

Faculty To Meet

A regular meeting of the faculty will be held this afternoon (January 12) at 3:15 in Room 10-250.

Items on the agenda include a proposal to change the name of graduate degrees in the Department of Architecture, the first presentation of the Report of the Ad Hoc Committee on the MIT Library System, and continuing discussion of the Report of the Special Task Force on Education. (Both reports were published in Tech Talk, December 15 and December 8, respectively. Both reports are available in the Information Center, Room 7-111.)

Non-members of the faculty are welcome to observe faculty meetings. The seating areas set aside for faculty members and for other members of the community will be clearly marked.

Claims Due for BC/BS

It's that time of year again—the New Year, Income Tax, and for filing Blue Cross-Blue Shield Benefits claims.

Each employee or staff member—plus family—covered by the BC-BS Master Medical Plan is also covered by the Extended Benefits feature of this plan. In most cases, this provides 80 per cent reimbursement for medical expenses each calendar year, beyond the first fifty dollars. This applies to bills for: doctor's visits (home and office), prescription drugs, visiting nurses, ambulance, purchase or rental of appliances, physical therapy and registered nurses (while hospitalized).

In filing a claim for reimbursement of these expenses, use the Extended Benefits form provided by calling the Benefits Office (Ext. 4271, Room E19-230) or the personnel offices at Lincoln and the Draper Labs. Attach all actual bills or receipts which are fully itemized as to date of service, fee, and the patient's name; for prescriptions, the RX number, RX name, quantity, and patient's name are required. All bills must be receipted "Paid," and coverage includes only expenses incurred in each calendar year. BC-BS will only honor claims going back eighteen months so be sure to file for 1971 early and for the balance of 1970 if not already filed.

For tax-paying aliens, the Benefits Office has a supply of tax return forms No. 1040NR with instructions. Because it is difficult to provide accurate information in each individual case, the Internal Revenue Service suggests that aliens fill out as much of the form as possible, then pay a visit to the IRS office in Room E100 of the John F. Kennedy Building in Government Center, Boston, or call 233-3446.



Freshman Paul Averbach on a free form pottery sculpture. The pottery workshop is one of several very popular activities being sponsored by the Student Art Association during IAP. Photo by Bob Lyon

Winemaking, Occult Sciences Are Among IAP Highlights This Year

MIT's second adventure with an Independent Activities Period is off and running and all indications are that it will be just as successful as last year's trial.

An informal sample of undergraduate residence halls and fraternities last Friday showed that approximately two-thirds of the students were on campus.

Altogether there are well-over 600 separate activities and events going on during the period which lasts through January 28. They

include mini-courses, seminars, tours, lectures, and how-to workshops, in addition to some regular subjects being offered in intensive versions.

Students seem to be just as pleased with normal MIT-type activities as they are with more exotic offerings not available during the regular semester. For example, an electron microscope workshop in Biology had to turn away students, as did another subject in winemaking and fer-

mentation. The National Magnet Laboratory's two-week series on an "Introduction to the Occult Sciences" has people standing in the aisles.

IAP highlights, including new listings and revisions may be found in the IAP section of the Institute Calendar on pages 4 and 5. Additions and revisions to the IAP Time-table may be found on page 7. Copies of the IAP Guides and the IAP Timetable are available in the Information Center, Room 7-111.

Breakthrough in Freeze-Drying

History's Flavor, Like Food's, Can Be Preserved

by Peter Spackman

The true taste of history, like the flavor of food, can be preserved by freeze-drying.

James Flink, assistant professor of Nutrition and Food Science at MIT, was a visiting professor at the Technical University of Denmark in Lyngby just outside Copenhagen when Danish librarian Henrik Hoyer called him one day to ask if he could lend a hand drying out some frozen historical documents.

In 1968 a fire had broken out at the Greenland Regional Library in Godthaab, the capital of Greenland, and in its aftermath, piles of valuable documents, water-soaked as the blaze was extinguished, froze solid in the frigid air. The Library's officials, fearing that conventional drying would ruin the materials, put them all into deep-freeze and shipped them to Denmark until a way to save them could be worked out.

The documents—manuscripts, books, letters and a photo-album—had been frozen for two years when Hoyer got in touch with Professor Flink to see if his laboratory could undertake their rescue by freeze-drying. The freeze-drying process, which is carried out in a vacuum chamber with carefully controlled increments of heat, changes water directly from a solid to a vapor and

since it is never in its liquid form it cannot soften and deform the material being dried.

"We thought freeze-drying should work nicely," Professor Flink recalls, "because the pages would dry without becoming resoaked, which would have caused the ink on the manuscripts to run. But having faith in a technique is not quite the same as

actually doing it, and even after trying it out with some test batches, my heart was in my mouth on the first real run. As a run proceeds, heating in a vacuum causes the ice to go directly into vapor, and this is drawn off, while the remaining ice keeps the batch cold enough so water stays frozen. The tricky part is at the end of the run, when there's not much ice left,

and you have to reduce the heat inflow sharply to prevent liquid from forming before the water vapor is entirely drawn off.

"When that first batch came out perfectly," Professor Flink went on, "I literally ran around the lab shouting. Each page separated easily and in no case did the ink run. It wasn't until afterward, as it

(Continued on page 6)



Copy of a photograph from freeze-dried Danish photo album, made by Professor James Flink. The photograph was taken by Danish polar explorer W.

Thalbitzer on an expedition to Greenland in 1907 and shows several eskimo kayaks in the foreground and a larger kviindebaad, or woman's boat.

Space Shuttle Will Benefit Draper Lab

The new \$5.5 billion space shuttle program okayed by President Nixon last week will have a "modest" effect on the Charles Stark Draper Laboratory, according to Joseph F. O'Connor, Assistant to the Vice President for Research at the Institute.

"It is difficult to predict this early exactly what role the Draper Laboratory will play in the development of the space shuttle," Mr. O'Connor said. "Right now it appears that the Laboratory will have a modest but continuing involvement in the project."

President Nixon gave the go ahead for the space shuttle last Wednesday. The shuttle, to be developed over the next six years, will create 50,000 new jobs and is expected to make a start in restoring the aerospace industry to health.

Mr. O'Connor went on to say that the Draper Lab's work would deal "only with software for the project. At this time it appears that we will have no involvement in the design of development of hardware." He also expressed doubt that the shuttle program would have any effect on Lincoln Laboratory.

Study Urges New Power Technology

by Michael Seif

A major study just completed at the Institute warns that power generation from nuclear reactors cannot be expected to grow fast enough to meet mounting US electricity demands and urges a vigorous research program to make do with available fossil fuels in ways that protect the environment.

The study was carried out by a team at MIT's newly formed and inter-disciplinary Environment Laboratory and was directed by Professor Jack B. Howard and Professor Hoyt C. Hottel, both of the Department of Chemical Engineering. The report is an outgrowth of a cooperative effort with Resources for the Future, Inc., Washington, D.C. The overall study was supported by the National Science Foundation.

According to the study, the nation must find ways soon of making steam generation of electricity more efficient--possibly through the use of turbine engine technology borrowed from the jet aircraft industry. In addition, technology must come up with methods of using the nation's abundant reserves of coals, tar sands and oil shale without polluting the environment with sulfur.

One promising avenue for research, the study says, is in the economical conversion of coal into burnable gas. Already, shortages of natural gas are beginning to loom, the report says, in the face of dwindling reserves, fewer new finds and skyrocketing industrial demands. Given intensive research, the report says, noxious sulfur compounds in the original fossil fuels might be turned into easily-removable hydrogen sulfide (H₂S) in the process of conversion to gas, thus serving the interests of pollution control and power demands.

The MIT portion of the study has just been published in book form, *New Energy Technology--Some Facts and Assessments*, by the MIT Press, while a summary article based on the work will appear shortly in the January issue of *Technology Review*.

Professors Hottel and Howard studied the economics and technologies of alternative fuel sources

and of simultaneously reducing some of the pollutants created by power production. The biggest mistake the nation could make, they say, is assuming that by merely fostering nuclear power, the nation's power problems will be solved automatically. Evidence is now clear, they say, that all the growth that will, and, they feel, should, occur in nuclear power will not happen fast enough to eliminate the need for alternative--and clean--fossil fuels. Inadequate emphasis on this research could result in an impasse between industrial energy needs and the need of the nation to protect the environment, they say.

Fortunately, even allowing for the expected growth in power requirements, there are enough fossil fuel reserves for hundreds of years still waiting to be tapped, the study says. These are in the form of lower grades of coal, oil shale and tar sands.

The study says that while combustion-generated sulfur dioxide (SO₂) is not a global pollution problem, it does present a dispersion problem or a local pollution problem. By 1980 two-thirds of the total SO₂ emissions in the US will originate from fossil-fuel power plants. There is just not enough low-sulfur fossil fuel available in the right places to economically solve the problem of sulfur pollution simply by using low-sulfur fuel, the study says, and contrary to popular opinion, technology is not developed enough to remove SO₂ from stack gas.

