

## Myron Tribus Named CAES Director

Dr. Myron Tribus, a noted engineering educator and a former US Assistant Secretary of Commerce for Science and Technology, has been named professor of engineering at MIT and director of MIT's Center for Advanced Engineering Study.

CAES, begun in 1963 at the urging of the late Alfred P. Sloan, Jr., is a major effort by MIT to give working engineers and scientists in industry and government opportunities to refresh and enrich their own engineering educations on a continuing basis.

Announcement of the appointment of Dr. Tribus was made by Dean Alfred H. Keil of the School of Engineering. Dr. Tribus will begin his new duties effective Jan. 1. He is a former faculty member at the University of California at Los Angeles and Dean of Engineering at Dartmouth College and has been a vice president of the Xerox Corp. at Stamford, Conn., for the past four years.

Dr. Tribus succeeds Professor Wilbur B. Davenport who became head of the MIT Department of Electrical Engineering Feb. 1. Professor Davenport will continue as acting director of CAES until Dr. Tribus arrives.

Dean Keil said Dr. Tribus will continue to enlarge and broaden CAES activities aimed at helping working professionals refresh and renew as well as expand their own educations. In addition, Dr. Tribus will explore ways CAES can contribute to and draw from current efforts within the School of Engineering as well as MIT's other schools to broaden the scope of teaching at all levels, particularly in the systematic application of technology to societally important

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Pictured here "going through the process" at registration in duPont Athletic Center are Jay Papp, from Long Beach, Cal., a student in the Sloan School of Management and two-and-a-half year old daughter Heidi. Diane Gilbert, a senior in civil engineering from New York City, lends a personal touch to the computer card confusion. Some 7,800 students began classes at MIT Tuesday, Sept. 10. Of that number approximately 3,300 are graduate students, 28 percent of whom are from foreign countries. Most members

of the freshman class—one of the largest in recent years at MIT—will build their program of study around two terms of physics, two terms of calculus, two terms of humanities, one term of chemistry or biology, plus one or more elective subjects, including perhaps an undergraduate seminar. All subjects taken by freshmen are graded on a pass/fail basis. Traditionally the most popular first year elective subject has been Introduction to Psychology. Registration took place Monday, Sept. 9.

## Faculty Panel to Address AOC

Six MIT faculty members, representing a cross-section of academic disciplines, will take part in a Sept. 14 panel presentation at the Institute on "Food, Population and Politics—The

World Crisis."

Co-moderators of the panel will be Dr. Nevin S. Scrimshaw, professor of human nutrition and head of the Department of Nutrition and Food Science, and Dr. Eugene B. Skolnikoff, professor of political science and director of the Center for International Studies.

The panel presentation, which will begin at 2:30pm in Kresge Auditorium, is part of the MIT Alumni Association's annual Alumni Officers Conference. Approximately 600 alumni officers,

their spouses and members of the MIT faculty are expected to attend.

Other panel speakers will be:

Dr. Glen L. Urban, associate professor of management science, an expert on the application of management science to family planning programs.

Dr. Richard S. Eckaus, professor of economics, who has done extensive research on the economic significance of production in undeveloped countries.

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## MIT Union Members Meet To Consider Action

MIT Cambridge employees represented by Local 254 of the Service Employees International Union (AFL-CIO) will meet Wednesday evening, according to notices posted on union bulletin boards, to "take whatever action the body shall decide" on contract proposals made by MIT.

The SEIU employees previously voted by a narrow margin to reject the Institute's proposal which provides for wage increases of 7½ percent in each year of a new two-year agreement, plus a non-contributory pension plan and other improvements in the pension, Blue Cross-Blue Shield and life insurance programs. The same basic terms have been offered to other unions representing MIT employees and have been accepted and ratified by the 850 employees represented by the Research, Development and Technical Employees Union.

The SEIU represents approximately 600 maintenance and custodial employees in Physical Plant, Housing and the Infirmary and 125 in similar categories at the Lincoln Laboratory.

Robert J. Davis, director of the Office of Personnel Relations, said he is hopeful that the employees will accept the Institute's proposal at tonight's meeting.

"There always remains the possibility," he said, "that they will reject the offer and decide to go on strike instead. While there has not been a strike of any group of the Institute's employees since 1962, that is a contingency for which we must be prepared. Since the agreement between the Institute and the union has expired, employees are free to strike at any time without prior notice to the Institute if they vote to do so."

## Gannett Grant to Support Newspaper Technology Study

The Frank E. Gannett Newspaper Foundation, Inc., has awarded MIT a \$125,500 grant for a three-year educational program to develop technologists in the newspaper business.

The grant was among \$1,576,075 in new grants announced by the foundation, which was established in 1937 by the late founder of the Gannett Group of Newspapers.

The award to MIT is for a program with three components—an MIT/Gannett Foundation Graduate Fellowship Program, a Seminar Series and a major Conference on Newspaper Technology and Journalism.

In proposing the program, MIT scientists and engineers said mod-

ern technologies—computers, digital communications, lasers, video scanners, display tubes, techniques of systems analysis, etc.—are revolutionizing the newspaper publishing business.

They stressed that newspaper companies and their equipment suppliers will have a major and increasing need for engineers and technologists as the use of technology intensifies in the years ahead.

But few young technologists, they said, are seeking careers in the business, primarily because the revolution is so new that few young people even know it exists.

One aim of the Gannett-support-

(Continued on page 12)

## Gene Signal Sequence Determined

MIT scientists have determined the sequence of what they believe to be the control signals for a man-made gene they have built, and are now chemically synthesizing these signals for linking them to the gene. Their achievement marks the first time such a gene with its control signals has been known.

The scientists, led by Nobel laureate Har Gobind Khorana, expect their work to shed light on how gene functioning is controlled in the cell. Although the code by which genetic information is transcribed into working molecules in the cell is well-known, little is known about how this transcription is controlled by the cell.

According to Professor Khorana, the great majority of genetic material is devoted to controlling the functioning of genes. Only a small portion is devoted to actually specifying molecules such as enzymes in the cell.

Professor Khorana and his colleagues announced synthesis of the 126-unit gene last August (1973), and said that work had begun on the start and stop signals by which functioning of the gene is controlled. The man-made gene, "tyrosine transfer RNA gene," is found naturally in *Escherichia coli* (*E. coli*), a bacterium commonly found in the intestines of humans and animals. The gene was the first ever synthesized with the potential for functioning detectably in a living cell.

The MIT scientists made their announcement at the annual meeting of the American Chemical Society in Atlantic City, New Jersey. In a major paper delivered Tuesday afternoon (Sept. 10), Professor Khorana described how he and his colleagues had puzzled out the start and stop signals of the gene.

