



Jacqueline Menn, Wellesley '73, gets a tip on engine tuning from Lewis Erwin, '72 at the IAP Auto Hobby Shop. —Photo by Jay A. Krone, '74.

Repair Shop Offers Haven for Car Buffs

"Automobile Repair: Organizing a Year-Round Auto Repair Facility on Campus" is the formidable title for an IAP activity being sponsored by the Department of Mechanical Engineering. Actually, it's an Auto Hobby Shop -- an inexpensive haven for car buffs and would-be mechanics.

The shop is located in a spacious old garage at 665 Cambridge Street (near the corner of Portland Street) and is open daily from 10 a.m. to 5 p.m. and 7 p.m. to 10 p.m. through the end of IAP.

Facilities are available for repairing just about any kind of automotive ailment, whether it's a valve job, clutch replacement, engine swap or rebuild, brake job, or a simple tune-up and oil change. All of the repair work is done by the car owners themselves, but a small group of students is on hand to offer help when it's needed.

One of the student supervisors, Lewis Erwin, '72, says, "Most of the people who have come in so far know what they're doing and just want to use the garage and equipment. We suggest, however, that people who have never done auto repair work read a repair manual before coming."

He continues, "Anyone in the MIT or Wellesley communities can use the shop. Girls shouldn't be afraid to bring their cars in -- there are always a few guys around who are quite willing to give lessons in auto repair, as long as the girls don't mind getting a little dirty."

The shop has quite an array of equipment -- floor jacks, a chain hoist, tune-up equipment, a battery charger, valve equipment, grease

guns, a jack stand and lots of wrenches. Other supplies, such as oil, spark plugs, distributor points and other parts, must be furnished by the car owner.

Undoubtedly the most appealing aspect of the Auto Hobby Shop is the low rates. A \$2 fee is charged the first time a car is taken to the shop -- this covers heating costs for the building -- but subsequent visits are free. A similar one-time charge of \$2 covers use of equipment.

The IAP Auto Hobby Shop is part of an effort being made by mechanical engineering professor Ernest Cravalho and several students to set up a year-round auto repair facility on campus. Lewis says, "There seems to be a lot of enthusiasm for the project. There have been at least 40 cars in the garage during IAP and more than 70 people have expressed interest in a permanent facility. If we can find a suitable location, we hope to open a garage some time this semester."

For more information about the Auto Hobby Shop, call Lewis Erwin on Ext. 3784 or Spence Wike at 661-8136. Better still, take your car to the garage.

Cost Reduction Effort Will Save \$3.2 Million in '73

Preliminary estimates of next year's MIT budget -- the budget for the 1972-73 year that begins on July 1, 1972 -- indicate that the cost reduction efforts that have been underway for the past four months will result in a reduction in the Educational and General Operations Budget of about \$3.2 million, according to Chancellor Paul E. Gray. This amount does not reflect the impact of salary and wage increases, which will result in an increase of nearly \$1.2 million.

"The budgets for 1972-73 are by no means complete or final," Dr. Gray said, "but it now appears that we will achieve our objectives of reversing the growth trend in the

operating gap and of relieving the pressure on unrestricted gift income. Hopefully it will be possible to turn our energies and attention next year to the development and creative application of new resources."

Intensive budget reviews with all departments over the past months have led to reductions totalling approximately \$3.2 million.

"In every case we were asking where savings could be made without unacceptable sacrifices of program quality or services," he said. "We thought we should aim for an overall reduction on the order of \$4 million, and were looking for reductions of about 10 percent in the General and

Administrative budgets for about \$2.1 million; of 4 percent in the Academic budgets for about \$0.9 million; and of 7 percent in Physical Plant budgets for another \$1 million. We have come as close to these targets as we think achievable and prudent. The final figures will be about \$1.7 million in the General and Administrative area; about \$0.8 million in the academic area; and about \$0.7 million for the Plant.

Pointing out that more than half of the Institute's overall budget is comprised of salaries and wages Dr. Gray said that a large portion of the projected savings were in that area, but emphasized that in most cases the reductions will not involve the termination of personnel. The regular turnover rate at the Institute in many departments is great enough so that attrition and normal retirements will accomplish most of the projected reduction in jobs, he pointed out.

"A major reason we have chosen not to press for the full \$4 million reduction was to avoid painful personnel situations," Dr. Gray continued.

Dr. Gray pointed out that significant savings would come from tighter management of MIT's services.

"For example, the steam we're using to heat the Institute now is several degrees cooler, and this is saving thousands of dollars spent on fuel," he said. "But I doubt if many people here have even noticed it."

Asked what effect the reductions in jobs and services would have on Institute programs, Dr. Gray replied that in many cases he thought the result would be improvement rather than damage. "Necessary change often provides a healthy opportunity to take a hard look at what you've been doing," he said. "We've tried to improve efficiency, clarify

(Continued on page 6)

Concert Band to Begin Tour

The Concert Band will premier "Werk," an electronic music composition, on this year's annual tour beginning on January 23.

Composed, specifically for the tour, by Paul Earls, a fellow at the Center for Advanced Visual Studies, "Werk" combines live orchestration with taped electronic music. Zip codes, names of cities, abbreviations of states, and players initials are incorporated in the orchestra's score. These specifics change according to the performance's locale. Therefore, each night of the tour the work will be significantly different.

Other works written for the Concert Band and included in the tour's repertoire are: "Prelude Allegro" by the late Gregory

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Employee Grievance Procedures Outlined

Six months ago the Institute established a special mechanism for employee protection against racial or sexual discrimination. Any employee who feels that MIT's policy of non-discrimination has been violated and that he or she has been discriminated against can seek redress through official channels.

A policy statement issued last year explains this mechanism as follows: "Such persons should be encouraged to communicate, either in writing or in person, with Mr. James C. Allison, Jr., the MIT Opportunity Development Officer, or with Dean Benson R. Snyder, chairman of the Institute's Equal Opportunity Committee.

"Either will initiate an inquiry into all the facts relevant to the issue and will attempt to resolve the matter to the satisfaction of both the aggrieved individual and the person or organization against which the charge of discrimination has been brought. If resolution is not possible, the matter will be referred to the President." (See Tech Talk, June 9, 1971, for a complete outline of the Institute's Affirmative Action Plan for Equal Employment Opportunity.)

The grievance procedure was established following recommendations made by the Equal Opportunity Committee. Mr. Allison says, "This kind of mechanism is not new. Several universities and companies have similar systems for handling complaints of discrimination.

Before we set up this particular procedure, employees were expected to take complaints of discrimination to their supervisor or the Personnel Office. They can still do that. But, we decided that there should be another channel for employees to follow if they feel uncomfortable discussing problems with their supervisors or personnel representatives."

If an employee feels that he or she has been discriminated against because of race, sex or ethnic background, he should file a written complaint with Mr. Allison (Room 4-144, Ext. 4941) or Dean Snyder (Room 7-202, Ext. 1896). Such grievances may concern a hostile working environment, inequities in salary, title or advancement.

After discussing the complaint with the employee, Mr. Allison or Dean Snyder will talk to the persons against whom charges of discrimination are being made. If the aggrieved individual desires, they will also interview fellow workers who might be able to substantiate the employee's complaints. However, this inquiry process will be held confidential insofar as the complainant wishes.

Following an examination of all the facts, Mr. Allison and Dean Snyder will offer possible recommendations in hopes of resolving the matter to the satisfaction of all those concerned. If a resolution is not possible, the case will be referred directly to the Office of the President and Chancellor.

Mr. Allison comments, "This system can only be as effective as the amount of faith people put in it. We hope to keep grievances within the Institute and to resolve them here rather than going to the Massachusetts Commission against Discrimination, HEW or the courts. From what we've seen, we think the system can be effective, but only if the employees give us a chance to help."

Inside This Week's Issue

New and revised listings for IAP events are listed with the Institute Calendar on pages 4 and 5. An updated IAP Timetable appears on page 7.