An alternative method of handling the problem, the study suggests, would be to convert, say, coal into gas and remove the sulfur in the form of hydrogen sulfide (H₂S), which is more



The first book written by members of MIT's newly-formed and inter-disciplinary Environment Laboratory was presented last month to Dr. Jerome Wiesner (center) by the authors, Professor Hoyt C. Hottel (left) and Professor Jack B. Howard. *New Energy Technology -- Some facts and Assessments* was published by the MIT Press under a new printing schedule that will provide the public with important information as rapidly as possible. With offset printing directly from typewriter copy, the book was completed only six weeks after the original copy was received at the MIT Press.

-Photo by Bob Lyon

concentrated than the sulfur in stack gas and lends itself to a simpler and less expensive process of chemical removal.

The study found a whole new industry will be needed to convert coal to gas in response to the shortage of natural gas that is certain to result from the increased use of this fuel at a time when less and less of it can be found. Removal of sulfur could become a routine step in this industry. Research on the conversion process is moving along four different lines, the study found.

"The nation cannot afford to overlook the possibility that any one of the four processes may have advantages properly assessable only on a larger scale than that of laboratory research completed to date," the study says.

For example, by funding research far enough along to demonstrate that one process will save even a few cents on every 1,000 cubic feet of gas produced, the nation would ultimately save

hundreds of millions of dollars each year, the study says.

According to Professors Hottel and Howard, waste heat disposal is becoming a serious problem. One way to decrease the potential for thermal pollution would be to increase the efficiency of power plants; in other words, squeeze out the greatest possible power from the fuel consumed.

After centuries of development, power production from steam has reached a plateau at a thermodynamic efficiency of about 40 percent. Thanks to the ever-increasing demands for jet aviation propulsion power, however, the gas turbine capable of operating at extremely high temperatures is now available for the production of electricity, the study says.

By using a gas turbine in conjunction with a steam generator, where the steam is produced by the turbine's exhaust, it should be possible to achieve an efficiency of 58 percent from gas to power. Allowing for the loss in conversion from coal to gas, an overall efficiency of 50 percent from coal to power production is estimated.

Although there has been much talk about using solar energy, which would be pollution free and inexhaustible, Hottel and Howard are not impressed with its potential. Solar energy may find some use in heating homes or domestic water supplies, they feel. But, they conclude:

"Physical as well as photochemical use of solar energy on any moderately large scale is nature's way--not man's."

Basic Pistol Class to Begin Jan. 20

The MIT Pistol and Rifle Club, Inc., will offer a course in basic pistol marksmanship beginning January 20. Classes will meet on five consecutive Thursday evenings from 6:30 to 8:30 p.m. in the pistol range in duPont Gymnasium. There will be a fee of \$10 to cover pistols, ammunition and targets. The course is limited to the first 20 adult members of the community to apply. Those interested should call Herald Sulahian at Ext. 3989.

MIT Articles in Post, Review Win Awards

MIT-connected articles won honorable mention in the 1971 AAAS-Westinghouse Science Writing Awards for two newspaper science writers late last month.

Victor McElheny of the *Boston Globe* won honorable mention in the magazine division for his columns appearing in MIT's *Technology Review* between August and October. Victor Cohn, *Washington Post*, won honorable mention among newspapers with more than 100,000 circulation with three articles on science and society, including one, headlined "Scientists are Harnessing Our Runaway Technology," that appeared September 5 and reported changing research and teaching interests among MIT engineering and science faculty. Westinghouse Electric Corporation and the American Association for the Advancement of Science sponsor the awards.

Charges Set for Microfilm Thesis Copies

Following the recommendation of the Graduate Student Council that the cost of microfilming theses should be borne by the student, the Committee on Graduate School Policy has set the following fees: doctoral theses, \$18; all other graduate theses, \$9.50.

Candidates for these degrees should pay the appropriate fee at the Bursar's Office and receive a receipt for this payment. Theses should be submitted to department headquarters in the usual manner together with the Bursar's receipt for the thesis microreproduction.

TECH TALK

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Mail subscriptions are \$7.50 per year. Checks should be made payable to Bursar, MIT, and mailed to the Editor, Room 5-111, MIT, Cambridge, Mass. 02139.

Please address all news and comment to the Editor, Room 5-111, Ext. 3277.

Hartford Grant to Aid Study of Brain Activity

The John A. Hartford Foundation of New York City has made a grant of \$86,451 to MIT to support studies on the control of certain brain activities - for example, sleep - through diet induced alterations in the chemistry of the blood.

The studies are being performed by Dr. Richard Wurtman, a physician and professor of endocrinology and metabolism, and his associates in the Department of Nutrition and Food Science. Announcement of the grant was made jointly by Harry B. George, President of The Hartford Foundation, and MIT President Jerome B. Wiesner.

The objective of the study is to determine if the rate at which the brains of mice form a hormone known as serotonin is related to the amount of a precursor amino acid, tryptophan, present in the circulating blood plasma. Serotonin is used by the brain as a chemical neurotransmitter; that is, serotonin molecules, when released from one cell body, flow across the

intervening gap, or synapse, to an adjacent cell body and take part in the transmission of signals from one cell to the next.

The brain cells require the amino acid, tryptophan, however, from which to form serotonin. The body derives tryptophan from food intake. The new studies are aimed at determining whether the amount of free tryptophan present in the blood plasma influences the amount of serotonin production.

The researchers also will seek to determine whether tryptophan - induced - and thus diet - induced - changes in serotonin levels are associated with parallel changes in behavior.

"Serotonin-containing brain neurons are thought to participate in a variety of important behavioral and neurophysiological functions," Dr. Wurtman says. "These include the production of sleep, the control of ovulation, the control of body temperature, the control of secretion from the pituitary gland, and the state of mood.

Aliens Must File Address Reports

January is the time of year when all resident aliens must remember to file address reports with the Immigration and Naturalization Service. Both the Registry of Guests (Room 7-121) and the Foreign Student Office (Room 3-111) have supplies of address forms for aliens who are members of the Institute community. Once the card is filled out, it may be turned in at the Post Office in the basement of the Student Center.



Sandy Yulke, '74, discusses student life at the opening seminar...

IAP Forum Explores Areas of Concern to Women at MIT

by Joanne Miller

"What we will try to do is identify what our problems are by the end of the month — and solve the easy ones," Professor Mildred Dresselhaus said in opening the Women's Forum last Thursday noon.

Professors Dresselhaus and Emily Wick originally planned the IAP seminar to focus on the problems of women students but soon expanded the concept to explore areas of common concern to all women at the Institute.

The opening meeting was attended by a widely representative group of 100 women and two men. Included were undergraduate and graduate students, secretaries, technicians, faculty, members of the administrative and research staffs and a few faculty and student wives.

The presence of the men was

felt strongly that the forum sessions should be open to all who wanted to attend. Task force subgroups which may be formed to address specific issues could be restricted to women only, she said, if their members so desired.

The number of topics suggested for consideration was wide ranging, taking in both fundamental issues, such as educational needs and legal rights of women, and minor annoyances like the shortage of ladies' rooms in some areas of the Institute.

Miss Wick briefly outlined the history of women students at MIT. Ellen Swallow, a Vassar graduate, became the first coed in 1871. By 1895, six percent of the student body were women, a percentage never again reached until 1969. The drop in the number of women was due mainly to two factors: expanding educational opportunities for women during the early part of this century and the lack of residential facilities for them at the Institute. The number of women students has risen sharply since McCormick Hall was built and other campus residences have become coeducational.

Questions concerning the education of women centered around the need for some kind of replacement of Miss Wick in the questioned, but Mrs. Dresselhaus pointed out that she and Miss Wick

Dean for Student Affairs Office, expansion of living and athletic facilities for girls and an examination of the concept of role models. One freshman commented that she had yet to meet a female faculty member, whereupon those at the seminar introduced themselves and their subjects.

Topics of concern to working women included professional mobility, child care, subtle discrimination, and sexual discrimination in certain services and benefits. As examples, one woman pointed out that married men may take out loans from the Credit Union on their own signatures while married women must get their husbands' signatures. She also questioned the sexual differential (based on actuarial life expectancies) in pension payments made to men and women.

Areas of subtle discrimination were voiced by professional women who are sometimes requested to type or make coffee for their male colleagues.

There was general consensus on the need for women to increase their own awareness of their roles, both as individuals and as a group, and to communicate that awareness to men who are intellectually committed to the equality of women.

The Women's Forum will continue on Tuesdays and Thursdays at noon in the Margaret Cheney Room (Room 3-310) through January 27. The organizers hope that more wives of faculty and students will attend the forum.