In an earlier paper Monday (Sept. 9) Professor Khorana's col-

(Continued on page 6)

## Slow Flight Symposiums

This is MIT's week—on each coast—for slow-speed flight.

On the campus, Wednesday through Friday (Sept. 11-13), Kresge Auditorium is headquarters for an international conference on very low speed, motorless flight (sailplanes, hang-gliders, man-powered aircraft, etc.). The meeting, accompanied by a display of some of the craft on Kresge Plaza, is open to MIT faculty, staff and students.

On the West Coast, in Monterey, Calif., MIT's Flight Transportation Laboratory is conducting a week-long workshop, Sept. 9-13, on lighter-than-air vehicles (blimps, dirigibles) and especially their potential as cargo carriers.





Undaunted by 10 days of Residence/Orientation Week activities, MIT freshmen David Loo (left) of Thornwood, N.Y., and Steven Norden of Princeton,

N.J., joined 1033 other newcomers for cotton candy and Dixieland swing at the first annual R/O block party, held Friday, Sept. 6 on Kresge Plaza.

## 382 Pledge Fraternities, 660 Welcomed in Houses

A spirit of celebration returned to MIT this weekend as 382 new fraternity pledges were toasted at Saturday night "special dinners" and some 660 freshmen dormitory students were welcomed with parties at on-campus houses.

Although the number of freshmen accepted into fraternities this year was slightly short of a pledge goal of 393, Kenneth C. Browning, assistant dean for student affairs, termed Residence/Orientation Week activities "very successful from the perspective of student housing."

He said 91 percent of the freshmen received their first choice of dormitory preference. The rate of success in the past has been about 82 percent.

MacGregor House at 450 Memorial Dr. was the most oversubscribed with Burton House and the East Campus houses tied for second. The German/French House, a new cooperative living group located in Ashdown House, was quickly filled to capacity by 22 students who will share language and culture.

Browning reported Monday that

assignment adjustments were being made for a number of freshmen residents of Bexley Hall, who had received their lowest choice in the lottery housing system.

"Although we wouldn't ordinarily direct these students back into an already overcrowded system," Browning said, "we feel committed to making them happy. We will count on late cancellations from upperclassmen to open up spaces for freshmen in preferred dorms."

Browning noted that between 60 and 65 rooms were filled beyond capacity, affecting 160 freshmen. He explained, however, that student/space ratios would improve as the Class of '78 underwent changes and upperclass students changed housing plans.

The Office of Vice President Kenneth R. Wadleigh, which recently issued a letter to faculty and staff seeking residence space for non-freshmen in private homes, reported that reaction to the project was optimistic but not critical. Approximately 20 faculty members and 20 students have signed up for possible pairing.

## New UROP Listings

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

### Welcome Undergraduates!

UROP invites and encourages you to participate with MIT faculty members in a wide range of research activities both on and off campus. The Fall, 1974, UROP Directory is now available in the Information Office, Room 7-111. To get started, first read the How to Participate section of the directory, talk with coordinators and faculty members and check with the UROP office, Room 20B-141, Ext. 3-5049, if you have specific questions. Current project offerings will be listed in this column and on the UROP bulletin board in the main corridor of the Institute.

### Call for Proposals

Undergraduates seeking funding support for research they are undertaking this semester should prepare proposals jointly with faculty members, and submit them to UROP through the faculty member's department coordinator. Requests for items of expense to undertake research will be welcome at any time during the semester. These are termed materials and supplies requests. Wages-related requests can be of three types. In the first type, a faculty member is willing to underwrite the full wages of a UROP student. UROP approval of this proposal will mean that the usual Institute indirect cost levy of approximately 66 percent will not be applied to wages paid to the student. This will be a saving to the faculty member. UROP will not limit the rate or amount of pay a student may receive. The second type of a wages-related request is where a faculty member indicates he will underwrite a part of a student's wages, and the request is that UROP supply the rest. UROP approval of this proposal will mean that the 66 percent indirect cost levy will not be applied to the faculty member's share of the wages. It is our hope that this savings will be given to the student, thus reducing the amount UROP must supply. By this means, UROP funds could be extended to more students and to expanding the summer program. The third form of a wages-related request is when the full amount is asked from UROP. These proposals are treated as special cases and will be negotiated on an individual basis. The first form of proposal is welcome at any time during the semester. The second and third forms of wages requests should be submitted as soon as possible. Responses will be made to these two kinds of wages requests on a first-come, first-serve basis. Decisions will begin to be announced the week of September 30th. Students receiving wages awards from UROP can earn \$2.50 per hour up to a maximum semester amount of \$375.

Department of Nutrition and Food Science—Fractionation and/or Purification of Proteins and Enzymes on a Large Scale Gel Chromatography-Ultrafiltration Sys-

### tem

Gel chromatography and ultrafiltration are widely used in the biochemical laboratory for analytical separations and purification of protein and enzyme solutions, with characterization of sample components the desired goal. In the past year we have constructed an automatic large-scale gel chromatography system which can be utilized for preparative separations. This project would involve evaluation of a combined gel chromatography-ultrafiltration system for preparation of significant amounts of purified enzymes or proteins. Interested students should contact Professor James Flink, Room 16-114B, Ext. 3-6735.

### Dynatech R/D Company

Cambridge, Mass.

Dynatech would like to meet students and faculty co-advisors interested in the following areas: 1) Biocompatible Polymers—A new (ethical) drug delivery system has been developed based on polymers which are slow to release the therapeutic agent. Delivery systems for sustained release through tissue absorbable preparations use implantable cartridges of a tissue-compatible hydrolyzable polymer matrix in which the medicant is dispersed. As the polymer disintegrates through hydrolysis into metabolizable fragments, the physically entrapped drugs are released. For complete information, call or visit Professor Charles Cooney, Room 16-229, Ext. 3-3108, or UROP. 2) Fuel Gas from Solid Waste—Dynatech is carrying out a program to develop a process for fuel gas production from solid waste. The system involves taking municipal solid waste, separating the organic and inorganic fractions, and then converting the organic fraction to fuel gas. The conversion is by anaerobic digestion, a conventional biological fermentation technique. Call or visit UROP, Room 20B-141, Ext. 3-4849.