Monopoly and Parchesi have given way to new and more active games that both enlighten the players and provide insight for social scientists. See page 6.

A report on last week's faculty meeting appears on page 2.



Sculptress Debbie Perlberg adjusts her new work in Rotch Library.
—Photo by Margo Foote

New Art Enhances Rotch Reading Room

Two new sculptures have become a part of the reading room of the Rotch Library in Building 7.

Created by Debby Perlberg, a member of the library staff, the works are silhouette sculptures, built in to the large panel windows of the reading room. They portray human forms caught in the tension

and anguish of the underlying theme, Attica.

Miss Perlberg is a graduate of Brandeis University, where she majored in sculpture. She spent more than a year on the works, which she designed specifically for the reading room. She works part time in the library so that she can continue her sculpture.

Uno Ingard to Receive Coveted Swedish Award

Dr. K. Uno Ingard, professor of physics and aeronautics and astronautics at the Institute, will receive the John Ericsson Medal for 1972 from the American Society of Swedish Engineers early next month.

Members of the Society cited Dr. Ingard "for serving as an inspired teacher and talented lecturer and for outstanding contributions to applied and theoretical physical acoustics." Dr. Ingard will be the 24th recipient of the award since it was established in 1926.

The John Ericsson Medal is awarded every second year and alternately to a Swedish citizen or an American (or Canadian) citizen of Swedish extraction as recognition of outstanding achievements in the technical or scientific fields. In Sweden the medal is generally considered the highest award a scientist or engineer can receive other than the Nobel Prize.

The medal will be presented to Dr. Ingard at the Society's 84th Anniversary Dinner to be held at the Plaza Hotel in New York City on Saturday, February 5.

Libraries, Education Reports Are Faculty Meeting Topics

Last week's faculty meeting was chiefly devoted to general discussion of the Report of the Ad Hoc Committee on the MIT Library System and the Report of the Special Task Force on Education.

The library report was introduced by Science Dean Robert A. Alberty, chairman of the committee, who stressed the importance of greater and continued involvement of the faculty and students with the libraries and the need to increase the level of inter-library cooperation. Although there has been a large growth in the size and quality of the library system and its services over the past decade, it will be difficult to continue this rate of growth in light of financial and space constraints. He noted that the great growth in the libraries budget over the past ten years is attributable not only to the expansion of the collection but to the expansion of services and the increased costs of processing library material. In addition, Dr. Wiesner suggested that the large number of reading rooms and small libraries (which provide important social as well as research and study space) may account for a substantial portion of the high costs.

Provost Walter A. Rosenblith alluded to the "revolutionary

period of information growth", and said that we are now provided with a good opportunity to make "very sharp priority choices" about what we can afford.

The faculty then turned its attention to further consideration of the education report, opening discussion on the proposal to establish an Education Division.

Professor Hartley Rogers, chairman of the faculty and of the Task Force, emphasized that there was no intention of bringing such a division into existence overnight nor of covering all areas. "The first stages," he said, "will be to have careful examination of possible general and specific areas that might come into such a program." He gave several examples of possible problem areas in education which might be appropriate foci for such a Division: education at the university level, curriculum reform and development, urban education, pre-school education, the learning process, systems and organizational problem in U.S. education, etc. Professor Rogers noted that it will be necessary to determine how such programs would relate to those existing now in departments and the Education Research Center.

In further discussion on the Task Force proposal to institute a

Dean for the Academic Program, attention again turned to the means of making such a position effective. Specific questions centered on to whom he would report and what impact he might have on faculty appointments and promotion.

In discussing the proposal to improve closer relationships between students and faculty members, the question of increased faculty time came up. Professor Margaret MacVicar said that her experience with the Undergraduate Research Opportunity Program (UROP) indicates that there would be no immediate "quantum leap in involvement." "It would not be a threat to faculty time beyond what we have now," she said.

The faculty meeting was opened by Dean William L. Porter of the School of Architecture and Planning, who proposed to change the names of the first two professional degrees in the Department of Architecture.

To keep the names of the degrees consistent with those offered by other institutions, he proposed that Bachelor in Architecture (B.Arch.) be Master of Architecture (M.Arch.); and that Master in Architecture (M.Arch.) be changed to Master of Architecture in Advanced Studies (M.Arch.A.S.).

Dr. Wiesner questioned the awkwardness of M.Arch.A.S. and suggested that the faculty might have a contest to see if it could arrive at a less cumbersome name. Dean Porter replied that M.Arch.A.S. was the result of a contest in the architecture department.

The change in the names of the degrees will come before the faculty again at the next regular meeting in February.

Changes Announced in Physical Plant Staff

William R. Dickson, Director of Physical Plant has announced several personnel changes within his department.

William H. Combs has assumed the new post of Superintendent of Buildings. In this position, Mr. Combs will be responsible for all building maintenance and repair activities, the operation of all trade shops and the work carried out by the Design Services Section.

Thomas E. Shepherd, Jr., will assume the post of Superintendent of Utilities. Mr. Shepherd will be responsible for the purchase of all fuel and energy, the operation of the Central Utilities Plant and the Maintenance, repair and operation of all utility distribution systems.

Haig Gechjian will join the Institute as Deputy Superintendent of Buildings. For the past 12 years Mr. Gechjian has been associated with the MITRE Corporation, most recently as Associate Director of General Services. Initially he will assume responsibility for the operation of the Physical Plant machine shops and for mechanical design carried out in the department.

H. Stanley Palmer will resign as Superintendent of Mechanical Services effective January 25, to accept the post of Plant Engineer at Colby College, Waterville, Maine. Mr. Palmer has been a member of the Physical Plant staff for nearly 14 years and has played a key role in managing MIT's ever-

growing and increasingly complex mechanical systems.

Mr. Dickson also announced the resignation of James F. Brady, which will become effective January 31. Mr. Brady has served as administrative services officer for Physical Plant for more than 11 years and is leaving to assume a new post in the Bursar's Office.

CE Faculty Win Honors

Two professors in the Department of Civil Engineering, Dr. C. Allin Cornell and Dr. Fred Moavenzadeh, recently received awards from two professional societies.

Dr. Cornell was awarded the Walter L. Huber Civil Engineering Research Prize by the American Society of Civil Engineers. He was cited for "his application of the probabilistic theory to the development of rational building code provisions and to seismic risk analysis."

Dr. Moavenzadeh has been named co-recipient of the 1971 Sanford E. Thompson Award, presented by the American Society on Testing and Materials Committee on Concrete Aggregates. He was cited for his paper "Fracture of Concrete" which appeared in the September 1969 issue of the *ASTM Journal Materials*.

TECH TALK

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

Benefits Offers Plan for Disabled Workers

There are many benefits offered to employees at the Institute. Some are widely, such as vacation and sick leave. Others, such as the long term disability insurance program, are not commonly known throughout the community.

Established on September 9, 1970, the disability insurance program is designed to provide an income for eligible full time employees on the hourly and bi-weekly payrolls in the event of their total disability. Each month prior to normal retirement date the disabled employee receives a portion of his normal income. The Institute also assumes the total cost of the employee's Blue Cross-Blue Shield, group life insurance and retirement pension plan.

To date there are five persons in the program. One of the first employees to benefit was Norman Nicholson, who worked in the Chemistry Department's machine shop for 27 years before he became disabled. Mr. Nicholson remarks, "I can't say enough about the program. It's fantastic. The benefits are very generous and when I reach retirement age I'll even receive full pension -- just as if I'd been working all along. The program has been a great comfort to me and my family."

All full-time employees on the

hourly and bi-weekly payrolls are automatically enrolled in the disability plan after three years of continuous full-time service. According to a Benefits Office brochure, "totally disabled" means disabled by bodily injury or sickness so as to be prevented thereby from engaging in any occupation or employment for substantial remuneration or profit... for a period of 12 months or more." If, however, an employee accepts rehabilitative employment approved both by the Institute and the John Hancock Life Insurance Company, he may still be eligible for a portion of his benefit.