Dr. Virginia Ross, Ph.D. '53, will discuss the symposium on Women in Academia held at the recent meeting of the American Association for the Advancement of Science in Philadelphia, at tomorrow's forum. The AAAS council passed a resolution which will "immediately establish an office for women's equality to work toward full representation for women in scientific training and employment, affairs of the association, and in the direction of national science policy."

Zue to Teach Chinese Class

During IAP the Chinese Students' Club is sponsoring an intensive Mandarin language course for beginners. The course is intended for those who have a serious desire to learn conversational Mandarin in the short time allotted.

A more extensive description of the course can be found in the December 15 "Supplementary Guide to IAP '72." One correction should be noted, however — Mrs. Yen of Harvard University will not be teaching the course. The instructor is Mr. Zue.

Openings are still available in the Mandarin language course. For more information, call Ray Eng on Ext. 2961 or 354-2789.



...as Mrs. Dresselhaus, one of the organizers of the Women's Forum, listens. —Photos by Margo Foote

Johnson to Chair Panel on 'Business in 1990'

Howard W. Johnson, Chairman of the Corporation, has been named chairman of a panel on technology and resources for business for the White House Conference on the Industrial World Ahead: A Look at Business in 1990.

The conference is scheduled for February 6-9. In addition to the panel headed by Mr. Johnson, other major panel topics include the social responsibility of business, the human side of enterprise and the structure of the private enterprise system.

Business, industrial and educational leaders from

LIS to Offer Special Class on COBOL

The Lowell Institute School will offer a special course in COBOL programming if there are sufficient applicants to form a class.

The course will cover the general principals of COBOL, including the logical sequence and interrelationships of the commonly used elements of the language and its application to basic business data processing problems. Students will be expected to write, keypunch and submit for testing several programs to run on the IBM-370 computer. Applicants should have some programming experience or have completed a formal course in computer programming.

Classes will meet from 7 to 9 p.m. Tuesday evenings starting February 8, and will continue for 15 sessions. There will be a fee of \$15, plus \$25 for computer costs. Those interested should telephone the Lowell Institute School, Ext. 4895, before February 1. Notification of acceptance will be sent by mail.

throughout the country will participate in the Conference. President Richard M. Nixon will address the conference banquet and the delegates will also hear addresses by Secretary of Labor James D. Hodgson and Secretary of Commerce Maurice H. Stans.

Holland Receives 1971 NCAA 'Teddy' Award

Dr. Jerome H. Holland, Ambassador to Sweden and a member of the MIT Corporation, received the 1971 Theodore Roosevelt Award from the National Collegiate Athletic Association (NCAA) at its annual honors luncheon last Friday.

Dr. Holland was selected to receive the "Teddy," the NCAA's most coveted award by a panel of prominent citizens and educators. The citation read as follows:

"In recognition of his superb undergraduate career as a scholar and an athlete and his continuing dedication to the highest personal standards, this award is presented to Jerome H. Holland, Cornell University, Class of 1939, in appreciation of his distinguished service and leadership in higher education, human relations and international amenity."

Previous Teddy award winners have included the late President Dwight D. Eisenhower, former Senator Leverett Saltonstall and Supreme Court Justice Byron R. White.

As an undergraduate at Cornell, Dr. Holland was chosen an All-America end in 1938 and 1939. He has since been inducted into the National Football Hall of Fame.

Dr. Holland was elected to the Corporation in 1969 and was named Ambassador to Sweden by President Nixon in 1970. From 1960 until 1970 he served as president of



Dr. Holland

Hampton Institute in Virginia. Earlier this fall Ambassador and Mrs. Holland were presented the annual citation for distinguished service by the Experiment in International Living.

'72-'73 Aid Forms Due

Undergraduate financial aid application for the 1972-73 academic year are due in the Student Financial Aid Office by January 28. Aid applications may be picked up now in Room 5-119.

Student Dies in Accident

Thomas R. Olejarski, 18, a freshman from Rochester, New York and a member of Tau Epsilon Phi fraternity, 253 Commonwealth Avenue, Boston, was fatally injured early Tuesday, when he tumbled over a fourth floor banister at the fraternity house and fell down the stairwell to the first floor.

Witnesses said Olejarski and other residents of the house had been pelting each other with water-filled balloons dropped down the stairwell. When Olejarski reached over to drop a balloon, he slipped on the wet floor and fell over the banister. He was dead on arrival at Massachusetts General Hospital.

Hayden Photo Show to Open

"The Innermost House," an architectural photography show, will be exhibited at Hayden Gallery from January 14 through February 14. Sponsored by the MIT Exhibitions Office, the show was assembled two years ago and recently revised by Jonathon Green, assistant professor of photography at MIT, to demonstrate the photographer's long-standing interest in architecture as subject matter.

The exhibition includes more than 75 works ranging from late 19th century to the present day by more than 35 photographers. Many famous American buildings are shown, as well as older, anonymous architecture.

Hayden Gallery is open from 10 a.m. to 5 p.m. on Mondays, Wednesdays, Thursdays and Fridays, from 10 a.m. to 9 p.m. on Tuesdays, and from 1 to 5 p.m. on Saturdays, Sundays and holidays.

THE INSTITUTE CALENDAR

January 12
through
January 21

Seminars and Lectures

Wednesday, January 12

Jewish Ethics in the Talmudic*

Ehud Luz, Hebrew College. Hillel Morris Burg Memorial Lecture Series. 7:30pm, McCormick Green Living Rm.

Thursday, January 13

What are the Important Features of Program Languages?

Panel discussion moderated by Prof. J. F. Corbato. Panelists include: Dr. K. D. Iverson, IBM Scientific Center; Dr. George Rodrigues, Softech Inc.; Prof. Marc Nelson, MIT. 1:15-3pm, Rm 26-100.

Structural and Functional Relationships in Bacterial Membranes

Dr. Milton R. J. Salton, professor and chairman of Department of Microbiology, New York University School of Medicine. Nutrition and Food Science Departmental Seminar. 4:15pm, Rm 9-150. Coffee, 4pm, Rm 9-150. Sherry Hour following, Rm 16-322.

Sunday, January 16

Directions of Hillel: Past, Present and Future*

Rabbi Albert Axelrad, Brandeis University. Supper discussion. 6:30pm, Hillel Kosher Kitchen (Walker basement). Admission: \$2 per person. Make reservations at Hillel Office, X2982, by Wednesday, January 12.

Monday, January 17

Studies of Man in Isolated Societies: The behavioral repertoire of man as revealed in the cultural improvisations of primitive groups*

Dr. D. Carleton Gajdusek, National Institutes of Health. ERC Colloquium. 12n, Rm 6-120.

Tuesday, January 18

Models for X-Ray Sources

Dr. Aldo Treves, visiting scientist, Center for Space Research. Astrophysics Seminar. 4:15pm, Rm 37-252. Coffee, 4pm.

Wednesday, January 19

Distinctions between Different Time-Dependent Annulus Flows Revealed by Measurements from a 100-Probe Synoptic Network—Energetics, eddy fluxes, and Fourier Analysis*

Richard Pfeffer, Director of Geophysical Fluid Dynamics Institute, Florida State University. 4pm, Rm 54-100. Coffee, 3:30pm, Rm 54-923.

Probe Response and Flow Field Measurements in a Simulated Ionospheric Satellite Environment*

Claudio Parazzoli, research assistant, mechanical engineering. Doctoral thesis presentation. 4pm, Rm 3-133.

Recycling Panel and Films*

Films on "The Realities of Recycling" and "The Green Box." Panelists include Nancy Bellows, Boston Environment Inc.; Stephen Senturia and David Wilson, MIT Lab for Recycling. 8pm, Rm 3-133.

Student Meetings

Student Information Processing Board Meeting

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

Thursday Staff Meeting**

Every Thursday, 8pm, 2nd floor, Walker.

Technique Staff Meeting

Every Saturday, 11am, Student Center Rm 457.

ERGO Staff Meeting

Every Sunday, 6pm, Student Center Rm 443.

MIT Club Notes

Book of the Week*

Informal discussion over dinner of *Beyond Freedom and Dignity* by B. F. Skinner. Wednesday, January 12, 5:15-7:15pm, Ashdown Dining Hall (table near door). Call James Snell, 523-1198.

MIT Club of Boston***

Luncheon meeting. "The Future of Mass Transportation" by Prof. Alan Altshuler, Massachusetts Secretary of Transportation. Thursday, January 13, 12:15-1:30pm, Aquarium Restaurant, 100 Atlantic Ave.

White Water Club***

Pool Session. Tuesday, January 18, 8-10pm, Alumni Pool.

Book of the Week*

Informal discussion over dinner of *School is Dead* by Everett Reimer. Wednesday, January 19, 5:15-7:15pm, Ashdown Dining Hall (table near door). Call James Snell, 523-1198.