### Massachusetts General Hospital Boston Role of Hyaluronate in Morphogenesis & Differentiation

A laboratory at Massachusetts General Hospital has offered the following project: Studies completed in the laboratory during the last three years have revealed a striking relationship of hyaluronate turnover with morphogenetic cell movements and subsequent differentiation in the regeneration blastema of the amputated newt limb and in the embryonic chick cornea, brain, limb bud and vertebral preskeleton. These observations led to a hypothesis in which hyaluronate facilitates mesenchymal cell migration but prevents aggregation and consequent differentiation. In a direct test of the latter proposal, hyaluronate, added in nanogram quantities to chick embryo chondroblast culture, was found to inhibit cartilage nodule formation. Thus the strategically timed and localized removal of hyaluronate or reversal of its inhibitory effect on differentiation would allow cell aggregation and differentiation to proceed in the proper sequence for correct tissue organization. The hospital would like a student to help extend their studies of the control of hyaluronate removal in the systems described above. It also would like a student to examine the effect of hyaluronate on cell surface glycosyltransferase and adenylyl cyclase activities. For further information call or visit the UROP office, Room 20B-141, Ext. 3-4849.

### McLean Hospital

Belmont, Mass.

A laboratory at McLean is investigating the neuronal basis of visual behavior in lower vertebrates, specifically fishes and frogs. Project suggestions include the analysis of single-neuron properties in the frog optic tectum and visual thalamus in relation to behavioral studies of visual perception and regeneration capacity in frogs. Additionally, opportunity exists for experimentation directed toward understanding mechanism of drug action using the frog optic tectum as a "model system." One potential project involved recording of neurons during the freely behaving state. For further information please contact the UROP office, Room 20B-141, Ext. 3-4849.

### Eunice Kennedy Shriver Center for Mental Retardation

Waltham, Mass.

B-galactosidase will be isolated from rat liver and rat brain tissue by employing published procedures. This enzyme(s) will be purified by a variety of established techniques, including affinity chromatography, gel filtration and electrofocusing. Optimal conditions for assay of B-galactosidase activity towards both synthetic and naturally occurring substrates will be ascertained. Particular emphasis will be placed on the isoenzymes' specificity and affinity for naturally occurring lipid substrates, such as ganglioside-G<sub>M1</sub>-asialo-G<sub>M1</sub>, lactosylceramide, galactosylceramide (cerebroside) and galactosylsphingosine (psychosine). These studies will aid in further elucidation of the "normal" catalytic role of mammalian B-galactosidase isoenzymes in the catabolism of the above membrane constituents. The results of the proposed experiments may also aid in the interpretation of data derived from diseased human tissues where the inherited biochemical defect is manifested by low tissue levels of B-galactosidase activity resulting in the accumulation of one or more of these glycosphingolipids (e.g. Krabbes' Disease, G<sub>M1</sub>-gangliosidosis and Lactoceramidosis). Please contact the UROP office, Room 20B-141, Ext. 3-4849, for further information.

### Massachusetts Eye and Ear Infirmary

Boston Mass.

Ear Investigation of the Cooling System of the Retina—Throughout every day, visible light and near infra red radiation bombard our retina. Much of this energy is absorbed by the pigment cells which back the retina (pigment epithelial cells, and choroidal melanocytes). However, the generated heat appears to be quickly taken away by the choroidal blood intense light (sun, laser, etc.) a retinal burn is produced. In the population of people over 65, almost 30 percent develop retinal degenerations, which may represent slow chronic burns of the retinas, due to an impaired cooling system. This project is set up to: 1) Define all the parameters involved in heating and cooling retina; 2) Define the relationship of these parameters; 3) Develop ways of measuring these parameters in (a) models, (b) animals, and (c) human patients. This project will require someone strong in physics and engineering, with an interest in application to biological systems. The first one-half to two-thirds of the project will probably be theoretical in nature, and the last portion devoted to designing and perhaps building a mechanical model, with the possibility of going on to living

systems, if time permits. For further information call or visit the UROP office, Room 20B-141, Ext. 3-4849.

### Whirlpool Corporation

Whirlpool in Benton Harbor, Mich., has suggested four possible UROP projects to be pursued on campus. Two of the suggested projects involve new systems for improving the operating efficiency of room air conditioners. The first system uses a secondary fluid for dehumidifying and cooling the air by direct contact. The purpose of the project is first to determine if fluids exist that can be used in the secondary loop, then to evaluate the overall system performance. In the second system, two evaporators operating at two different temperatures and served by a single compressor are used. In a theoretical study, it would be desirable to determine the required operating conditions for each evaporator and the resulting system improvement. The other two projects are open-ended and will tax a student's creative ability rather than analyze an existing concept. They are: 1) The investigation of a new concept for refrigeration to replace a conventional system or simplify it through innovative changes. 2) Each year Whirlpool uses about 12,000,000 solenoids to convert electrical energy to a mechanical movement of 1/8-inch to one inch. A concept is desired that will produce the same net result using a new method of energy conversion. For more information, call or visit the UROP office, Room 20B-141, Ext. 3-4849.

### Department of Nutrition and Food Science—Development of System for Temperature Measurement in a Microwave Cavity—Determination of sample temperatures and heating rates are important in the design of microwave heating systems and processes. Traditional methods for measuring temperature give erroneous readings when used in a microwave energy field. The co-supervisors have an idea for a new approach and this project would involve development of the idea into a working apparatus, and evaluation of the systems capabilities. Some knowledge of electronics would be desirable, though not required. Interested students should contact Professor James Flink, Room 16-114B, Ext. 3-6735.

Computer Systems Division, Bolt Beranek & Newman, Inc. Cambridge, Mass. Using several PDP-10's and other computers, this division has several large R & D programs underway on the forefront of computer technology: 1) Computer/Communications—Computer Network—This division did much of the basic work on ARPA network. 2) Computer Applications in Life Sciences and Medicine—This division works in more than a dozen biomedical projects ranging from computer algorithms to generate 3D models of drug molecules to telephone communication systems for the deaf and/or speechless. 3) Computer Applications for Data Handling—Project possibilities include text editing using storage tube displays, communications between a large time-sharing computer and a remote mini computer-based graphics terminal, and large-scale generalized file-management techniques. 4) Computer Applications in Signal Processing—Projects involve world-wide seismic data handling and handling underwater acoustic array data. Pay or credit

modes available. Easy transportation to Fresh Pond area available. Desire early beginning. For complete information call or visit the UROP office, Room 20B-141, Ext. 3-4849.

## New Subjects

18.425 THEORY OF COMPUTERS (A)  
Prereq: Permission of Instructor

Year: G(1)

3-0-9

This term we shall continue to study algorithmic complexity. The main goal is to provide theoretical guidelines for establishing the inherent complexity of various computational problems. The topics will be chosen according to the interests of the participants and will be based partially on results which have not yet been published formally. The seminar will consist of lectures given by the instructor and other participants. Each student attending the seminar for credit will also be required to give a lecture. (Attendance in this seminar during the spring term of 1974 is not a prerequisite.) The topics will be drawn mainly from the following list:

Algebraic and logical computational complexity: dimensionality and rate of growth arguments; calculation of linear, bilinear, and multilinear forms (matrices, etc.); boolean functions and post algebras; complexity of decision procedures in various logical theories.