Similar benefit programs are provided for exempt, faculty and staff personnel. Additional information on the disability insurance program is available from the Benefits Office, Room E19-230, Ext. 4271.

AMS Elects Dr. Newell

Professor Reginald E. Newell of meteorology has been elected a Fellow of the American Meteorological Society. He is presently on sabbatical at the Imperial College of Science and Technology in London.

Research Team Develops Stronger Alloy to Be Used in Surgical Bone Implants

Researchers at the Institute have demonstrated a way to make a chromium-cobalt base alloy now used in surgical bone implants as strong as stainless steel.

John Wulff, Professor Emeritus in the Department of Metallurgy and Materials Science, has shown that the alloy, called Haynes Stellite 21 (HS 21), can be greatly strengthened by hot working and subsequent heat treatment.

The resultant wrought metal may be just what the orthopedic surgeon ordered: an inert material that combines the strength of stainless steel with the corrosion resistance of conventional cast chromium-cobalt alloys, thus making it close to ideal for use inside the human body.

Metal alloys -- as screws, wire and plates -- are used in surgery to replace or repair damaged bone in humans. Trouble can arise because the interior of the body constitutes a relentlessly harsh environment for most implanted foreign material. Salty body fluids corrode most metals with ease. Body tissue and bone can react in so many adverse ways -- inflammation, bony deposits and fibrous growth -- that new surgical metals must undergo lengthy animal testing before certification for human use.

The two most popular alloys for surgical implants are molybdenum containing wrought stainless steel and precision cast alloys of cobalt-chromium-molybdenum carbon,

such as Vitallium, Vinertia and Haynes Stellite 21.

Neither type of alloy has been considered entirely satisfactory: stainless steel, while strong, tends to pit-corrode in body fluids; the chromium-cobalt alloys, while more resistant to corrosion, are not sufficiently strong and ductile to withstand shortcomings in design, fabrication and use.

Working with Thomas M. Devine, Jr., and Frederick J. Kummer, teaching and research assistants in metallurgy and materials science, Professor Wulff conducted studies of the hot and cold deformability of chromium-cobalt alloys of various composition. He found that their mechanical properties were greatly improved by extrusion or press forging at 1100 to 1200 degrees centigrade. Subsequent cold-working plus heat treatment, he found, increased the metal's strength to more than double that of the material when cast.

In further tests, the Wulff team found that the wrought alloy is not only far stronger and more ductile than the cast product, but has even better corrosion and wear resistant qualities. They placed samples in a strong acid solution that simulates body fluid corrosion in an accelerated fashion. Stainless steel samples in this solution became visibly pitted within one hour. Specimens of cast HS 21, however showed no corrosion after a year of immersion in this concentrated solution.



Believe it or not, this space in building 4 will shortly be ready for business as a new classroom. --Photo by Margo Foote

Remodelling in Bldgs. 2, 4 to Consolidate Math Dept.

Ten new classroom and a new undergraduate mathematics headquarters in Buildings 4 and 2 will be ready for use at the start of the second term, according to Superintendent of Buildings, William H. Combs.

The new rooms will take up the space previously occupied by chemistry laboratories, which were torn down last fall. "The actual remodelling began in early December," explained Mr. Combs.

"After this construction has been completed, we will be able to convert the classrooms on the second and third floors of Building 2 into offices. The overall purpose of the project is to consolidate the Mathematics Department by providing office space in Building 2 for members of the math department who now have offices in Building 24."

All of the new rooms are being remodelled using low cost construction techniques, but all will be carpeted. Mr. Combs described the designs as "innovative as well as inexpensive." The new offices will be ready for occupancy on April first.

The cost of the total project is \$200,000.

'Guide for the Handicapped' Published by Planning Office

Handicapped people frequently are confronted by physical barriers that complicate and limit their use of public buildings, community facilities and educational institutions. To assist MIT students, staff and visitors who have ambulatory handicaps, the Planning Office has prepared a guide that illustrates the most comfortable ways for them to get around the campus.

Prepared through the cooperative efforts of Alpha Phi Omega, the Safety Office and the

Soaring Club to Host Fall Symposium

A three-day international symposium on "The Technology of Motorless Flight," sponsored by the MIT Soaring Association, will be held in Kresge Auditorium next fall.

The symposium, scheduled for October 18-20, 1972, will commemorate the fiftieth anniversary of the first participation by American pilots -- two MIT students -- in an international gliding contest. Some 500 distinguished soaring experts from countries throughout the world are expected to attend.

The session will be co-chaired by Professor Rene Miller, head of the Department of Aeronautics and Astronautics, and Dr. Ernst Steinhoff, a scientist at Wright-Patterson Air Force Base in Dayton, Ohio, and former visiting professor at MIT. The symposium will include technical seminars on different aspects of soaring as well as informal, non-technical meetings and discussions.

Soaring began at MIT more than 60 years ago when the Aero Club was founded in November 1909. Three months later, the club had designed and built its first glider, which won a local contest in Waltham in April, 1910. In 1922, MIT students Eddie Allen and Otto Koppen constructed a glider and flew it in the Third International Soaring and Gliding Contest in Wasserkuppe, Germany, where it not only won, but set a new meet record.

Planning Office, the guide consists of a map indicating passageways, ramps, elevators, and rest rooms with special facilities for the handicapped. The map also shows the location of existing barriers, and is designed so that as these barriers are eliminated, the map can be easily updated.

The reverse side of the guide lists other pertinent information such as people and extensions to call for special problems or help.

Copies of the guide are available in the Information Center, Room 7-111.

Brammer Named Director of Housing, Food Services

The appointment of H. Eugene Brammer as Director of Housing and Food Services has been announced jointly by Philip A. Stoddard, Vice President for Operations, and J. Daniel Nyhart, Dean for Student Affairs.

Mr. Brammer will assume his new position on March 1, succeeding Howard F. Miller, who requested to return to the Department of Physical Plant. Mr. Miller will become the Assistant to the

Director of Physical Plant.

Mr. Brammer originally worked at MIT in 1960 in the Naval Supersonic Laboratory. After several years in industry he accepted a position at Project MAC, later becoming assistant to Professor Robert M. Fano who was then the Director of MAC. In March 1969 Mr. Brammer was appointed administrative officer of the Department of Electrical Engineering.

THE INSTITUTE CALENDAR

January 19
through
January 28

Seminars and Lectures

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.

Computer Recognition of Tissue Sections*

D. W. Hartman, electrical engineering. CIPG Seminar. 12n-1pm, Rm 20B-220.

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.; James A. Freaney, president, Freaney Corp.; Stephen Senturia and David Wilson, MIT Lab for Recycling. 8pm, Rm 3-133.

Thursday, January 20

Single Atom Visibility in Electron Microscopes*

Norman Punsky, graduate student, electrical engineering. Electron and Ion Optics Seminar. 3pm, Rm 13-3034.

Monday, January 24

Application of Contraction Mappings to the Control of Nonlinear Systems

William R. Killingsworth, graduate student, aeronautics and astronautics. Instrumentation doctoral thesis presentation. 11am, Rm 33-206.

Tuesday, January 25

Medical Technology: Outpatient Accomplishments and Inpatient Prospects**

Dr. B. Reiffen and Dr. H. Sherman, Lincoln Lab. 3:30pm, Lincoln Lab Cafeteria.

Wednesday, January 26

An Interpretation of the PDP-11 Design*

Prof. F. F. Lee, electrical engineering. CIPG Seminar. 12n-1pm, Rm 20B-220.

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 *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.

Tech Dames Meeting**

Talk w/slides on "New Life for Old Houses" by George Stephen, BRA Director of Rehabilitation Design. Wednesday, January 19, 8pm, Student Center Mezzanine Lounge. Husbands invited to attend. Refreshments following meeting.