Zero Population Growth**

Meeting. Wednesday, January 19, 5-7pm, Student Center Rm 473.

Outing Club**

Slide show on mountain safety. Thursday, January 20, 7:30pm, Sala de Puerto Rico.

Baker House SPAZ Jogging Club**

Daily, 10:45pm, Baker 2nd Floor West.

Hobby Shop**

Open weekdays, 10am-4:30pm, duPont Gym basement. Fee: students, \$6/term or \$10/year; community, \$15/year. Call X4343.

MIT/DL Duplicate Bridge Club**

Every Sunday, 2:30pm, Walker Blue Rm. Every Tuesday, 6pm, Student Center Rm 491.

Classical Guitar Society**

Every Monday and Thursday, 3:30-7:30pm, Student Center Rm 491.

Outing Club*

Every Monday, Thursday, 5pm, Student Center Rm 473.

Fencing Club**

Every Tuesday, 6-9pm, duPont Fencing Rm.

Tiddlywinks Association*

Every Wednesday, 8-11:15pm, Student Center Rm 407.

Soaring Association*

Ground school, first Thursday every month; general meeting, third Thursday every month. 7:30pm, Student Center Rm 473.

Science Fiction Society*

Every Friday, 5pm, Rm 1-236.

Student Homophile League*

Meeting and mixer. Every Friday, 7:30pm, Mission Church, 33 Bowdoin St, Boston.

Mixers

Muddy Charles Pub**

Join your friends at the Muddy Charles Pub, 110 Walker, daily 10:30am-7:30pm. Call X2158.

Friday Afternoon Club**

Music, conversation and all the cold draft Budweiser you can drink. Featuring folk singer Rich Holloway. Every Friday, 5:30pm, Ashdown basement Games Rm. Admission: men \$1, women free. Must be over 21.

Movies

The Knack**

LSC. Friday, January 14, 7pm and 9:30pm, Rm 10-250. Tickets 50 cents.

Creature from the Haunted Sea and Last Woman on Earth**

LSC. Friday, January 21, 7 and 10pm, Rm 10-250. Tickets 50 cents.

Dance

Yoga for Beginners

Classes. Monday, January 17, 7-8pm; Thursday, January 20, 11am-12n. Rm 10-340. Space available in intermediate classes. Eileen Turchinets, 862-2613.

Turkish Students Club*

Folk dance practice. Every Sunday, 4-7pm, Student Center Rm 473.

Folk Dance Club*

International folk dancing. Every Sunday, 7:30-11pm, Sala de Puerto Rico.

Tech Squares*

Every Tuesday, 8-11pm, Rm 10-105. Call dorm X0888 or 492-5453.

Modern Dance Technique Class**

Elementary/Intermediate. Every Monday, Wednesday, Friday, 5:15pm. Every Sunday, 1pm, McCormick Gym.

Folk Dance Club*

Folk dance classes. Every Tuesday and Thursday, 3-6pm, Student Center Rm 407.

Folk Dance Club*

Folk dancing. Every Tuesday, 7:30-11pm, Student Center Rm 407.

Folk Dance Club*

Israeli folk dancing. Every Thursday, 7:30-10pm, duPont Gym T-Club Lounge.

Exhibitions

The Innermost House*

Photography exhibition. Hayden Gallery, January 14 through February 14.

Exhibition of Paintings by Susan E. Schur

On display at the Faculty Club through mid-January.

Photographs by Josh Collins*

On display in the Rotch Library through February 4.

Art LaZar Exhibition*

Creative Photography Gallery (3rd floor duPont Gym), 12n-7p through February 1.

The Art of Rigging and Buoy System for Air-Sea Studies*

Hart Nautical Museum, Bldg 5, 1st floor.

Main Corridor Exhibitions*

Presented by students and departments. Bldgs 7, 3, 4, 8.

Athletics

Freshman Basketball*

Phillips Exeter Academy. Wednesday, January 12, 4pm, Rockwell Cage.

Varsity Hockey*

Lafayette. Friday, January 14, 7pm, Skating Rink.

Basketball*

RPI. Saturday, January 15, Freshmen at 6:15pm, Varsity at 8:15pm, Rockwell Cage.

Varsity Hockey*

Nichols. Saturday, January 15, 7pm, Skating Rink.

Varsity "B" Basketball*

Wentworth. Monday, January 17, 7:30pm, Rockwell Cage.

Wrestling*

Harvard. Tuesday, January 18, JV at 6pm, Varsity at 7:30pm, duPont Gym.

Varsity Fencing*

Johns Hopkins. Wednesday, January 19, 7pm, duPont Fencing Rm.

Religious Services and Activities

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

Sha'al: An Urban Collective in Israel*

Bruce Kutnick, graduate student. Following Hillel services, Friday, January 14, 9pm, Chapel.

Roman Catholic Mass*

Every Sunday, 9:15am, 12:15pm, 5:15pm, Chapel.

Christian Worship Service*

Every Sunday, 11am, Chapel.

Christian Discussion Group*

Bible study and discussion of Christianity today. Every Sunday, 9:30-11am, McCormick Seminar Rm A. Call Ron Gamble, X6712-547-4279.

Hillel Religious Services*

Monday-Friday, 8am, Rm 7-102; Fridays, 7:30pm, Chapel; Saturdays, 9am, Chapel.

Christians for Dinner*

United Christian Fellowship. Every Tuesday, 6-7pm, Walker Dining Hall (under sign of the fish).

Praying, Singing, Sharing Meeting*

United Christian Fellowship. Every Tuesday, 7-8pm, East Campus Lounge.

Christian Science Organization*

Meeting includes testimony of healings. Every Tuesday, 7:15pm, Rm 8-314.

Christian Bible Discussion Groups*

Every Wednesday, 12:30pm, Rm 4-343; Every Thursday, 12:15pm, Rm 20B-031. Call Prof. Schimmel, X6739, or Ralph Burgess, X2415.

Islamic Society Prayers*

Every Friday, 1pm, Kresge Rehearsal Rm B.

Vedanta Services*

Every Friday, 5:15pm, Chapel; discussion hour, 6pm, Ashdown Dining Hall.

Free Draft Counselling*

Hillel, 312 Memorial Drive, X2982. Call or visit 10am-5pm.

Announcements

National Teacher Examinations

Exams will be given at Boston University, Boston College and UMass/Amherst on January 29 and April 8. Information and registration forms available in Student Placement Bureau, Rm E19-455, X4733, or directly from National Teacher Examination Box 911, Educational Testing Service, Princeton, New Jersey 08540.

IAP Listings

Wednesday, January 12

Understanding Environmental Noise Using Model Experiments
Prof. R. Lyon. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Cyclotron Resonance
Seminar on Quantum Magneto-Optics. 10am-12n, Conference Rm, National Magnet Lab.

Ballet Classes
Dance Workshop. 10:30am, McCormick Gym. (Repeated through Friday, January 14).

Development of an Artificial Kidney Membrane
Jeff Silliman, graduate student. Chemical Engineering Seminar. 11am-12n, Rm 12-142.

Dynamics and Control of a Magnetically Levitated Vehicle*
Dr. Dennis F. Wilkie, Ford Motor Company. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

Applications of Wavelength-Tunable Lasers
Prof. C. Forbes Dewey. ME Staff Seminar Series. 3pm, Rm 1-146. Followed by coffee, Rm 1-114.

Research in Computer Systems
Prof. F. J. Corbato. Research Highlights in EE Seminar. 3-4pm, Rm 10-105. Coffee.

Yoga Exercises
Every Wednesday during IAP, 3-5pm, Rm 37-232.

A Funny Thing Happened on the Way to the Forum*
Humanities IAP Film Series. 6pm, Rm 10-250. Free admission.

The Filmmaker's View of the City
Urban Studies and Planning Film Series. 7:30pm, Bldg E21. (Repeated Wednesday-Friday, January 12-14.)

Thursday, January 13

New Techniques for Audience Feedback
Prof. Thomas B. Sheridan. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

The Cranz-Schardin System of High Speed Photography
Dr. David Kocher. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

Mechanisms for Stability and Instability in Feedback Systems*
Prof. J. C. Willems, electrical engineering. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

Afro-American Dance
Every Thursday and Monday during IAP, 2-3:30pm, Walker Gym.

Social-Cost Transfer and Incentives for Social Change
Prof. D. G. Wilson. ME Staff Seminar Series. 3pm, Rm 1-146. Followed by coffee, Rm 1-114.

Minicomputer: What Is It and Where Is It Going?
Prof. F. F. Lee. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

King Kong*
Humanities IAP Film Series. 6pm, Rm 10-250. Free admission.

Songwriting**
Opportunity for students to perform and discuss their own and other's songs. Music Section of Humanities. Every Thursday during IAP, 7-9pm, Rm 14N-311.