Combinatorial computational complexity: set algorithms, graph problems, string pattern matching, sorting and median calculation searching, weighted tree algorithms, flow problems.

21.017 CLASSICAL GREEK I

Prereq: None

Year: U(1)

4-0-8

Study of Attic Greek: grammar, reading and composition. The first term of a two-term sequence will cover the first half of "Ancient Greek: A New Approach" by C.A.P. Ruck, and supplementary readings.

21.018 CLASSICAL GREEK II

Prereq: 21.017 or equivalent

Year: U(2)

4-0-8

Study of Attic Greek: grammar, reading and composition (continued). Ruck's "Ancient Greek: A New Approach" will be completed. Introduction to Epic and Koine Greek. Supplementary readings.

The first meeting will be held on Tuesday, Sept. 10 at 2pm in Room 24-202; course hours will be arranged at that time. For additional information call Professor Kaplan, Ext. 3-3811, or Professor Reiche, Ext. 3-4451.

## Tech Talk

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# Pecknold Named Hockey Coach

An MIT professor of transportation—who has long combined teaching and research with a side career in semi-professional hockey—will spend part of his time this winter outside the classroom as MIT's new varsity hockey coach.

He is Dr. Wayne M. Pecknold of Winchester, Mass., associate professor of civil engineering at MIT and for eight years a defenseman with the Eastern Olympics of Concord, N.H., in the semi-professional New England Hockey League.

Announcement of his appointment as hockey coach was made by Ross H. Smith, MIT director of athletics.

"We are very pleased to have Professor Pecknold join our coaching staff—even though on a part-time basis," Professor Smith said. "He has a rich and extensive background in hockey to bring to our MIT students."

Professor Pecknold, who succeeds Ben Martin, long-time MIT hockey and lacrosse coach who retired in July, coached MIT freshman hockey for two years, 1964-1966, and was assistant varsity coach during the 1966-1967 season.

"I'm very excited by the opportunity to return to coaching," he said. "I've worked with the MIT hockey team before and am looking forward to it again. It's nice to win, but it's most important for the players to enjoy themselves and learn something about hockey—and that's my basic objective this year."

Professor Pecknold started playing hockey in Victoria, B.C., when he was 12, which he says is a late start by Canadian standards. He played minor league hockey for the next five years in Victoria, Vancouver and Quebec and, after high school, he played junior hockey (21 and under) for one year

with the Prince Albert Mintos of the Saskatchewan Junior Hockey League.

The next year, 1959, he was awarded a hockey scholarship at Michigan State University, but after one term discovered he was ineligible because of an "A form" he had signed the year before, putting him on the protected list of the New York Rangers of the National Hockey League and signifying he would attend their training camp.

"The form made me the property of the Rangers," he explained, "and a Big Ten rule prohibits you from playing if you've signed this kind of form."

Signing the form, Professor Pecknold said, "actually changed the course of my life."

"Up to that point," he said, "I had really considered being a professional hockey player. But once I was ruled ineligible for college hockey, all I could do was help out with the MSU freshman team and study. As it turns out, losing my eligibility actually helped me in coming to MIT."

As the result of less hockey and more studying, he was the 1959 MSU recipient of the Tau Beta Pi Award for Outstanding Freshman Engineer.

Although he had given up the idea of professional hockey, he did play professional lacrosse ("box, or indoor, lacrosse as opposed to field lacrosse") in Vancouver during the summers. In a nine-year period from 1957 to 1966, he played for the Vancouver Burrards team, which won the Canadian lacrosse championship (the Mann Cup) three times and the Western Canadian title four or five times.

In 1963, he came to MIT, where he played on intramural and graduate student hockey teams.

For eight years, from 1966 through 1974, he also played defense (and sometimes center) and was captain of the Eastern Olympics of Concord, N.H., in the New England Hockey League.

For three years, Professor Pecknold also served as assistant coach as well as playing defense for the Olympics. In the eight years he was with the team, it won the New England title four times.

Professor Pecknold was selected as a member of the New England all-star team representing the league in the John F. Kennedy Memorial Olympic Games in Lake Placid, N.Y., in February, 1970.

"We played against a Canadian team and the Austrian National team in a three-game round-robin series and just missed winning the tournament," he recalled.

Professor Pecknold received an SB from Michigan State in 1963, an SM from MIT in 1965 and PhD at MIT in 1970. He became an instructor in 1965 and an assistant professor of civil engineering in 1970. He was promoted to associate professor in July, 1974.

At MIT, Professor Pecknold is a member of the Transportation Systems Division of the Department of Civil Engineering and of the Center for Transportation Studies.

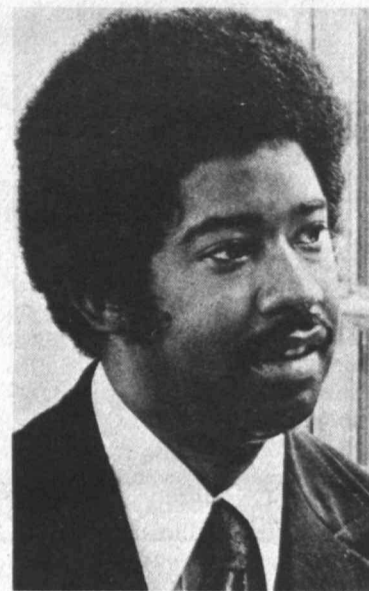
He is presently doing research on statewide multimodal planning and programming for the state departments of transportation in Massachusetts and California. He also, with four others, has recently incorporated a transportation consulting firm, Cambridge Systematics, Inc., which is involved in performing transportation analysis and planning studies.

Professor Pecknold, 34, his wife, Jeannie, their three children, Kristen, 10, Rand, 7, and Brett, 5, and dog, Fluffy, live in Winchester.

# Graduate School Appoints J.B. Turner Assistant Dean

Dr. John B. Turner, a specialist in student personnel administration, has been appointed Assistant Dean for Minority Graduate Students at MIT.

Announcement of the appointment was made by Professor Irwin W. Sizer, dean of the MIT Graduate School. Numbers of minority graduate students at MIT



Dean Turner

have been increasing rapidly in recent years. This year, minority students account for about six percent of MIT's 3,500 graduate students.

Dr. Turner, 32, succeeds Dr. Clarence G. Williams, who has

## Wrong Number

Because of a typing error, HoToGAMIT 6 published the wrong number for calling the time. The correct dormline is 0765, not 9765.

# Bruce Mazlish Appointed Acting Head of Humanities

Dean Harold J. Hanham, Dean of the School of Humanities and Social Science, has announced the appointment of Professor Bruce Mazlish as Acting Head of the Department of Humanities for the academic year 1974-75.

