoretical Physicist, Lab. for Nuclear Science (2/22)  
H78-19, Theoretical Physicist, Lab. for Nuclear Science (2/22)  
H78-20, Theoretical Physicist, Lab. for Nuclear Science (2/22)  
H78-21, Theoretical Physicist, Lab. for Nuclear Science (2/22)  
H78-22, Theoretical Physicist, Lab. for Nuclear Science (2/22)  
H78-28, Theoretical Physicist, Lab. for Nuclear Science (2/22)  
H78-55, Staff Scientist, Arteriosclerosis Center (4/5)  
H78-58, Spons. Res. Staff, National Magnet Laboratory (4/12)  
H78-60, Combustion Engineer, Energy Laboratory (4/12)  
H78-64, Spons. Res. Staff, Earth & Planetary Science (4/12)  
H78-68, International Energy Economist, Energy Laboratory (4/12)  
H78-69, Temporary, Systems Programmer, Energy Lab. (4/5)  
H78-70, Energy Analyst, Energy Laboratory (4/12)  
H78-73, Computer Programmer, Energy Laboratory (5/10)  
H78-79, Spons. Res. Staff, Mechanical Engineer (4/19)  
H78-81, Spons. Res. Staff, Lab. for Nuclear Science (4/19)  
H78-82, Spons. Res. Staff, Lab. for Nuclear Science (4/19)  
H78-83, Spons. Res. Staff, Lab. for Nuclear Science (4/19)

R78-84, Spons. Res. Staff, Lab. for Nuclear Science (4/19)  
R78-85, Technical Asst., Nutrition & Food Science (4/19)  
R78-89, Sr. Exp. Plasma Physicist, National Magnet Laboratory (5/3)  
R78-93, Res. Engineer, Civil Engineering Dept. (5/10)  
R78-101, Spons. Res. Staff, Lab. for Nuclear Science (5/31)  
R78-102, Spons. Res. Staff, Lab. for Nuclear Science (5/31)  
R78-103, Spons. Res. Staff, Lab. for Nuclear Science (5/31)  
R78-104, Physicist, Temp., Lab. for Nuclear Science (6/7)  
R78-105, Physicist, Temp., Lab. for Nuclear Science (5/31)  
R78-106, Spons. Res. Staff, Cell Culture Center (5/31)  
R78-108, Programmer, Temp., Res. Lab. of Electronics (5/31)  
R78-110, Spons. Res. Staff, Part-Time, Seagrant College Program (5/31)  
R78-112, Spons. Res. Staff, Center for Cancer Research (7/12)  
R78-113, Spons. Res. Staff, Sloan School of Management (7/12)  
R78-117, Spons. Res. Staff, Temp., Economics Dept. (7/12)  
R78-118, Sr. Engineer, National Magnet Laboratory (7/12)  
R78-119, Theoretical Plasma Physicist, National Magnet Laboratory (7/12)  
R78-120, Spons. Res. Staff, National Magnet Laboratory (7/12)  
R78-121, Staff Technician, Earth & Planetary Science (7/12)  
R78-122, Spons. Res. Staff, Electrical Systems Laboratory (7/12)  
R78-123, Spons. Res. Staff, Electrical Systems Laboratory (7/12)  
R78-124, Spons. Res. Staff, Electrical Systems Laboratory (7/12)  
R78-125, Spons. Res. Staff, Electrical Systems Laboratory (7/12)  
R78-128, Programmer, Center for Space Research (7/12)  
R78-129, Research Engineer, Energy Laboratory (7/12)

The following positions have been FILLED since the last issue of *Tech Talk*:  
R77-80 Spons. Res. Staff  
B78-304 Acct. Clk. IV  
E78-25 Exempt, Data Base Manager  
R78-72 Spons. Res. Staff  
R77-74 Spons. Res. Staff  
R77-73 Spons. Res. Staff  
B78-319 Sec. V  
B78-281 Sec. IV  
B78-301 Clk. III  
R78-107 Spons. Res. Staff  
A78-29 Journals Manager  
B78-227 Medical Records Technician IV  
B78-144 Sec. IV  
B78-305 Technician A (E-M)  
H78-94 Technician A  
H78-52 Spons. Res. Staff  
R78-61 Sr. Clk.  
B78-312 Electrical Technician A  
H77-206 Spons. Res. Staff  
R78-91 Programmer  
R78-111 Clk. III  
B78-352 Sr. Clk. IV  
B78-266 Spons. Res. Staff  
R78-44 Admin. Asst. V  
B78-198 Sec. IV  
B78-100 Sec. IV, Part-Time  
B78-297 Sec. IV  
B78-256 Admin. Asst. V  
B78-285 Technician A (Mech-Optical)  
H78-68 Sec. III, Ocean Engineering  
B78-321 Sec. IV  
B78-320 Clk./Typist III  
B78-295 Sec. IV  
B78-280 Sec. IV  
B78-300 Clk. III  
B78-379 Acctg. Clk.  
B78-351 Dorm. Maintenance Mechanic  
H78-85