How to Build a Silk Screen
Demonstration by Mimi Luft. 7:30pm, Student Center Rm 429.

Songs
Experimental film by Stan Brakhage. 7:30pm, Rm 5-234. (Repeated Tuesday, January 18, and Thursday, January 20.)

Friday, January 14

Two Engineering Problems: Phantom Heads in Hydraulic Pumps; Converting an Eight-Short-Stack Power Plant to a One-Tall-Stack Plant
Prof. Warren M. Rohsenow. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Polaron Studies
Seminar on Quantum Magneto-Optics. 10am-12n, Conference Rm, National Magnet Lab.

High Molecular Weight Poly (vinyl alcohol) for Biomaterials*
Tim Burke, graduate student. Chemical Engineering Seminar. 11am-12n, Rm 12-142.

Studies of Small Blood Flow
Dr. Searle Reese. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

Diagonal Dominance: A New Way of Solving Old Problems*
Prof. H. Rosenbrock, professor of control engineering, University of Manchester Institute of Science and Technology, England. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

Rational Measurement of Fluid Kinematics Using Opticophysical Interactions

Colin E. Hackett, research associate. ME Staff Seminar Series. 3pm, Rm 1-146. Followed by coffee, Rm 1-114.

The Magneplane: An Electromagnetically Guided and Propelled Transportation System

Prof. R. Thornton. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

Notes on Jazz of the 20's to 40's
Jazz sessions with Profs Roy Lamson and Warren Rohsenow. 3-5pm, Rm 4-260. (Repeated on Monday, January 17 and Wednesday, January 19.)

Saturday, January 15

Lecture and Experimental Films by Stan Vanderbeek*
LSC. 7pm, Rm 26-100. Free admission.

Monday, January 17

Man-Computer Control of Remote Manipulators
Prof. Daniel E. Whitney. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Interband Magneto-Optical Studies
Seminar on Quantum Magneto-Optics. 10am-12n, Conference Rm, National Magnet Lab.

A Stereo Camera for Closeup Photography, Especially Eyes
Dr. David Donaldson. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

A Study of Mass Transfer Aspects in Atherosclerosis
Vince Vilker, Bob Bratzler, Rich Freedman, graduate students. Chemical Engineering Seminar. 11am-12n, Rm 12-142.

Mean Square Performance Bounds for Some Estimation and Control Problems*

Prof. Ian B. Rhodes, Control Sciences Group, Washington University. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

Afro-American Dance
Every Monday and Thursday during IAP, 2-3:30pm, Walker Gym.

Modern Solid State Theory
Prof. A. Adler. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

The Frozen World*
Kenneth Clarke's Civilisation Series. 7:30pm, Student Center (room number will be posted). Free admission.

Tuesday, January 18

What Limits the Clearance of Sliding Systems?
Prof. E. Rabinowicz. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Photography of Blood Flow in Man
Dr. Roe Wells. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

Stability of Distributed Parameter Process Control Systems*
Prof. Morton Denn, Dept of Chemical Engineering, University of Delaware. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

Research Directions in Communications Engineering
Prof. R. S. Kennedy. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

M*
Humanities IAP Film Series. 6pm, Rm 10-250. Free admission.

The Great Thaw*
Kenneth Clarke's Civilisation Series. 7:30pm, Student Center (room number will be posted). Free admission.

Studio Lighting Techniques Using Polaroid Camera
Demonstration by Lee Parks. 7:30pm, Student Center Rm 429.

Wednesday, January 19

Substitute Limbs and Senses for Humans
Prof. Robert W. Mann. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Semi-Conductor Lasers
Quantum Magneto-Optics Seminar. 10am-12n, Conference Rm, National Magnet Lab.

Experiences with High Speed Photography
Gjon Mili. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

A Study of Mass Transfer Aspects in Atherosclerosis
Continued from Monday, January 17. Chemical Engineering Seminar. 11am-12n, Rm 12-142.

Autopilot Design for Flexible Aircraft*
Dr. Grant B. Skelton, Minneapolis Honeywell. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

Energy Crises—Causes or Effects?
Prof. D. White. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

Discussion of Einstein and Others from a Psychoanalytic Viewpoint
Led by Profs Harry Schey and Bennett Simon. 4pm, Rm 26-204.

Nanook of the North*
Humanities IAP Film Series. 6pm, Rm 10-250. Free admission.

Early Career of Louis Armstrong
James Patrick, Princeton University. Sponsored by the Music faculty. 8pm, Sala de Puerto Rico.

Thursday, January 20

Regulating Automobile Pollution
Prof. J. Fay. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Studio Demonstrations with Multiflash
Gjon Mili. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

Photoresist Pottery Glazing Technique
Demonstration by Student Art Association. 1pm, Student Center Rm 429.

A Markovian Approach for Pursuit Evasion Differential Games*
Dr. David L. Kleinman, Systems Control, Inc. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

Engineering Technology and Health Care
Prof. R. Mark. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

Passion of Joan of Arc*
Humanities IAP Film Series. 6pm, Rm 10-250. Free admission.

Friday, January 21

Supersonic Booms Created by Maneuvering Aircraft
Prof. Allan Pierce. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Magneto-Plasma Phenomena
Quantum Magneto-Optics Seminar. 10am-12n, Conference Rm, National Magnet Lab.

Photography
Gjon Mili. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

Diffusion of Oxygen in Blood
Pieter Stroeve, graduate student. Chemical Engineering Seminar. 11am-12n, Rm 12-142.

The Innovations Approach to Filtering Problems*
Dr. Paul Frost, Bell Telephone Labs. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

Computers in the Industry—Now and in the Future
Dr. J. Bertram, director of engineering, programming and technology, IBM Corp. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

*Open to the Public
**Open to the MIT Community Only
***Open to Members Only
†Freshmen encouraged to attend

Send notices for January 19 through January 28 to the Calendar Editor, Room 5-111, Ext. 3279, by noon Friday, January 14.

Old Satellite Provides Clue

'Wrong Way' Protons in Solar Wind May Explain Auroras

by Robert M. Byers

A new look at data from an old satellite has yielded evidence of a previously unreported phenomenon in the magnetic sphere surrounding the earth.

Charged particles that flow past the earth as part of the solar wind apparently are turned completely around in the tail of the earth's magnetosphere further out in space and come flowing back toward the earth inside the magnetic cavity.

Evidence for the intermittent flow of "wrong way" protons streaming toward the earth at the distance of the moon on the night side of the earth was found by Professor Anand Prakash of the Center for Space Research and reported by him at the recent annual meeting of the American Physical Society at the Institute.

The discovery could provide an important clue to the causes of magnetic storms and auroras, the colorful displays of lights seen in the sky during arctic and antarctic nights, Dr. Prakash said. A back flow of protons could follow magnetic force lines inside the magnetosphere and reach down to the earth's surface, particularly at the poles, he said.

The solar wind is composed of electrons and positively charged atomic nuclei -- mostly protons -- that are continuously boiled off the super hot sun and blow outward in all directions from the sun at supersonic speeds. The solar wind

has been among important discoveries of space age research with satellites and space probes.

It is through the solar wind that many solar events are felt on earth. Aurora borealis (northern lights), disturbances in radio transmission, and magnetic aberrations, for example, are local earthly events now known to be related to ebbs and surges in solar wind. Moreover, at least part of the particles trapped in Van Allen radiation belts just above the earth are put there by solar wind, but by processes that are not yet clear.

As space physicists now visualize it, the solar wind elongates the earth's magnetic field on the night side into a long trail trailing off in the direction away from the sun. The mental image often used is that of a gigantic teardrop shape. The field lines in the tail intersect at some distance in space -- the so-called "neutral line" -- forming a teardrop shape with the earth at the large forward edge of the drop. There is thus a magnetic cavity around the earth which is elongated on the side of the earth away from the sun and it is in this cavity -- at the distance of the moon -- that the backflow of protons has been detected.

It is the magnetic field around the earth that deflects the brunt of the solar wind and keeps it from striking the earth with full force. This interaction of the solar wind with the earth magnetosphere does make itself felt on earth in diverse ways, however, and thus is of intense interest to scientists.

Numerous satellites and probes over the past decade have returned data physicists have needed to form their ideas about the solar wind and what it does to the earth magnetosphere. The Center for Space Research has built many of the instruments used in these probes and has been responsible for many of the findings that have resulted.

One probe that proved useful was Explorer 35, launched into orbit around the moon in August, 1967, carrying proton detection instruments built at MIT. Since it was anchored to the moon, Explorer 35 also orbited the earth once a month along with the moon. Its data was used to chart solar

wind phenomena on all sides of our planet. The MIT experiment operated until July, 1968, making 11 trips in all around the earth at the distance of the moon.