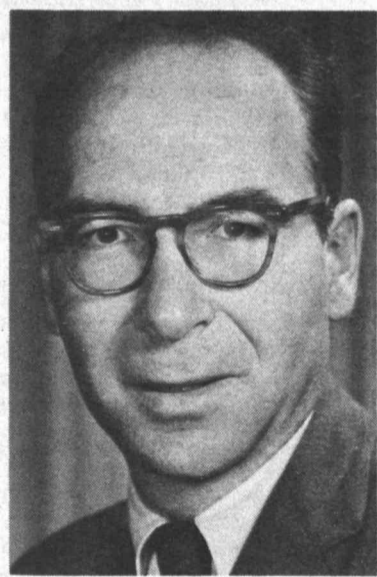
Dean Hanham had been serving as acting head of the department since coming to MIT in the spring of 1973.

Professor Mazlish, who received his PhD from Columbia University, came to MIT in 1950 and has been at the Institute ever since, apart from a two-year break in 1953-55.

He became professor of history in 1965 and was chairman of the history section from 1965-70.

He has served two terms on the Committee on Educational Policy and has also been a member of many other Institute committees.

He spent the academic year 1972-73 at the Institute for Advanced Study at Princeton working on a book on James Mill and John Stuart Mill. He is a member



Professor Mazlish

of the American Academy of Arts and Sciences.

Among his books are *In Search of Nixon, A Psychohistorical Inquiry*, published in 1972; and *The Railroad and the Space Program*, published in 1965.

# 1974 Tuition Assistance Participation Jumps 40%

Nearly 40 percent more persons studied under MIT's Tuition Assistance Plan during the past fiscal year than during fiscal 1973, the Office of Personnel Development has reported.

A total of 577 individuals working on the campus and at Lincoln Laboratory took advantage of the plan, which provides tuition assistance toward job-related or career-oriented courses at MIT and elsewhere, the Office said in its year-end review of the plan for fiscal 1974.

The number studying—577—represents about seven percent of those eligible for tuition assistance, the report said. Participation in the past has ranged as high as 10 percent overall, and 14 percent or more in some categories such as exempt technical personnel.

Explaining how a sizeable increase in the number studying could result in a relatively low percentage of participation, the report said that during the year the number of persons eligible for tuition assistance was considerably expanded. Part-time personnel working at least half time became eligible for pro-rated assistance, and members of the faculty and academic staff not previously eligible are also now included in the plan.

Another change that encouraged participation, the report said, was permitting non-exempt personnel for the first time to receive tuition assistance for daytime study, at the same rate as staff members—one course a semester. Also, persons within five years of retirement can receive assistance toward courses that will prepare

them for retirement activities.

Of special interest, the report said, was the number of women taking part in the program.

"The percentage of those eligible who studied was higher for females in every category except the hourly-paid," it said. "Overall, 12 percent of eligible women participated, as compared with 5 percent of men."

Members of minority groups that took advantage of tuition assistance was about the same proportion as all others—7.8 percent participation for minority groups, as against 7 percent for all personnel.

Among the reasons for the increase in participation and the higher percentage of women in the program, the report said, "would surely be MIT's increased encouragement of career development, especially for women."

These were other highlights of the report:

—On the campus, study by exempt personnel (50) and those paid annually (232) more than doubled, and there were lesser increases in other categories. At Lincoln Laboratory there was little change from the 1973 pattern.

—As in other years, over half of all who studied were pursuing degrees—211 studying toward undergraduate degrees and 107 toward graduate degrees.

—The reimbursement formula has been simplified and is now: for off-campus courses, day or evening, 100 percent of tuition up to a maximum of \$625 in a calendar year; for MIT courses, 75 percent of tuition with no dollar maximum but a limit of one course a semester.

been serving as acting assistant dean since his appointment last January as Special Assistant to the MIT President and Chancellor for Minority Affairs.

Dr. Turner's central concerns will be recruitment of minority graduate students and assessment of minority needs at MIT for the dean of the Graduate School and the various academic departments. He also will provide placement counselling and academic advising.

Dr. Turner has been assistant dean of the freshmen division and director of Project Upward Bound at Indiana University at Bloomington since 1968. He has also served as educational director of the Urban League in Indianapolis, where he designed and administered a summer job-search program for high school and college minority students.

During 1967-68 he was assistant head counselor of a residence hall at IU.

He was a management trainee in engineering and industrial sales with Westinghouse Electric Corp., Chicago, Ill. from 1965 to 1967.

He received the BA degree in 1965 in mathematics from Fisk University, Nashville, Tenn., and while there was an instructor in math.

He received the MS in 1968 in student personnel administration and the EdD in higher education in 1972, both from IU.

He also served a postdoctoral internship in administration in the Chancellor's Office at IU.

Dr. Turner and his wife Cleverone, a psychiatric social worker, live in Lexington with their three daughters.

# Newspaper Debut: 'The Graduate'

Joining the ranks of campus publications this week is *The Graduate*, a newsletter of the Graduate Student Council.

The first issue, an 8½x14-inch single sheet, printed on both sides, will be distributed Thursday, Sept. 12, through Institute mail.

Main purposes of *The Graduate* will be to serve as a clearing house on information relating to graduate students and to present in-depth articles on various aspects of graduate life, according to Hillel Chiel, editor of the new publication.

Final dimensions and frequency of issue of *The Graduate* are yet to be decided, he said, and depend primarily on building a staff and finding funds. Graduate students who would like to work on the paper may sign up at the Graduate Student Council Office, Rm 50-110, Ext. 3-2195.

# R/O Blood Drive Nets 231 Pints

The MIT community donated 231 pints of blood during a two day mini-blood drive, the second Residence/Orientation drive conducted by the Technology Community Association, a student service group.

The total exceeds last year's by 50 pints.

"This drive was more successful because of greater publicity...with many freshmen giving for the first time," according to Susan Strand, a blood drive worker.

An eight day drive, the second of the term, will be held October 30-November 1 and November 4-8. Blood collected in all MIT drives is donated to the Cambridge Chapter of the American Red Cross.

## Roll Card Notice

(The following notice was inadvertently not distributed with roll cards at Registration.)

### Important Notice

A Roll Card should be submitted to the instructor in charge of each subject for which you are registered at your first day of attendance of the subject. Failure to submit a Roll Card is not a legitimate way of dropping registration, however. No registration in any subject will be cancelled by the Registrar unless a properly signed Correction Card is received by Drop Date (November 27, 1974) irrespective of whether a Roll Card has been submitted. After Drop Date subjects can be dropped only by successfully petitioning the Committee on Academic Performance in the case of an undergraduate and the Registrar in the case of a graduate student. In both cases, the petition must be signed by the Student's Faculty Counselor or Registration Officer.