Outing Club**

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

White Water Club **†

Pool Session. Tuesday, January 25, 8-10pm, Alumni Pool.

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.

Outing Club*

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

MIT/DL Duplicate Bridge Club**

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

Judo Club**

Every Monday, Wednesday, Friday, 5pm; every Saturday, 1pm. duPont Gym Exercise Rm. Beginners welcome.

Classical Guitar Society**

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

Fencing Club**

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

Tiddlewinks 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

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

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

What's Up Tiger Lilly**

LSC. Saturday, January 22, 7pm and 9:30pm, Rm 10-250. Tickets 50 cents.

Pyasa*

SANGAM. Sunday, January 23, 3:30pm, Rm 26-100. Tickets: \$1.50 club members; \$1.75 non-members.

Bedazzled**

LSC. Friday, January 28, 7pm and 9:30pm, Rm 10-250. Tickets 50 cents.

Dance

Yoga for Beginners

Classes. 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.

Modern Dance Technique Class**

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

Tech Squares*

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

Folk Dance Club*

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

Folk Dance Club*

Folk dance classes. Every Tuesday and Thursday, 3-6pm, 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.

Student Art Exhibit*

Student art works produced during IAP including photographs, graphics and drawings. Friday, January 28 through mid-February. Hayden Corridor Gallery.

Exhibition of Paintings by Susan E. Schur

On display at the Faculty Club.

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

Varsity Fencing*

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

Varsity Indoor Track*

Tufts, Williams. Saturday, January 22, 12:30pm, Rockwell.

Varsity Fencing*

Southeastern Mass, Norwich. Saturday, January 22, 2pm, duPont Fencing Rm.

Varsity Hockey*

St. Anselm's. Saturday, January 22, 7pm, Skating Rink.

Wrestling*

Amherst. Wednesday, January 26, duPont Gym. JV/F at 6pm. Varsity at 7:30pm.

Varsity Hockey*

Holy Cross. Friday, January 28, 7pm, Skating Rink.

Varsity Basketball*

Colby. Friday, January 28, 7:30pm, Rockwell.

Religious Services and Activities

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

Reflections on the Jewish Community in France*

Jerome Milch, graduate student, political science. Hillel Graduate Discussion Group. Monday, January 24, 8pm, Student Center Rm 441.

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 or 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

Creative Writing

Experimental creative writing course without a teacher will meet every Monday during the semester. For information call Wanda Adams, X7078.

Christian Faculty Fellowship

All faculty members interested in Christian Faculty Fellowship please call Prof. James Bruce, 259-9509 after 7pm.

IAP Listings

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.

Curriculum Planning—Literature*
Guests from different field each week. Meet every Wednesday, 10am, Rm 14E-307.

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

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

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 from Fossil Fuels and Conversion
Prof. J. F. Louis and Prof. W. S. Lewellen. Aero and Astro IAP Seminar. 3-4:30pm, Rm 33-418.

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.

Manook 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
John Mili. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

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.

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

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

Brahm's "German Requiem"*
Informal performance conducted by Klaus Liepmann with the Choral Society, Glee Club, Symphony Orchestra and others. 8pm, Kresge. Free.

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
John 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.

Computer Synthesis of Chemical Processes—Where Does the Man Fit In?
Prof. Gary Powers, chemical engineering. IAP Seminar Series. 1pm, Rm 10-275.

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.

Sunday, January 23

Humor in Music*
Concert and forum by students and faculty on works by Mozart, Mendelssohn, Poulenc, Chabrier and Prokofieff. 3pm, Music Library. Free.

Monday, January 24

Durability, Serviceability, etc. of Fibrous Structures: Some Engineering Speculations

Subhash K. Batra, research associate. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Underwater Still and Elapsed Time Photography
Dr. Kenneth R. H. Read. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

Biological Oxygen and Carbon Dioxide Transport
Jerry Meldon, graduate student. Chemical Engineering Seminar. 11am-12n, Rm 12-142.

New Enterprises in the Process Industries
Prof. Samuel Bodman, chemical engineering. IAP Seminar Series. 1pm, Rm 10-275.

Applications of Modern Control Theory to Pollution and Process Control Systems*

Dr. C. H. Wells, Systems Control, Inc. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

Major Problems and Current Developments in Air Traffic Control
Dr. Herbert G. Weiss, Lincoln Lab. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

Socioeconomic Problems and Modern Control Theory
Prof. M. Athans. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

Nuclear Energy and Its Conversion
Prof. J. F. Louis and Prof. W. S. Lewellen. Aero and Astro IAP Seminar. 3-4:30pm, Rm 33-418.

Poetry and Music: A Comparison of Multiple Settings of Two Poems*

Lecture-recital by Richard Blumenthal of Harvard and Robert Freeman of MIT comparing work by Goethe and Verlaine. 8pm, Music Library. Free.

Romance and Reality*
Kenneth Clark's Civilisation Series. 8pm and 9:15pm, Sala de Puerto Rico. Free.

Tuesday, January 25

Macro-Engineering: History and Prospects
Frank P. Davidson, visiting lecturer. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Experiences with Elapsed Time Photography in Loch Ness
Dr. Robert Rines. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

Crystallizer Design—Is It Still an Art?
Prof. Geoffrey Margolis, chemical engineering. IAP Seminar Series. 1pm, Rm 10-275.

A Canonical Form for Sequential Stochastic Control*
Dr. Hans S. Witsenhausen, Bell Telephone Labs. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

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

Quarter Tones*
Lecture-demonstration by Donald Sur, humanities. 8pm, Music Library. Free.

Wednesday, January 26

Attenuation of Shock Wave Generated by High Speed Tube Vehicles
Visiting Prof. J. H. T. Wu. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Electronic Flash Lamps and Their Uses
Dr. Bruce Newell. Stroboscopic Experiments and Seminars. 11am-12n, Rm 10-275.

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

To Be Announced*
Prof. P. C. Parks, University of Warwick, England. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

The Developing Field of Solid State Electronic Devices
Dr. David G. Thomas, executive director, Electronic Materials and Processes Division, Bell Telephone Labs. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

Advanced Energy Converters: Improved Gas Turbines and Magneto-hydrodynamics

Prof. J. F. Louis and Prof. W. S. Lewellen. Aero and Astro IAP Seminar. 3-4:30pm, Rm 33-418.

Spy Who Came in from the Cold*
Humanities IAP Film Series. 6pm, Rm 2-190. Free admission.

Early Versions of Robert Schumann's "Dichterliebe"*
Lecture-recital by Rufus Hallmark of Brown University. 8pm, Music Library. Free.

Thursday, January 27

How Mechanical Energy Is Generated in the Human Body
Prof. I. V. Yannas. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Algebraic Methods in Control System Design*
Prof. A. S. Morse, Yale University. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

Microcomputers Built with Electron and Ion Optics
Prof. C. K. Crawford. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

The Threepenny Opera*
Humanities IAP Film Series. 6pm, Rm 10-250. Free admission.

A Comparison of Bach's "E Major Prelude for Violin Alone" with the First Movement of "Cantata 29" and Schumann's "Pianoforte Accompaniment"*

Lecture-recital by Joel Lester of City University of New York. 8pm, Music Library. Free.

The Energy Crisis and Its Implications for Engineering Education
Prof. Peter Griffith. ME Staff Seminar Series. 9:30am, Rm 1-146. Followed by coffee, Rm 1-114.

Friday, January 28

Enzyme Engineering
Bing Van Dyke, graduate student. Chemical Engineering Seminar. 11am-12n, Rm 12-142.

Applications of Extended Kalman Filtering Methods to Target Tracking*

Dr. John Tabaczynski, Lincoln Lab. Decision and Control Sciences Group IAP Seminar Series. 1:30-2:30pm, Rm 10-105.