One important region of the magnetosphere that remains uncharted and unknown is the extreme end of the elongated tail of the magnetic envelope, the "neutral line" region.

The findings by Dr. Prakash, with a second look at Explorer 35 data, show that the "neutral line" is well beyond the moon distance and that some of the proton constituents, at least, in the solar wind become entangled in the converging magnetic force lines in the tail and are dispatched from there toward earth.

Remembering the Explorer 35 experiment, Dr. Prakash got out the 11 months worth of data taken then and concentrated on that part that was recorded during the three days or so in each month when the moon and the satellite were on the far side of the earth away from the sun. During this full moon phase the satellite was being carried through the region of the earth's magnetic tail at the lunar distance.

By analyzing and averaging particle events recorded during the 11 passes through the tail, Dr. Prakash found intermittent streams of protons flowing back toward earth in a direction opposite to that of the solar wind.



Cleaner Air Is ASH Aim

A meeting has been scheduled for tomorrow, January 13, at noon in the Miller Room (Room 1-114) to form a local chapter of ASH -- Action on Smoking and Health -- a group composed of people who want to breathe the clean air indoors as well as out. Those interested in attending should bring their lunch and a pen for addressing envelopes. Those who cannot attend the meeting but want to support ASH, may call David Wilson on Ext. 2237.

WTBS Lists Programming

Copies of the January program schedule of WTBS are available by calling the radio station, Ext. 4969 or Dorm Ext. 0731. WTBS operates at 88.1 FM and to campus residences at 640 AM. Widely known in the area for its superior musical programming, WTBS offers such varied programs as "Earth Music," "Rock Celebration," "Cantate Domino," and "Ballroom Serenade." The station closes its week with "Little Walter's Golden Time Machine of Oldies," which begins at midnight and lasts, according to schedule, "until Little Walter collapses."

Telecommunications, EE Give Switching Course

The Department of Electrical Engineering and the Telecommunications Office are jointly sponsoring an IAP course in telephone switching systems beginning January 13 in Room 37-187 and meeting on Tuesdays and Thursdays from 1:30 to 3:30 p.m. for five sessions.

The course will cover basic concepts of switching, functions of a switching system, network

organization, etc. Specific systems will be discussed and special problems of toll switching and signalling will be included. The course will also include field trips to both MIT and the New England Telephone Company facilities.

There are no prerequisites for the course, but enrollment is limited. Prospective students should call Ken Pogran on Ext. 6037 for more information.



This crowd of colorful creatures decorates one hallway in Building 24.

-Photo by Margo Foote

Freeze-Drying Saves Priceless Documents

(Continued from page 1)

turned out, that I discovered just how valuable the documents were. Later on I wanted to have a look at some of the manuscripts and went to the Library. They let me see them, of course, but I was astonished to find that they were keeping them in a locked compartment inside a larger locked safe. They were truly irreplaceable. The Library people had thought they had the manuscripts on microfilm, but these turned out to have been lost. If I'd known that I might not have had the courage to tackle them to begin with."

The documents Professor Flink restored are known as the Kleinschmidt collection, 27 packets of hand-written letters, manuscripts and maps produced by Samuel Kleinschmidt, a prolific mid-nineteenth century missionary to Greenland. Kleinschmidt is one of the most important figures in Greenland's cultural history, having put the Greenlandic language into its written form by writing and then printing its first grammar book. It was Kleinschmidt's practice to write out by hand the entire manuscript of a book before setting it in type, and his translation of the Bible into Greenlandic is still used today. It was these handwritten pages that freeze-drying restored.

Professor Flink, who has taken all of his degrees at MIT, reported the results of his work with Hoyer in a December issue of *Nature*. And because of this, he is now acquainted with the pleasures of being mis-quoted by a national magazine. A story on his exploit in last week's *Newsweek* has him recommending freeze-drying as a means for saving water-damaged paintings, such as those devastated by the 1966 flood in Florence.

"Actually," Professor Flink says, "I only speculated on the possibility of such a thing. It seems like an idea worth looking into, and might be a good undergraduate research project for a culturally inclined technician. But I'm no art expert. My main feeling about the Danish manuscripts, aside from the natural excitement of helping

save something truly unique, was the satisfaction of returning the many favors the Danes had done me."

Much of Professor Flink's own history has been spent at MIT, where he arrived in the fall of 1960 as a freshman. He took his B.S. in Industrial Management in 1964, his M.S. in Chemical Engineering in 1969, and his Ph.D. in Food Science under Professor Marcus here in 1970. An expert on freeze-drying processes, his special interest is in differentiating the processes that account for the preservation of flavor in freeze-dried food.

CU to Meet

The annual business meeting of the MIT Employees Federal Credit Union will be held Thursday, January 20, at 5:30 p.m. in the Bush Room (Room 10-105). All members are urged to attend.

Graham to Be WISE Guest

Professor Patricia Graham, Director of the Education Program and the Department of History at Barnard College, will informally address Women in Science and Engineering (WISE) at 8 p.m. Friday, January 14, in the Cheney Room (Room 3-310).

The discussion will center on present actions and ideas on the status of women at universities. Some specific topics include nepotism rules at various universities, methods of pressuring universities to hire women faculty and the tenure system.

Interested members of the community are invited to attend.

Theses Due for Ph.Ds.

Theses for doctoral degrees are due January 14.

Erica Babcock Urges Commuters to Car Pool

Car pooling is an old idea, but while it used to be done to save money and effort, now it's being pushed as one possible solution to the problem of urban transportation. Across the country car pooling groups are springing up in corporations, businesses and universities in an effort to reduce pollution, congestion and parking problems.

MIT's leading proponent of car pools is Erica Babcock, a secretary in civil engineering. "I already drive three people to and from work," she explains. "One day during rush hour I noticed that almost every car had only one person in it, and I thought how much nicer it would be if all the cars had four riders and there were only 25 percent as many cars."

Since then Erica has been trying to get people to start their own car pools, but without much success. "The solution is so obvious, but I guess people just don't want to be bothered. With some organization, car pooling would be no more troublesome than driving to work every day. If we could only get it started, I'm sure the idea would catch on."

Right now Erica is trying to get ride boards put up in each department as well as starting some sort of Institute-wide system for matching drivers and riders, but she desperately needs organizational support. She would welcome letters to her in Room 1-280 from anyone willing to help.

"If we could get only a 50 percent reduction in the number of cars, that would already be wonderful.



"Besides," Erica Babcock points out, "it's more interesting driving to work when you have someone to talk with." —Photo by Margo Foote

And MIT should be able to save money too, since it wouldn't have to provide so many parking spaces."

Total Rises in UF-UBA

The 1971 United Fund-United Black Appeal Drive officially ended in November, but donations are still coming in. As of December 29, the Institute's campaign had collected a total of \$136,107.33 from 4,273 pledges. This is nearly \$10,000 higher than our 1970 total.

Broken down, the donations represent \$115,270.19 for the UF and \$20,837.24 for the UBA. Pledges to the UF were made by 4,047 members of the community while 1,032 contributed to the UBA. Statistically, the average donations were \$28.48 to the UF and \$20.19 to the UBA.

January 14 is the target date for a final report on the Institute's campaign. Anyone who has not yet donated should submit his pledge card to Sandra Holland in Room E19-238 as soon as possible.

IAP Timetable--Revisions and Additions

New Offerings

J01-26	The Collapse of the Westgate Bridge.....
J02-21	Recycling Films
J03-15	Solidification Seminar
5.931	Seminar in Physical Chemistry
J06-89	Telephone Switching Systems
J08-33	Solid State Physics Seminar
J15-11	Arbitration of Grievances as seen by an Arbitrator
J15-12	Can We Improve Productivity
J15-13	Application of Models to Marketing
J15-14	Recent Conversa Decision Supp System
J15-15	University Involvement and Corporate Responsibility, Our Sum Study
J15-16	So You Want to Start a Business
J17-9	Evaluation of PPB
18.700	Linear Algebra
23.11	Elementary German
23.13	Intermediate German
23.53	Intermediate French
JERC-30	IAP Reading Course
JORC-2	Faculty and Student Seminar
Miscellaneous	
Italian Fascism	
MIT Peace Coalition	
Model Railroad Club, Meetings and Workroom	
Outdoor Medicine	