# How to Use the MIT Telephone System

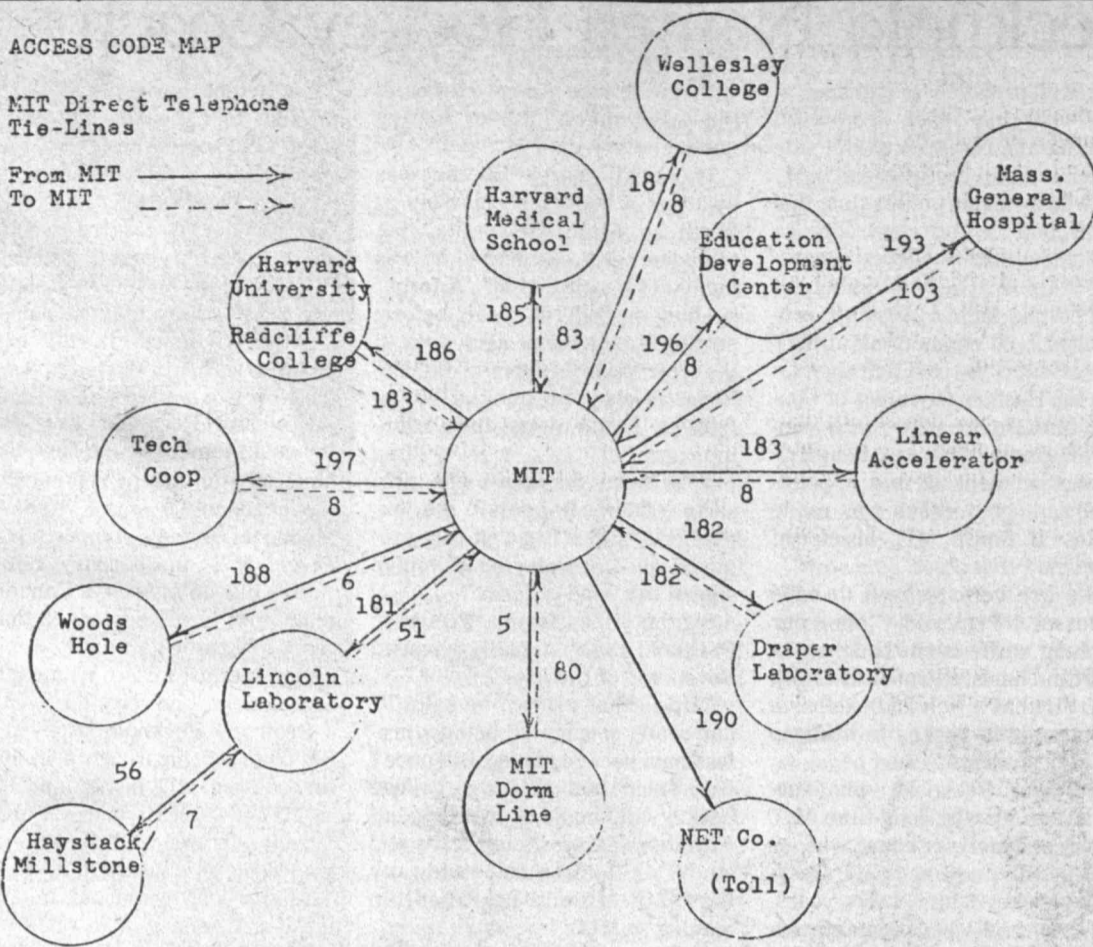
Because there are many people new to the Institute community right now, the Telecommunications Office offers this brief explanation of how the MIT telephone system works, and a map of the tie lines. Additional information is contained in the front of the MIT telephone directory, and a list of tie lines appears on the inside back cover.

| To make calls for:                                     | Dial:            |
|--|------------------|
| Campus telephones                                      | 3 + four digits  |
| Dormitory telephones                                   | 5 + four digits  |
| Local area telephones—<br>from unrestricted telephones | 9 + seven digits |
| Directory assistance                                   |                  |
| Campus—<br>from unrestricted telephones                | 0                |
| Campus—<br>from restricted telephones                  | 3-6000           |
| Local area—<br>from unrestricted telephones            | 9 + 411          |
| Toll calls and credit cards                            | 190              |
| Telephone trouble                                      | 3-3654           |
| Campus Patrol  | 3-2996           |
| Emergency  | 100              |

## ACCESS CODE MAP

MIT Direct Telephone Tie-Lines

From MIT ———→  
To MIT - - - - ->



A field trip to Cambridge City Hall was one of a series of weekly trips made by the children of Tutoring Plus during the summer. Shown above, in the City Council Chamber are, left to right, front row: Sara Moreira, Sandy Moreira, Kerine Royes, Stacy Moran, Andrea Evelyn, Robby Smith, Michelle Moran and Pat Centani, who was their guide. Left to right, back

row: Aiden Evelyn, Mrs. Bernice Spencer of the T+ staff, Leroy Knight, a T+ graduate who served as a Neighborhood Youth Corps aide; Mrs. Virginia Williams, administrator of T+, Cambridge Mayor Walter J. Sullivan, and Paul Chu, MIT work-study aide for T+

## 30 Sign up as Tutoring Plus Volunteers

More than 30 freshmen signed up as volunteers for Tutoring Plus at the Activities Midway last week, "a most encouraging sign," according to Mrs. Virginia Williams, administrator of the program.

Tutoring Plus, the flagship of the MIT Community Service Fund, is a neighborhood agency which matches volunteer tutors with children on a one-to-one basis. Now in its 11th year, it has had a major impact on the educational outlook of the children of Area 4.

"We always need more volunteers," she said. "We usually have about 50 from MIT, including both employees and students, but we can use more because there is a waiting list of children wanting tutors."

Also high on the list of needs at Tutoring Plus this year is a piano. "We can't afford one, so we are looking for a donation," Mrs. Williams said. "We could pay moving expenses, but nothing more."

A sewing machine would also be gratefully received, along with scraps of fabric. "The kids would love to learn how to sew," she said. "We've written to sewing machine companies, but without success so far."

"In fact, we could use lots of things many people throw away," Mrs. Williams said. "Things like

baby food jars, egg cartons and pieces of wood provide great opportunities for the kids to exercise their creative energy."

Persons who would like to volunteer time or materials may call Mrs. Williams at 547-7670 or 547-4681.

## Whitesides Wins ACS Award

Professor George M. Whitesides of the Department of Chemistry at MIT has been named the 1975 winner of the American Chemical Society Award in Pure Chemistry, sponsored by the Alpha Chi Sigma Fraternity.



Whitesides

Dr. Whitesides will be presented the award for \$2,000 at the Society's 168th national meeting in Philadelphia next April.