The following positions are on HOLD pending final decision:  
R77-95 Spons. Res. Staff  
R78-59 Spons. Res. Staff  
B78-208 Sec. IV  
B78-313 Sr. Library Asst. IV  
Z78-1 Admin. Director

## Tailoring Lighting to Conserve Energy

(Submitted by the Office of the Environmental Engineer)

In many MIT buildings the existing lighting differs from the existing fixtures. Many of these differences are the results of the MIT relamping/delamping cycle. Every two to three years the lighting in each MIT building is relamped. When a building is slated for relamping, a survey of the existing lighting is done to determine what changes in lighting should be made. After the survey is completed, the light fixtures in the building are washed and the bulbs are replaced with the recommended changes implemented.

Changes in the lighting are often necessary, and for greatly different reasons. Buildings built or renovated in the 1960s were designed with area lighting, which lights all parts of the room equally. Consequently, in offices all areas were lit well enough for desk work. Today's lighting is usually energy-conserving task lighting, where the different parts of a room are lit to the different levels necessary for the tasks performed in them. For example, a stronger light would be placed over a desk than over a couch. All task-lighting at MIT is in accordance with the levels recommended by the US Government.

The amount of energy conserved by conversion of area lighting to task lighting differs from building to building. In buildings where the lighting work was done in the 1950s, savings are modest, because

lighting designed in that period is efficient and high levels of lighting had not yet become common. However, buildings built in the 1960s and early 1970s were equipped with much more lighting than necessary, and savings in those buildings are great. For example, Building E18, which was renovated for MIT usage in 1963, had over 50% of its lights removed during delamping.

Another energy conservation measure implemented in relamping was the replacement of 40-watt fluorescent tubes with 35-watt tubes. The original 40-watt tubes gave off less light, and often helped cut down overlighting in areas. The newer 35-watt tubes sustain the same level of lighting as the 40-watt tubes and are currently being installed in most locations. However, these tubes are incompatible with the starters used in some of the older fixtures, and do not operate reliably at lower temperatures or in fixtures controlled by dimmer switches.

Where tubes are removed from fixtures as part of delamping, efforts are made to remove all the tubes in one series-connected fixture wherever possible. However, where one tube is necessary for illumination, a phantom tube is used to complete the circuit. This tube is a glass tube with a capacitor inside which consumes no power and produces no light. Phantom tubes are avoided wherever possible due to the cost and the lowered efficiency of operation of the remaining tube.

Delamping is also done at other times to provide more efficient lighting. Changes in lighting are effected at the user's request.

When the occupant or usage of an area changes, the lighting is changed to reflect the new lighting needs. In addition, all newly renovated areas are delamped after the occupants are settled. Room lighting is tailored to the individual needs of the occupants, and lighting will be reduced or increased as necessary. The ultimate objective of delamping is to provide the most effective lighting possible with the existing fixtures while consuming the least possible energy.

The MIT relamping/delamping cycle was begun in late 1972, and is in the midst of its third cycle. Four buildings—Rockwell Cage, the skating rink, and East and Albany Garages—are relamped annually, while all others except Building 20 and the dormitories are on the cycle. The most recent buildings to be relamped and delamped are Buildings 36 and 38.

## Wood to Head Boston Schools

Dr. Robert C. Wood, elected last week by the Boston School Committee to a four-year term as superintendent of schools, is a former faculty member at MIT.

Joining the faculty in 1957, Dr. Wood was professor of political science, head of the Department of Political Science and director of the Harvard-MIT Joint Center for Urban Studies in 1970 when he resigned to become president of the University of Massachusetts. In 1966-69, while on leave from MIT, Dr. Wood served as undersecretary and later as secretary of the US Department of Housing and Urban Development.