New Scheduling--This Information Supersedes that in the IAP Timetable

J01-1	Effects of Wind on High-Rise Buildings
J02-3	Engineering Design Philosophy and Role of Designer
J02-13	Analog Computation
J02-15	Digital Computation
J03-4	The Nature and Use of Phase Diagrams
J03-8	Trans Phenomena in Process Metallurgy
J03-13	Fracture and Fatigue
J06-1	Statistics: How-To-Do-It
J06-3	Strategy and Tactics in Experiments on the Brain
J06-4	Lasers
J06-27	Abstract Algebra
J06-40	Introduction to Probability Theory
J08-23	Astrophysical Observatories
8.05x	Physics of Atoms and Molecules
J13-1	Diving Technology
J13-2	History of Ships and Seafaring
J15-1	Application of Stoch-Opt Contr Th
J15-2	Dynamics of Social Systems: Theory and Application
J16-2	Advanced Energy Conversion
J16-14	Soaring Ground School and Field Trip
16.62	Experimental Projects
J17-5	The Politics of Fear
J17-6	The New Hampshire Primary
J17-8	The Federal Budget and National Priorities
J18-4	Quadratic Function Fields
J21-35	Humanities Film Series (Formerly "Civilisation")
J21-36	Some Notes on Jazz of 20's to 40's
23.14	Advanced German
23.171	Spoken German I
JERC-3	Discussion of Einstein (and others)
Miscellaneous	
Intensive Mandarin Language Course	

M 4-5:30	1-190	1/24
W Eve (7-10:30pm)	3-133	1/19
TBA		
T 4-6	2-390	
TR 1:30-3:30	37-187	
W 10:30-12:30	13-2010	1/12, 1/26
T 3:30	E52-461	1/11
W 3:30	E52-461	1/12
R 3:30	E52-461	1/13
W 3:30	E52-461	1/19
R 3:30	E52-461	1/20
R 10:30-12	E52-461	1/13
R 10-12	E53-216	
TW 12-1:30		
TR 12-2	14N-225	
M 2	14N-225	
W 10:30-12	14N-225	
MWF 4-5:30	5-234	
TR 4-5	5-234	
RM 10-12:30	24-307	1/6, 1/10
R Eve (8-12pm)	1-136	1/6, 1/20
M Eve (5-7pm)	16-711	1/10
24 hrs a day	20E-210	
MW Eve (7-9pm)	3-270	
MWF 10	1-136	
TR 10-12	31-161	
TR 10-12	3-370	
Except	3-446	1/18, 1/20
MWF 10-12	3-370	
Except	3-270	1/17, 1/19, 1/21
MTWRF 11	8-205	1/5-1/14
MTWRF 9	8-105	
MTWRF 10-12, 1-5	2-146	1/10-1/14
MTWRF 11	20E-222	1/5-1/18
TR 3-5	20E-021	
TR 2-3:30	20E-103	
TR 2:30-4	37-186	
W 10	26-217	
Note: Consult Secretary X4801		
MWF 2-4	13-2101	
MT 1-5	5-218	1/17, 1/18
TR 2	5-217	
MW 10:30-12	E52-461	1/10-1/19
MTWF 10-12, 1-3	9-150	1/17-1/21
MW 3-5	33-407	
MWR 3-5	33-319	
TR 10-11:30	33-418	
RFMT 10-12	E53-212	1/13-1/18
R 10-12	E53-212	1/20
F 9-11	E53-216	
F 1	2-143	1/7
MTWRF 1	2-142	1/10-1/14, 1/24-1/28
W Eve (7-11pm)	2-190	1/26
FMW 2-5	4-260	1/14-1/19
M 2	14N-225	
TR 12-2	14N-225	
W 4-5:30	26-204	1/19, 1/26
MTWRF 1-10	1-273	

CLASSIFIED ADS

Ads are limited to one per person per issue and may not be repeated in successive issues. All ads must be accompanied by full name and extension or room number. Ads may be telephoned to Ext. 3270 or mailed to Room 5-105. The deadline is noon Friday.

For Sale, Etc.

Tortoise shell music box, exc cond, plays 3 tunes, \$50. Cathy, X5730.

Man's hockey skates, 13, used 3 times, \$15. X7785.

Br mod couch, \$70. Call 484-3360.

Steel file cab, 4-drw, \$20; also sublet 1-BR apt, Beacon St, \$200/mo. Call 266-5840 evgs.

Ski boots, 9 1/2 N, used twice, \$25; sm round tbl w/2 chrs, fold-away bed, reas. Larry, X1960 or X5763.

Diamond ring, 2/3 carat, appraisal papers, value \$450, sell for \$200. Wigs: 2 short frosted, \$10 each; 1 long br, \$25. Silver mink stole, exc cond, best offer. Call 661-1929.

Rims, 2 15" for '67 Ford, \$6. Don, X5869 Linc.

Woman's Rieker ski boots, 7 1/2 N, \$10. X1555.

Advent Dolby model 101, retail \$125, asking \$80. David, 266-4743 evgs.

Br new Pentax Spotmatic f/1.4 auto super Takumar lens w/yr warranty, list \$310, asking \$199. Call 491-1620.

Frigidaire refrig, \$30; Zenith 21" console, \$30. Bill, X4367 Linc or 926-2148 evgs.

Baby furn: crib, lt blue mesh playpen, Jolly Jumper baby seat, rolls & bounces, all exc cond, \$30. Call 398-3995 6-9pm.

Instamatic X-50 camera outfit, \$5; woman's lace ski boots, 6, \$10; hi-fi trntbl, base & arm, \$35. Bill Blatchley, X4576 or 893-5765.

Sears adult mod tricycle, almost unused, orig \$124, now \$60 incl basket & speedometer. Wilson, X2237.

VW bus tires, 7.00x14, reg or snow, new & slightly used; man's lace ski boots, 12M, new \$15 or best. Call 625-9456.

Lange std man's ski boots, 8, used one season, \$40. Michael Ensley, X5719 Linc.

Pr Rosemont ski boots, 8, lk new, \$75. Ron, X2052 or 926-1585 evgs.

Wedding gown, 12, orig \$360, worn once, \$75; match petticoat, \$9; man's fur-lined overcoat, orig \$2000, now \$200; lady's mole skin coat, 14, \$135; rock maple glider chr, child's wardrobe, movie cam, screen, splicer, etc. Call 277-1401 evgs.

Din tbl w/4 chrs, \$35; 9x12 oriental rug, \$15; Nikkormat FTN, f/1.4, new \$265. Call 876-3508 evgs.

Nikkor 200mm f/4 lens, exc cond, \$100. Anson Whealler, 247-8029.

Baby bassinet, infant seat. Call 354-3985.

Sears 6000 BTU air cond, used part of 1 summer, exc cond, \$120. Rod Alberts, X7109 or 492-4191.

Teac 1200 tapedeck, exc cond, 6 mos old, \$240. Eric, 266-2649.

Recording tape, 7", 1800' reels: Scotch 207, \$5/reel, Scotch 203, \$4.25/reel, order now for Feb delivery. Jay Benesch, X3161, lv msg.

Ham rotor TR44, nvr used, incl wire, \$50; Ham SSB equip; tuxedo, 4 suits, 4 jackets, 40 reg, all exc cond. Tony, X7571 or 7611 Linc.

Bundy flute, new pads, \$90. David, Dorm X9772, lv msg.

McIntosh mod MC40 40w amp, asking \$50; Gen R type 874GA adj attenuator, 100-4000mc, best offer. Call 625-1378.

Leitz telyt 200mm f/4 lens, like new, in orig box, with adapter & filter, \$175. Call 444-5272 evgs.

Old 21" color TV, w/gd pic tube, works but could use tinkering, \$75. Irv, 876-3735.

Rabbit-fur lined man's bl leath gloves, L, never worn, worth \$10, best offer. Joan, 5649 days.

Man's Rosemont Fastback ski boots, 8, extra pads, used 2 seasons, orig \$160, will sell for \$50. Ellen, X5883.

Dbl bed w/frame; twin bed; stainless steel desk, 48x24"; K tbl w/4 chrs, etc, best offers. Hiram, X5150 or 776-2647.

Two electronic "antiques"—b/w 12" TV, circa 1956; Tandberg 5.4 track stereo tape rdr w/extra preamp for stereo rcding, circa 1959. Make offers. X5957 or 547-4763.

Playpen, very gd cond, \$8. Sigi, X2392.

Bright red, plush-velvet chair-sofa cushion, exc cond, \$4. Call 232-0484.

Cannon camera with f/1.4 lens, exc cond. John, X7220 or 254-1090 evgs.

BSO Tues Camb series, 2 tickets for Feb 1 and Mar 1 performances, \$6 each ticket. Call 646-9077.

Ice skates, man's, 10, lady's, 9, \$5 per pair. Malcolm, X4301 or 491-7774.

Woman's Henke buckle ski boots, 8 1/2, \$25; Lady Schick hair dryer, \$20. Jerry, X2092.

'70 Charmer hsetrailer, 17 1/2', fully self-contained, spare tire, storage, 2 gas tanks, slps 5-6, \$1,800-\$2,000. Call 486-4047.

Vehicles

'63 Ford Fairlane, 8 cyl, new batt, durable, \$200 or best. Lori, X5619.