The Problems of Using Computers in Large Organizations
Edwin Jacks, director of technical development, information systems activities, General Motors Technical Center. Research Highlights in EE Seminar. 3-4pm, Rm 10-105.

Mother Nature and Other Light Motifs: Notes on Musical Unity in Wagner's "Ring"*

Illustrated lecture by Steven Ledbetter of New York University. 8pm, Music Library. Free.

*Open to the Public

**Open to the MIT Community Only

***Open to Members Only

†Freshmen encouraged to attend

Send notices for January 26 through February 4 to the Calendar Editor, Room 5-111, Ext. 3279, by noon Friday, January 21.

Games Probe Structures of Society

We dropped in on the Urban Studies and Planning Department's IAP course "Urban Gaming and Simulation" last week to find out what kind of games academics play. This, the last session of a five-day mini-course, was to be devoted to a game simulating the problems of the elderly in an urban environment. The name of the game was *End of the Line*.

Arriving in the Emerson Room, 7-403, at 9 a.m. sharp, we found a group of undergraduate and graduate students munching doughnuts awaiting the opening gun. One man, whom we took to be a student, was busy untangling and arranging lengths of clothesline rope, shower curtain rings, pencils, scoresheets, paper clips. He turned out to be Robert Hollister, assistant professor of urban studies and planning.

"I got interested in games while I was an undergraduate," Hollister told us later. "My professional interest is in the mechanisms and effects of the various systems by which social services are delivered, and social games -- which are extremely good ways to study such delivery systems -- inevitably presented themselves. I've kept up an avocational interest, as well, and in fact a colleague and I have just sold a game to Hallmark Cards, which is starting up a game division. It's a simple strategy game using L-shaped blocks made out of three cubes, that can be arranged in various configurations on a board. We wanted to call it "Mental Blocks" but that name, as it happened, had already been used, so we settled for 'Top-o-Logic.'"

William Doebele, visiting professor of Urban Studies at MIT this year (he also teaches at Harvard), opened the class with a review of the games played so far. "Those of you who have been to every session will recall that the principle behind these new games is to discard something like 99 percent of reality while abstracting out of a situation a few operational elements for study," he began. "We've been interested in seeing if these elements are truly critical for the given situation; how well, in short, the games represent the complexity of the real world in a simplified way. At their best, such games operate rather like theorems in science -- they give the planner a way to test certain ideas about the real world in a compressed time-period. Computer-based games such as METRO and APEX which are based on some extensive studies of Lansing, Michigan, can quite literally simulate something like five years of actual experience in a week-end of play.

"The games in this course, somewhat less complex than computer games, nevertheless compel the players to deal with a number of simultaneous variables. The psychological game *Star Power* did, I think, give many of you a genuine feeling for the arbitrary way in which social class confers power on some at the expense of others. *Policy Negotiation* and *CLUG* -- the Cornell Land Use Game -- were

intended to give you some grasp of the conflicting interests, trade-offs, and possible resolutions involved in urban planning. *El Barrio* was based on actual studies of chicanos in a large city and represented some of the perplexing problems and strategies of the urban poor.

"The game we are playing today," Professor Doebele continued, "is brand new and still in the process of evaluation. *End of the Line* was developed by Frederick Goodman at the University of Michigan, a center for gaming activity, for a federal agency concerned with the urban problems of old people, who now compose a significant percentage of the population. It is to a certain extent the outgrowth of another game of Goodman's involving welfare agencies that was called *End of the Line* has been played once with students at Harvard, and this is the third time it's been played at MIT."

Professor Doebele went on to outline the rules for *End of the Line*. Hollister had meanwhile set up twelve chairs in four rows of three in the center of the room, and piled playing equipment on each chair, distributing three-foot lengths of rope, paper clips, and the like more or less at random to simulate different starting situations for the players. The chairs represented the city of the aged and the point of the game was simply to stay alive. Mobility in the city was controlled by lengths of rope. If you ran out of rope, you had reached the "end of the line" and died.

The game was conducted in rounds, in which the elderly players bargained for paper-clip pay-offs at a table at the front of the room. These paper-clips represented "friends", who would help stave off the various turns of fate. Fate was a deck of cards, one of each suit for each player, the black cards representing bodily disasters and the red cards representing intellectual infirmities such as failing memory.

Others beside the aged inhabited this city. There were two welfare agencies, GASP (for Golden Age Survival Program) and GAPP (for Golden Age Productivity Plan). GASP's aim was to keep as many of the elderly alive as possible; GAPP's was to maximize present prosperity by increasing the number of clips in the game. Both agencies received appropriations each round from the Foundation, the sole source of revenue in the game. Money was represented by round paper clips and could be used by aged players to rent transportation for one round in the form of six foot lengths of rope. And finally, the Police (played with law-and-order zeal by Professor Doebele) roamed the city confiscating rope when fate so decreed and picking up any stray "friend" clips the elderly were clumsy enough to let fall off their chairs.

As play began, we moved spryly to a chair in the last row upon which, we had happened to note, there seemed to be a good number of ropes. We were number 10. One

end of our rope, attached to a small wooden tray with a "friend" clip in it had to remain in our chair. The other end of the rope had to be hooked around our leg. As quickly as our palsied finger would allow, we attached the ropes together with the shower rings, tied one end around our ankle and set off at a lively pace toward the front of the room, where bargaining was already getting under way. We had gone scarcely four steps when the tray went crashing to the floor and we had to scramble back to retrieve the fallen clip before the fuzz collected it. Then we set out in a much more gingerly fashion, shuffling along with the care of the elderly.

A stranger in these parts, we soon surmised we had moved into the wrong section of the city. Even our ample supply of rope would allow us to get no further than half way to the bargaining table. We struck up a conversation with our neighbor, number 11, who was, it turned out in the same situation. We offered him our extra rope and "friend" clip for bargaining and, feeling infirm as anything, sat down to await his return.

A representative of GASP showed up to ask if there was anything the agency could help us with. We pointed out that with but one rope and one "friend" to our name we were on the point of expiration, and, shrewdly neglecting to mention the loan of assets to number 11, collected two money clips from GASP. These were at once invested in transportation. One of these long ropes, however, was missing its shower ring and unable to attach it, we complained to GASP in a voice made shrill by exasperation. By the time a ring came, the rope attached, the distance to the front of the room slowly but successfully navigated, the round was over and the long ropes collected by the police, who also made off with our pencil as fate would have it. This made it impossible to note down the changes in the pay-off matrix for the second round, and we retreated to our chair feeling peeved and cheated.

So it went in successive rounds. We gained a bit here, lost some there, managed to pick up a few extra friends even as we lost some of our mobility, haggled with the welfare agencies while picking our slow way about the city. Fortunately we had made a will (witnessed by two members of the Foundation) leaving our dwindling assets to number 11, when fate dealt us a spade and we died of a heart attack.

After several more rounds, Professor Doebele called a halt and, turning on a small portable recorder, began the discussion. There had been a number of deaths, but some of the players had done well in staving off the final throes and collecting "friend" clips, and there was some feeling that this particular session had had too many assets to promote the inevitable feelings of growing isolation and helplessness that game usually induces in its players.

A lively argument however took place between the Foundation and

the two welfare agencies. Both agencies had been diffident, according to the Foundation; GASP had not been careful enough in handing out its resources, bestowing largesse without careful checking on actual need, while GAPP's two representatives had seemed to be working at cross-purposes. The Foundation had therefore limited the amount of funding to each agency and had begun to stimulate player-groups to form non-profit corporations to qualify for direct funding. The two agencies saw this as a direct attempt to undermine their capacities to help their clients, and had responded in different ways, GASP by passing out money as rapidly as possible to retain their clients' confidence and GAPP by helping clients to maximize the bargaining pay-offs.