The award, given to scholars under 36 years of age, recognizes Dr. Whitesides' pioneering research in several areas of organic and inorganic chemistry, including organometallic compounds, magnetic resonance spectroscopy and the chemistry of metal hydrides. Most recently Dr. Whitesides has focused on enzyme technology, using enzymes to synthesize organic and biological compounds which previously had been difficult to produce.

Since his appointment to the

MIT faculty as assistant professor of chemistry 11 years ago, Dr. Whitesides has published more than 50 professional scientific papers. He became associate professor in 1968 and professor in 1971.

A native of Louisville, Ky., he received the SB degree from Harvard University in 1960 and the PhD degree from the California Institute of Technology in 1963. He is a member of the American Chemical Society, the American Physical Society and the Chemical Society of London.

## AWS to Hear Mary Rowe

Dr. Mary P. Rowe, Special Assistant to the President and Chancellor for Women and Work will present an informal talk and discussion on "Determinants of Success of Women in Science and Engineering," sponsored by the Association for Women Students Monday, Sept. 16, at 4pm in the Cheney Room (3-310). Men and women are welcome. Refreshments will be served.

## School Begins at Children's Center Nursery School

Among those starting school Tuesday (Sept. 10) at MIT were some 50 children between the ages of 2½ and 5, who entered a world of unsuspected wonders in the Technology Children's Center Nursery School.

The 34-week session, held in the Eastgate and Westgate apartment complexes, offers classes two, three, or five days a week. Younger children attend as few as six hours a week while older students attend up to 20 hours a week.

Frances Olsen, TCC Director, said applications are still being accepted for a Monday-Wednesday-Friday group (3¼-4½ years) and a Tuesday-Thursday group (2¾-3½ years), mornings from 9-12, both located in Westgate.

Openings are also available in a group for children between the ages of 2¾ and 4½ years, which will meet in Eastgate from 9-1pm Tuesdays and Thursdays.

Carmenza Fonstad is parent chairperson of this year's cooperative nursery program, which requests all parents to assist in the classroom, in frequent parent-teacher conferences and in occasional clean-up work. She is the wife of Clifton G. Fonstad, Jr., assistant professor of electrical engineering.

Since the school's founding in 1963, parents have traditionally arranged their own hours for helping and their own replacements when absent. Each class of 15 or 20 children has a head teacher and at least two assistant or student teachers from nearby colleges and MIT.

"The nursery school has been undersubscribed by the MIT community in recent years," Ms. Olsen said, "but increasing interest on the part of our Cambridge neighbors has encouraged us to expand our admissions outside the campus community. One

factor that makes this school unique is the international make-up of the classes. Children of graduate students from Japan, Taiwan, Korea and Norway come here to learn English, but there is no question that the American children are beneficiaries as well."

Technology Children's Center administers both the nursery school and a full day care center for children of parents who work or study full-time in the MIT community. Information on both of these is available through MIT's Child Care Center, Margaret Sand, director, Rm E19-220.

The staff of the nursery school works closely with the MIT Pediatric Unit, Social Service Department and the Cambridge Guidance Center.

Parents who will be assisting with maintenance and repair of play equipment are Michael and Nancy Heinemann. He is a graduate student in life sciences-nutrition. Robert J. Hannemann, a graduate student in mechanical engineering and a resident of Eastgate, will serve as general treasurer of the nursery school this year.

## Activities Begin In Lobby 7

Regular weekly events in the Building 7 lobby will get underway in dramatic silence with two noon hour programs by members of the National Mime Theatre, Wednesday, Sept. 18 and Thursday, Sept. 19.

The troupe will perform two classical mimeworks and conclude with a mime technique demonstration drawing on audience participation.

Organized a year ago under the direction of the well-known mime actor Kenyon Martin, the company has recently completed a six-week summer engagement at Lesley College in Cambridge.

Upcoming programs planned by Suzanne Weinberg, Lobby 7 coordinator, include return concerts by the Wellesley College Madrigal Singers, Wednesday, Sept. 25 and Marie Rhines, violinist.

Sponsored by the Lobby 7 Committee, the weekly events include exhibitions and a broad variety of performances. The public is invited, free of charge.

## Fulbright-Hays Award to Cornell

Dr. C. Allin Cornell, of Cambridge, professor of civil engineering, was recently selected for a Fulbright-Hays award by the Board of Foreign Scholarships and the US Department of State.

The award will support his research and consultation in Portugal in structural safety theory and application.



## Three Join Staff of Technology Review

Three appointments to the staff of *Technology Review*, two of them completing that magazine's first Board of Editors, have been announced by Donald P. Severance and John I. Mattill, Publisher and Editor, respectively, of the magazine.

The new appointments are:

Dennis L. Meredith of Arlington, formerly Assistant Director of the MIT News Office, is now Managing Editor of *Technology Review*.

Kathleen B. Sayre of Cambridge has been promoted to the Institute staff as Production Manager of the *Review*.

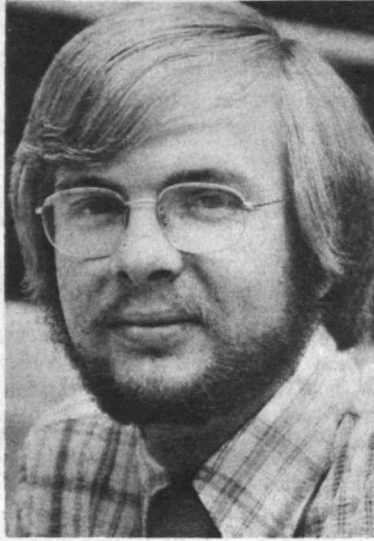
Christine C. Santos of Brighton, who graduated from Wellesley College in June, has joined the *Review* as Assistant Editor.

Mr. Meredith and Ms. Santos will join Mr. Mattill, Michael D. Feirtag, and Sara Jane Neustadt

professional journal in science, engineering, architecture, and management and their implications; it is a project of the MIT Alumni Association, of which Mr. Severance is Executive Vice President. The *Review's* circulation includes more than 35,000 MIT alumni as well as over 17,000 "paid" subscribers—the largest distribution in the magazine's 75-year history.

*Technology Review* was recognized by the American Alumni Council earlier this summer by its Stewart Award for "outstanding service rendered to institutions or to the cause of education by organized alumni effort."

A native of Groves, Texas, Mr. Meredith studied chemistry at the University of Texas (BS 1968) and biochemistry and science writing at the University of Wisconsin (MS 1970). He joined the MIT News



Mr. Meredith

his master's degree.