'63 Studebaker 1/2 ton pickup, 6 cyl, positrac, asking \$325. Bill, 661-8567.

'63 Volvo sedan, 4-dr, v gd cond, snows, \$600. Call 491-1390.

'64 Corvair Monza, 4-spd, gd tires, gd cond, \$100 or best. Stan, X7472 or 354-3545 evgs.

'64 Ford Galaxie, auto, p st, new snows, nds some repair. Silveas, X7821 or 876-0286 evgs.

'65 VW bug w/sunrf, fac rebuilt eng, new clutch, \$600 or best offer. X5054 or 864-2371 evgs.

'66 VW sqbk sunrf, orig owner, exc cond, \$800. X2231 or 729-8305.

'66 VW sunrf, bl, exc cond, \$800. Paul, 475-7512.

'67 Cougar, AM/FM reverb stereo, snows, v clean, must sell, \$950. John, X7950 or 391-4359 evgs.

'67 VW fstbk, radials, nds valve job, \$600 or best. Call 259-8013.

'68 MGB-GT, Mich ZX radials, wire wh, Koni rear shocks, AM/FM R, \$1850. Gibeling, X4233 or 491-8616.

'68 (late) TR 250, 38K, R&H, 5 new radials, exc mech cond, wh w/bl top, \$1395. X7235.

'69 VW sedan, auto, v clean, \$1195. Call 369-6669.

'69 Pontiac Firebird, OHC6, auto, met blue w/bl int, v clean, \$1650. Tom, X474 Linc.

'69 VW bus, 39K, orig owner, exc cond, \$1700 or best. Bill, X5792 or 523-1081 evgs.

'70 Camaro, 6 cyl, auto, p st, R, snows, exc cond. X7906.

'70 Gremlin, std, R, exc cond, must sell. X4710 or 783-3155.

'70 Mustang, lime green w/bl vinyl top & int, 2-dr hd top, p st, V8, 26K, exc cond, \$2000 or best. Ian, X5734.

'70 VW, lt blue, std, R&H, back defrost, orig warranty, v gd cond. Carol, X3906 or 661-8054 evgs.

'71 Maverick, 14K, auto, \$1850 or best. Maureen, X7888.

'71 VW Super Btle, 4 reg and 2 mtd snow trs, R, std, 21K, \$1700. X4541 or 729-4368.

'64 Vespa, runs gd, nds tire, \$50. X3773 or 536-0389.

Rupp snowmobile, 2 yrs old, 18 hp, 15" track, gd cond, \$350. X3716 or 369-4741 evgs.

Housing

Arl, mod 1-BR apt, w-w, air cond, disp, \$200/mo, pking avail, avail 2/1. Call 646-9077 evgs.

Arl Ctr, new 2-BR apt, all elec, dish, disp, incl basement, pkg, \$265. Call 643-3862.

Brk, lovely rm for rent, near MBTA, semi-private bath. Arlene, X6010.

Brk, private room, bath, entrance, professor's home, \$70, for male student only. X5757 or 232-9725.

Camb, 3-3-3 Victorian, 2 B, 220 wiring, off street pking, quiet neighborhood, fenced garden, 1 mi from MIT, \$28,000. Call 864-9010.

Fenway, immed sublet, cozy studio apt, 3 bay windows, new refrig. Call 523-7141 evgs.

Jay Peak, Vt, lakeside ski lodge, all util, plowed, reas rent, on 200 acres. Denny, X2430 or 665-6220 evgs.

Kenmore Sq, studio apt, sublet, furn, \$165. X3773 or 536-6389.

Lex, 4-BR contemp, Turning Mill area, comm pool, for sale by owner, mid \$50s. Call 862-3358 for appt.

Malden, unfurn, 4 rms & attic, 2nd floor, 2 fam, elec stove, auto heat, hot water, avail Feb 1, adults only, no pets, \$130, heat & util not incl. Call 324-7908.

Wat, mod 1-BR sublet, Feb 1 or Mar 1 thru May 31, all extras, 15 min from MIT, \$210. Chris, X2431 or 924-7896.

Lg sunny rm in historic landmark farmhse, 15 MBTA min to Harv Sq, kitchen priv, adv grad student w/generous nature preferred. Call 484-9499.

Animals

AKC reg Siberian husky, male, b/wh, gd papers, 3 yrs, make offer. Don, X7048, X4130 or 535-1816 evgs.

Blue pt Siamese, spayed fem, 1 1/2 yrs, gd temperament, free to gd home. Martha, X6716.

Wanted

Daily ride Methuen to MIT & back, 9-5 or earlier. Rosemary, X7173.

Ride to West Coast at end of Jan, must reach Portland by 1/30, wl share driving & exp. Call 547-5374.

Pking for small car w/in 10 min walk of Camb Common. Call X1632 days or 547-6013 evgs.

Used boat sextant. X5413 Draper.

Elec typwr, gd cond, best price. X6265 or 436-0269 evgs.

N-gauge model railroad. Wayne, X463 Draper 7 or 648-8138.

Two free gerbils, pref same sex. Norm Tibbetts, X250 Bedford.

Fem rmmate for apt nr Harv Sq, own rm, \$112.50/mo + 1/2 security deposit. Annette, X1896.

Person exp in Pitman shorthand to help decipher century-old diary. John, X439 Draper 7 or 625-8386 evgs.

High chr, baby carriage, humidifier. Bill, X6598 or 566-1486 evgs.

Rmmate, preferably male, to sublet W Rox apt, 2-BR, mod bldg, w/swim pool, \$65. Terri, X1947 or Andy H., 327-9038.

Self-contained motor home for 3 wks in March; must sleep 6. Susan, 646-3721 evgs.

People into photography to share interest w/8-12 yr old kids. Jean at Tutoring Plus, 547-7670.

Fem, 22+ to share 2-fl apt w/2 people, own BR, Cam'port area, \$65/mo. Call 868-1818.

Used aquarium, lg or sm. Call 489-3014.

Fem rmmate to share Bri apt, off T, own BR, avail now, \$74/mo. Carolyn, X2406 or 787-3622.

Daily ride to MIT, arrive by 9, from St. Paul St., Brookline. Mary, X7745.

Stereo tape 8 track cart, prefer C & W, reas cost. Mike, X6562.

High chair, cross entry skis. Call 492-6877.

Dyna SCA-35 or similar stereo amp, 15 to 20w RMS/channel. Larry, X6096 or 643-0765.

TV w/pic, sound not needed. X3120 or 241-9387.

Miscellaneous

Large used refrig, will consider any offer. David, X0356 dorm after 8:30pm.

Old dressers, chests, etc, free or cheap. Paul M., X5461.

Will type theses, papers; gen or tech, IBM Selectric. Call 661-1929 any time or X6470 evgs.

Will babysit in my Mass Ave apt. Call 491-0075.

MD w/family would exchange Phoenix, Ariz home for local dwelling 3/1/72 to 8/1/72. Call 861-9309.

Wl translate French reports, articles. Joan, X6829 or 354-7611.

Spanish speaking mother will babysit in her home. Call 876-7933 evgs.

Exp German tutor now accepting students on all levels. Call 734-4630.

Will do gen & tech typing on Smith-Corona elec. Ron, X7273.

IRS Outlines Withholding Rules for '72

The Commissioner of Internal Revenue, Johnnie M. Walters, has issued the following statement:

"The Revenue Act of 1971 has made important changes in the income tax withholding system. The new law makes it necessary for you to file a new Employee's Withholding Exemption Certificate (Form W-4) with your employer if you wish to claim the new "special withholding allowance." If you do not claim the "special withholding allowance," you may have more than the correct amount of income tax withheld from your pay.

"Each single person, and each married person whose spouse is not also employed, is entitled to one "special withholding exemption." This allowance may not be claimed by either husband or wife when both are employed or by any employee who has two or more concurrent jobs. For further details, see Form W-4 (Revised Dec. 1971).

"You may claim all the exemptions and allowances to which you are entitled. However, you may not claim the same exemptions and allowance with more than one employer at the same time.

"You must also file a new certificate if the number of exemptions and allowances you previously claimed decreases.

"The number of your exemptions will change when:

1. Your marital status changes.
2. A dependent is born or dies.
3. You begin or stop supporting a dependent.

"If you expect to itemize deductions you may qualify for additional withholding allowances and have less Federal income tax withheld. See Form W-4.

"To avoid owing Federal income tax at the end of the year you may increase the amount to be withheld by claiming fewer or zero exemptions or by entering into an agreement with your employer to have more withheld.

"If you expect no tax liability this year and had none last year, you may avoid Federal income tax withholding by filing Form W-4E with your employer. He must however, withhold Social Security tax, if applicable."

MIT employees may pick up their W-4 Forms in the following locations: campus, Room E19-515; Draper Laboratory, 143 Sidney Street, Lincoln Laboratory, Room A275.