"The interesting thing about these games," Professor Doebele told us after the session, "is that their outcomes differ so much depending on their variables. The games are therefore an extremely limited predictive tool, although sometimes naive people act as if they can foretell behavior in real situations. But the constraints of real life are quite different, of course, and even people who play their own real-life roles in games often behave very differently in a simulated situation.

"But the games are marvelous teaching and research devices. The better games all have a number of feed-back loops that present a constantly shifting number of variables. The enthusiasm for business games of a few years back died out because the games turned out not to be variable enough. Since they tended to turn on the single variable of profitability, they all got psyched out quite rapidly.

"These new games -- which are incidentally constructed by serious study of the appropriate literature -- are more difficult to break because they contain so many variables. And they frequently lead to some quite surprising results. For example, *Policy Negotiations* -- which is really a systematic structure of the decision making process into which different concrete issues can be inserted -- was once played by students in Marin County in California in a session at which the real-life counterparts of the players -- county officials, interest group representatives, and so forth -- acted as advisers during the course of the game.

"A heated debate there at the time involved two conflicting proposals for a new superhighway, and these, as well as a host of less important issues, were written into the games as the substance for rounds of negotiation. There were two results and both of them were unanticipated. First, it turned out that the two highway proposals were so evenly weighted as to their support during the game, that neither could be adopted without tremendous political repercussions. In most cases it is possible to form coalitions around a compromise, but in this one wasn't. Second, it turned out that much more agreement could be

obtained on the secondary issues than had been thought possible.

"So while the highway issue was more polarizing than suspected, a whole host of other issues turned out to be less polarizing," Professor Doebele concluded. "It had simply not occurred to anyone that this situation could arise. But once such an idea is discovered in a simulated context, you can take it out into the real world and see if it works there too, and often quite new realms of social research suggest themselves. That's what games can do."

'73 Budget Cut \$3.2M

(Continued from page 1)

organization and responsibility, and improve management, and have frequently been able to devise methods that are both cheaper and better." Dr. Gray cited as an example the current practice of publishing committee and task force reports as special supplements to *Tech Talk* rather than as separate booklets as in the past. The resulting saving in printing, handling, and mailing is significant.

Dr. Gray said that the growing pressure on unrestricted income of recent years is the result of increased support to education and research during the early and middle 1960's coupled with an abrupt leveling of that support in 1968. While MIT has not experienced a decline in research support, as have some other institutions, the abrupt cessation of growth in research support has meant a decline in purchasing power because of inflation and has required rapid adjustments in style and mode of operation."

"This entailed increasing reliance on unrestricted income to fill the operating gap, and thus a growing restriction on the Institute's freedom to experiment with new ideas and to develop new programs. With the envisaged reductions, we should bring expenses in line with foreseeable income."

Concert Band Goes on Tour

(Continued from page 1)

Tucker, who was a member of the music faculty, from 1947 until 1971; "Marche Baroque," composed by alumnus Andrew Kazdin '63 while he was a student; "Suite I II III IV" composed by John Bavicchi in 1969. Traditional band music in the repertoire includes works by Giannini, Respighi, Hindemith, Husa, Chance, Gould and Surinach.

The Concert Band, founded in 1948, is devoted exclusively to the performance of modern compositions for concert bands, and has pioneered in the commissioning of concert band music. The band presents four concerts a year at the Institute, and an annual mid-winter tour.



"Where there's smoke..." doesn't really apply in this case. The smoke here is steam, being used to clean the venerable facade of Ashdown house.

-Photo by Margo Foote

Dr. Ross Discusses Women in Academia at IAP Forum

By Linda Omohundro

The percentage of women on university faculties has decreased from 30 percent in 1940 to 19 percent in 1970, according to Dr. Virginia Ross, Ph.D. '53, who spoke at the Women's Forum last Thursday.

Dr. Ross, reporting on a recent symposium on "Women in Academia" at the American Association for the Advancement of Science meeting in Philadelphia, also noted that women comprise from zero to five percent of the faculties at the nation's ten most prestigious universities, including MIT. She said, "Some schools achieve higher percentages by including untenured and part-time faculty members in their counts, so the number of full-time women faculty members is likely to be lower than the statistics indicate."

One important result of the AAAS meeting was passage of a resolution establishing an office for women's equality in scientific training and employment, affairs of the association, and in the direction of national science policy. Toward this end, the AAAS women's office will accumulate a nationwide listing of women in technical and scientific fields. Such a list will provide universities and industry with an invaluable source for finding qualified women in a wide variety of fields.

According to AAAS studies, women faculty members generally earn lower salaries than men in the same positions and are offered fewer fringe benefits. Dr. Ross said, "In academic levels the mean

salary for men is \$12,000 and for women it is \$8,000, although I think those are generous figures.

Dr. Ross continued, "The low number of women in academia is caused partly by the double standard -- women are forced to compete for jobs according to male criteria. If a woman is aggressive, she's considered masculine; if she's feminine, then she is not creative. Either way, she doesn't qualify."

"A woman can't leave her family and travel 2,000 miles to find a better job," Dr. Ross said. "She is forced to compete in a limited job market. A man, on the other hand, will pack up his family and move to Timbuktu if that's where he can find the best job opportunities."

Several recommendations were made at the AAAS symposium. One was the establishment of women's groups in colleges and universities across the nation. Dr. Ross commented, "If women are to improve their standing in the academic world, then they have to get together and discuss their problems. Such groups, similar to the Women's Forum here at MIT, can be quite beneficial. Age and occupation are unimportant -- in addition to discussing common problems, the older women can counsel the young who are just beginning careers in academia."

The AAAS meeting also expressed a desire to increase representation by women on national committees and government granting agencies. Now only one percent of committee and agency memberships are made up

of women.

Following a brief discussion of Dr. Ross's report, Mrs. Amy Metcalfe, a staff member in the Office of the Vice President for Research, reported on the Institute's Affirmative Action Plan. Established in October, 1969, the plan calls for equal employment opportunities for minorities, particularly blacks and women. By 1974 at least one member of a minority must be employed in each department and laboratory of the Institute.

To help meet this goal, the Institute has formed several committees, including the Task Force on Faculty and Staff. Mrs. Metcalfe, a member of the task force, pointed out that with 24 departments and only 19 women faculty members at MIT, a large emphasis has been placed on recruiting women for the faculty ranks. "One problem," she said, "is that many of the vacant faculty positions are in very narrow fields so the number of qualified applicants is limited."

At the seminar tomorrow Miss Dorothy Blair and Mrs. Sally Hansen will represent the Office of Personnel Relations, describing its organization and how it works with departments. Topics will include a survey of the secretarial staff, exit interviews and turnover, and promotion procedures for both secretaries and professional staff.

The Forum is held in the Margaret Cheney Room (Room 3-310) beginning at noon. It is open to all members of the community interested in attending.

John Wiley to Be Visiting Professor of Aero & Astro

John Wiley, a 1933 graduate of MIT who will retire soon as director of aviation for the Port Authority of New York, will become a Visiting Professor of Aeronautics and Astronautics at MIT effective July 1.

He will be associated with the department's Flight Transportation Laboratory, participating in various research and teaching programs having to do with air transport. Announcement of the appointment was made by Professor Rene Miller, department head.

IAP Timetable—Revisions and Additions

New Scheduling—This Information Supersedes that in the IAP Timetable and the Previous Revision

J06-36	HiFi Amps, Tuners, TV and All That	MTWRF 10:30-12	3-464	1/17-1/21
J06-37	Dynamic Systems Model and Control.....	TR 10-12	37-186	
6.631J	Introduction to Plasma Physics	MT 11-12:30	26-210	1/24, 1/25
8.03x	Physics III	MTRF 1-5	8-119	
		W 1-4	8-119	
8.04c	Principles of Quantum Physics	MTWRF 9-5	4-309	
8.04x	Principles of Quantum Physics	MTWRF 1-4	4-355	
8.613J	Introduction to Plasma Physics	MT 11-12:30	26-210	1/24, 1/25
J11-3	The Filmmaker's View of the City	MTWRF Eve (7-10pm)	E21	1/6-1/19
J15-7	Building Models for Public Sector Decision Making	T 10-12	E52-461	1/25
J16-2	Advanced Energy Conversion	MW 3-5	33-418	
J16-4	Lasers in Aerospace Research	MTWRF 10-12	33-419	1/17-1/21
J16-6	Numerical Analysis	MTWRF 1	33-422	1/24-1/28
J16-11	Investigation of the Application of Air Cushion to Vehicles	MWRF 2	33-418	1/12-1/28
J17-3	PL/1 Program Principles for Social Sciences	MTR 10-12, 2-4	E53-216	1/17-1/27
J18-1	Knot Theory	cancelled		
J18-3	Probability Theory	TR 10:30	2-151	
J18-16	Manifolds, Morse Functions, etc.	MWF 1	2-143	
J18-18	Seminar on Geometrical Property of Differential Oper	W 4	2-390	1/12-1/26
18.03	Differential Equations	TR 11	2-131	
		Sec R01		
		Sec R02		
18.700	Linear Algebra	TW 12-1:30	2-131	1/12-1/25
J21-30	Jazz	FMW 2-5	4-160	1/14-1/19
J21-32	Songwriting	R Eve (7-9pm)	4-160	1/13-1/27
J21-35	Humanities Film Series	TWR Eve (6-10pm)	10-250	1/6-1/27
		W Eve (6-10pm)	2-190	1/26
23.174	German Reading II	R 12	14N-325	1/13-1/27
JERC-6	Filming for Channel 44	WRF 2	E53-212	1/12-1/28
JNML-6	Quantum Magneto-Optics	MWF 10-12	NW14-2209	1/12-1/21
Miscellaneous				
	Disagreement, Common Ground and the Dialogue Process	cancelled		
	Library-Role of the University in Cambridge Housing	MWF 1-3	5-231	1/12-1/28
	Seminar on Generative Grammar	TBA		
	Student Center Films—"Civilisation"	MT Eve (7:30pm)	Std Ctr	1/17-1/24

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.

Goodyear snows (2), 6.00x12, like new, \$30. Shelia, X6334.

Sgl bed, used 2 mos, \$35; lg desk, \$25; dresser w/mir, \$25; metal closet, \$10. Claire, 547-7278 or 876-3308.

Used slide rule, \$5. Roy, X5427.

Hyer boots, 9 1/2 B, brand new, \$30. John Sachs, X7920.

Symphonic stereo red player, plays satisfactorily, \$20. Mike, 547-1549.

Hide-a-bed sofa, \$20. Call 862-0964.

Moss gr 12x12' rug; mahog DR tbl w/2 leaves, mod; contemp green tweed sofa; mahog cof tbl; lf lamp; Lawson style love seat, 2 new Mustang tires, 7.00x13. Call 864-3263 evgs.

Paramount bowling balls, candle & duckpin, engraving done; bowling bags, gd prices. X7522.

Kingston Deluxe trumpet w/case, gd cond, \$70; Wittnauer watch, 1 1/2 yrs old, \$20; XAM spkr, 14 1/2" x 10" x 10 1/2", \$5. Willie, 661-9673.

Baby crib w/matt, \$15. X5543 Linc.

K tbl & 3 chrs, \$18. Call 661-9255 evgs before 8:30.

New deluxe stainless Oneidaware, 5-pc place settings for 6, \$15; Lawson 3-seat sofa & club chr, v sturdy, exc cond, best offer. Call 395-8751.

Ohlin Mark I skis, 195 cm, nvr used, must sell, \$100. X3942.

Homesites (3) on Fla west coast, 1 on canal w/access to Gulf, discounted at \$10,290. Frank Gargiulo, X112 Millstone or 251-8633 evgs.

Kastinger man's buckle ski boots, 9, plastic sole, \$8. Russ Cipolla, X2311.

Old sofabed, 60" wide, 3/4 bed, bed gd but sofa nds reuphol, free. X6154.

Dbl bed w/box sprgs & frame; lg desk w/swivel chr; 3 prs white drapes; prices negotiable. Sandy, X3533 or 354-4005 evgs.

Kastinger Austrian ski boots, 9 1/2, man's, used twice, \$20. Call 277-8605.

Wooden storm windows, 4-pane, 15x30", and 2-pane, 20x30", gd cond, \$2 each. Call 277-3956 evgs.

Fischer skis w/safety bndgs, 200 cm, \$15; imported Danish furn, tbls, sofa & chr, gd cond; Norwegian sweaters, new, \$20 ea. Gundersen, X6085 or 332-8251.

Sturdy high chr, \$5; 2 training chrs, \$2 & \$3, all exc cond. Call 861-8070.

Lady's Reiker ski boots, 9, \$20; lady's brown Head ski pants, 10, never worn, orig \$45, now \$25. Margaret, X7254.

'61 Evinrude Lark motor, 40 hp, elec starter w/controls, \$250 or best. Compact Cannon 35mm camera, demi model, \$35. Sears Super 8 movie camera, \$25. Noreen, X7241.

Reidell girls' figure skates, 10, 1N, 2N, 3, all exc cond, \$10 each; boy's Hyde skates, 2, \$5. Dorothy, X1534 or 661-1382 evgs.

Graduating, must sell all furn. Joe Turnage, X3211 or 729-8561.

Kanekalon wig, med br, like new, \$9; Dynel wig, wavy, med br, \$10. Call 868-5189. Delta mtd tires, 7.75x15, w/fit Ford up to '69, like new; Montgomery Ward's best 8.15x15, used, both for \$20. X6913.

Lving country, must sell furn. Call 244-0616.

Welbilt wh 2.3 cu ft refrig w/frzr shelf, 15 mos old, asking \$50. Call 354-7594 evgs.

Candido accordion, fl size, exc cond, price negotiable. Manuel, X3785 or 266-2968.

Contemp forest green lthr sofa, 50x30", \$40; cherry red uphol lounge chr on bl frame, \$20. Call 648-9066.

Br new self-cleaning broiler oven, \$30. Beverly Carroll, X5736 or 661-0296 evgs.

Firestone E78-14 studded snows for VW bus, 3K, \$24/pr. Call 864-9010.

LeTrappeur ski boots, woman's, 7 1/2, used once, \$25; ski poles, m and f, \$5 per pair. Janice, X2431.

Dyna stereo 70 pwr amp, rec overhaul, new tubes, \$70. Laynor, X7202 Linc or 369-6436 evgs.

Vehicles

'61 VW SR bug, 1 owner, w/serv records, ivory. R&H, best offer. Call 868-0681 or 661-3812.

'63 Olds F85, 4-dr, 8 cyl, auto, R&H, 62K, \$225. Joel, X7154.

'64 Ply Valiant, new br, alternator, batt, rec tuneup, avail 1/25, \$300 or best. Hiram, X5150 or 776-2647 evgs.

'64 Chevy Nova wagon, gd cond, \$230. X8775.

'65 VW 1500S, gd cond, \$600 or best. Jim, 354-0615 or 354-8833.

'65 Ford wgn, 289 V-8, auto, exc body, snows, \$400 or best. Aleco, X7267 or 492-2826 evgs.

'66 Olds Cutlass, auto, p st, air cond, gd cond, X5426 or 277-5028 evgs.

'66 Chrysler Newport 2-dr hrdtp, wh, exc cond, price fair. Call 933-3971.

'67 Chevy El Camino, exc eng, runs well, has a few dents, \$500. Call 667-7994 evgs.

'68 Camaro convert V-8 auto, 6 tires, \$1200. X3740 or 387-8039.

'68 Rover 2000TC, new br and tuneup, everything, \$1400. Martha, X6605 or 661-8395 evgs.

'69 Ford Cortina, std, AM/FM, snows, 20K, \$900 or best. Call 876-4825.

'69 VW, exc cond, new tires, br, tune-up, low mi, R&H, asking \$1050. Call 965-0451 9-10am.

'70 Ford Torino 4-dr sedan, p st, auto, defogger, R, 14K, perf body 2 yr warranty on new batt, \$2190 firm 'all 729-9483 evgs.

Housing

Rm available in Ashdown House for spring term. Herb, X7170 or 868-6975.

Jay Peak, Vt, ski lodge, sleeps 11, on Canadian border. Chrissy, 665-6220 evgs.

Lex, 1 rm, nice, walk or bike 1.5 mi to Linc Lab. Call 862-5383.

Northgate, 2-BR apt, air cond, dishwasher, w-to-w carpet, 10 min drive to MIT, pking avail, avail 2/1, \$235/mo. Bob, 625-2817 evgs.

Westgate, 1-BR apt sublet, avail 2/5, air cond, dishwasher, built-in cupboards, off-street pking avail, \$195/mo. Call 661-3989 early morns or evgs.

Animals

Free: 8-wk-old kittens, all wh & part wh, raised w/children & lg dog, George, X7638.

Free: 6-wk-old male Abyssinian guinea pig; 15-mo-old pregnant fem, Elizabeth, dorm X9547 or lv message X5961.

Lost and Found

Lost: set of 6 keys in soft bl case, nr Mass Ave & Vassar St. X2584.

Wanted

Male rmmate for Brk apt, own BR, avail now, \$80/mo. Paul, X575 Draper 7.

Rmmate to share apt at Cleve Cir, own BR, nr T & bus, avail 2/1 or sooner, \$80/mo incl ht. Barry, X1978 or 566-2503 evgs.

IEEE Trans in Circuit Theory, '63-'70; IRE Trans in Circuit Theory, '50-'62. Jonathan, X2351 or 492-3986.

Rmmate to share 2nd floor 3-BR apt, lg K, lg LR w/firepl, 1 1/2 B, W. Newton, avail Feb 1, \$82.50. Brian, X7287.

Rags, old sheets to clean silk screens. Bring to Rm 7-303 or call 547-3834.

Fem rmmate, 23+, own rm, lg K, 1 1/2 B, Camb, \$75 incl ht. Anne, X2209 or 491-8915 evgs.

Fem rmmate for lg mod 3-BR apt near Porter Sq, air cond, new K, 2 B, own rm, \$125, avail 2/1. Norma, X3570 or Cathy, X6002.

File cab, 1 or 2 drw, prefer legal size. Elaine, X3651.

Rolltop desk. Dorothy, X7974.

Used dkrm equip, esp enlarger. Ron, X4749 or 625-5179 evgs.

Male rmmate to share Brighton apt, \$74/mo. I'll do all cooking. Fran, X2740.

Efficient all-band linear KW to borrow for ARRL phone DX contest. Rick, X469 Draper or 969-2062.

Old file cab, 1-4 drws. Peggy, X4801.

Positions Available

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

SENIOR SECRETARY FOR RESEARCH SCIENTIST

Coordinate and manage the busy office of a Nobel prize winning distinguished Enzymologist. Schedule appointments, set up meetings, and identify and place world-wide phone calls. Manage publication process of research papers, and a technical typist who assists, and account charges for two projects. Laboratory set-up includes overseeing a small technical reading room, and purchasing supplies for a group of international post-doctoral researchers. Candidate should be seeking career opportunity, have at least three years of experience including a shorthand skill, and have a flair for organization and accounting. Work schedule over 35 hours. Call Office of Personnel Relations

Priscilla Mead, Ext. 4251

Rmmate to share apt w/3 others, lg priv rm, lease through Aug w/renewal opt, \$65/mo. Call 783-3942.

Reverb for hookup to fender amp. X7971 Linc.

MIT rmmate to share Harv St apt, \$100 incl util. John, 876-6904, 5-7pm.

Old used refrig. X5571.

Male rmmate for Harv Sq apt, own rm, \$70/mo. Paul, X6022 or 876-8321.

Miscellaneous

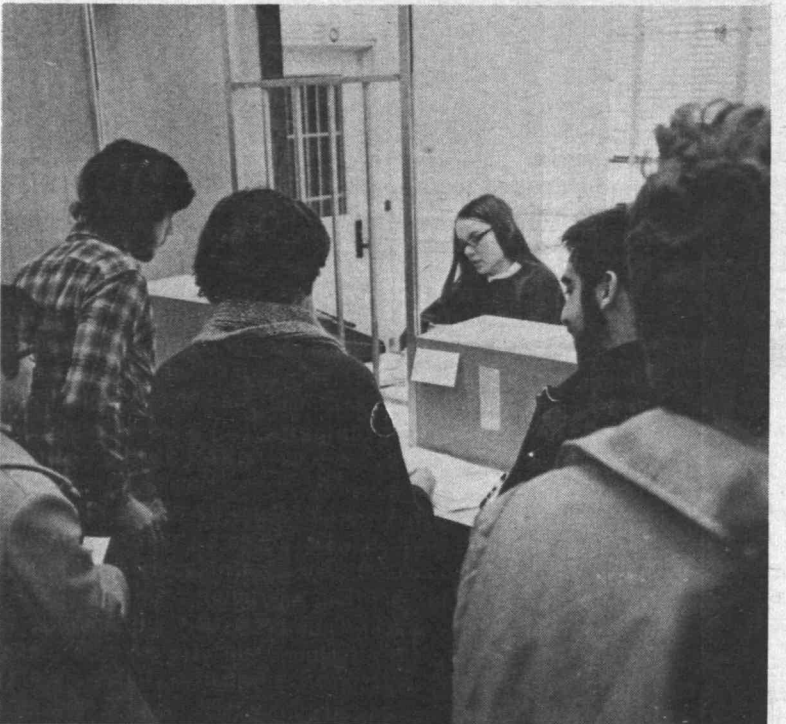
Exp thesis, etc typist desires work. Short notice accepted. Call 491-6434 evgs.

Starving secretary w/BA in Eng will type, 50¢ per page, 75¢ w/light editing. Tricia, 354-2190.

Wl sharpen edges, repair gouged bottoms on all skis. Call 661-9876 evgs after 9 or mngs before 10.

Center Urges System Users to Start Early

The Information Processing Center would like to remind students and instructors who intend to use the Job Processing System (the S-370-155) in preparing theses or for class assignments to plan on starting early. Computer time is not as readily available this year as it has been in recent years. As a consequence, turn-around times are considerably longer and the number of possible daily runs are fewer than before. Both students and instructors whose classes include computer assignments should keep this situation in mind when scheduling their work.



Always a popular place, the Cashier's Office may become less crowded when the check cashing service charge brings on February 1.

-Photo by Margo Foote

Check Cashing Service Fee Starts February 1

Members of the community are reminded that beginning February 1 there will be a 15 cent charge for cashing each personal check in the Bursar's Office (Room 10-180), and that personal checks will no longer be cashed in E19-215.

Paul V. Cusick, vice president for business and fiscal relations, announced the new fee in Tech Talk earlier this month. He said, "We are sorry to impose the fee, but the expense of running the service has to be offset. We gave

some consideration to eliminating the service altogether, but decided that people would probably prefer to pay for the convenience. However, there are four branches of local banks located in the vicinity of the Institute, and I am sure they will offer their services to the community."

The check cashing fee will be used to offset the expense of running the cashier's office in addition to paying for the delivery of cash and underwriting any forgeries.

Science Magazine Carries Signer Article on Red China

Dr. Ethan Signer of MIT's Department of Biology is co-author with Yale's Dr. Arthur W. Galston of an article on education and science in mainland China appearing in the January 7 issue of

Science magazine. Drs. Signer and Galston visited the People's Republic of China last May, the first scientists to be admitted after the Chinese began permitting Americans to visit.