Mr. Meredith is co-author (with psychologist Henry Biller) of *Fathers and Children*, to be published early next year by David McKay Co. He holds a Westinghouse Science Writing Award from the American Association for the Advancement of Science and a Certificate of Special Recognition from the Atomic Industrial Forum for "Nuclear Power Plant Siting: a Handbook for the Layman," written in 1972 at the University of Rhode Island. He is a member of the National Association of Science Writers.

A native of Rochester, N.Y., Ms. Sayre came to *Technology Review* in 1969 to help prepare the reports of Class Secretaries for publication in the "Class News" section of the magazine. She studied French at Rosary Hill College, Buffalo (BA 1968), and at the Sorbonne in Paris (MA 1969). Ms. Sayre became Assistant Editor in charge of the "Class News" material in 1971, and she has been Production Manager since 1972.

Ms. Santos studied at MIT as a special student in 1973-74 and during a portion of that year served as teaching assistant in the Department of Humanities. Her major fields at Wellesley were music and English; she wrote music criticism as well as sports news for student publications at both Wellesley and MIT, and after the 1974 season she was awarded an MIT varsity letter as coxswain of the women's crew.



Ms. Santos, left, and Ms. Sayre

Photo by Calvin Campbell

as members of the Board of Editors, sharing responsibility for the magazine's coverage of new developments in science and engineering and its reporting of MIT affairs.

*Technology Review* is a national

Office in 1973 after three years as Science Editor at the University of Rhode Island and two years of science writing experience in the University of Wisconsin's University-Industry Research Program and Medical Center while earning

## Obituaries

### James G. Cronin

James G. Cronin, 61, of Roslindale, an administrative assistant in the Comptroller's Accounting Office and chairman of the credit committee of the MIT Employees' Federal Credit Union, died Sunday, September 8.

Mr. Cronin first came to the Institute in 1943. He was formerly associated with the Naval Radar Training School and later the Dynamic Analysis and Control Laboratory prior to joining the Accounting Office.

An active member of the MIT Credit Union for the past 17 years, Mr. Cronin became chairman of credit committee in 1961. He was also a member of the Quarter Century Club.

He leaves his wife, A. Edna, four sons, James G. Jr., of Randolph, Robert J. of Roslindale, Paul K. of Canton and William D. of Norwood, a daughter, Elaine M. of Roslindale, and 11 grandchildren.

### Harold F. MacNeil

Harold F. MacNeil, 67, of Watertown, who retired as an electrician at Lincoln Laboratory in 1972, died Monday, August 26.

Mr. MacNeil, who had worked at the Laboratory for 20 years, is survived by two daughters, Mrs. Elizabeth Guerra of Medford, Mrs. Mary L. McDonald of Watertown and, and a son, Dr. Daniel J. MacNeil of Orinda, California.

## Innovation Center Exposition

A wide band electric guitar, a programmable record turntable, and a heating-venting air conditioning (HVAC) controller system are some of the student projects to be displayed at an Innovation Center Exposition Thursday, Sept. 12, in the Marlar Faculty Lounge (37-252) from 2-5pm.

Professor Yao T. Li, of the Department of Aeronautics and Astronautics, is director of the Center, which was organized a year ago to provide students with inventing and entrepreneurial experience connected with various functions of industry.

The MIT Innovation Program, one of three in the country, was funded last August by a \$1.125 million grant from the National Science Foundation to encourage the development of socially relevant products from conceptual stage through pilot production.

The projects scheduled for the exposition are also supported by the Innovation Co-op, the Center's product development laboratory, administered by Lamar Washington, general manager.

Refreshments will be served at the afternoon exposition.



Philip Doucet, MIT '74, a student in the Sloan School of Management, displays heating-venting air conditioning controller system he co-invented with John Reese, also a 1974 electrical engineering graduate. The system will be exhibited at Innovation Center Exposition Thursday, Sept. 12 in the Marlar Faculty Lounge (37-252) from 2-5pm.

## Dr. Louis Menand Named To Dual Appointment

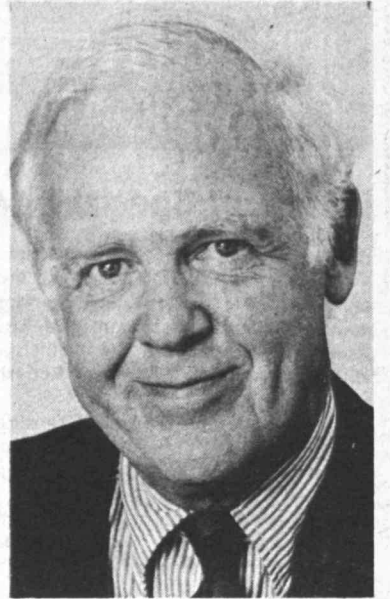
Dr. Louis Menand, III, Assistant to the Provost at MIT, has been promoted to Senior Lecturer in the Department of Political Science and will become Special Assistant to the Provost. This new dual appointment is effective September 1, according to an announcement made jointly by Professor Myron Weiner, head of the department, and by Professor Walter A. Rosenblith, Provost.

Dr. Menand, who has been associated with the department and the Office of the Provost since he came to MIT in 1968, will continue, in his new appointment, to have responsibilities in both places.

In the Department of Political Science, he will continue his teaching in the fields of American politics and constitutional law. His teaching will include a subject, *The Supreme Court and Constitutional Processes*, which he developed and which was offered for the first time in the department last year. In addition to his teaching duties, he will work on the department's undergraduate program under a new departmental organization which has been established by Professor Weiner.

In his role as Special Assistant to the Provost, Dr. Menand will be concerned with undergraduate fieldwork programs, with related academic programs, with Institute-wide activities in environmental education, and will continue to serve as chairman of a group that authorizes the use of MIT facilities by outside organizations. In addition, he will undertake spe-

cific projects for the Provost and for the Dean of the School of Humanities and Social Sciences at MIT.



Dr. Menand

Dr. Menand, who is a specialist in undergraduate education, has had an extensive career in both teaching and college and university administration; he came to MIT from Educational Associates, Inc., Washington, D.C., a private educational consulting group which organized and directed the nationwide Upward Bound program that prepares disadvantaged high school students for college.

At MIT, he has been responsible for several of the Institute's community educational programs, particularly those carried out as public service by MIT students, and for the development of new undergraduate educational and extracurricular activities.

Dr. Menand came to MIT as Assistant to the Provost, Executive Officer of the Department of Political Science, and Director of Upward Bound. He has been chairman of the law-related studies committee, is a member of the ROTC Committee, and is secretary of the Interdisciplinary Environmental Council. He serves with the Pre-Professional Advisory Committee and with the Committee on Curricula.

His activities in university-community relations include work related to the President's Fund for Community Affairs, to Upward Bound, and to the Lowell Institute School, and he has been involved in minority affairs through his work with the Equal Opportunity Committee and the Technical Training Committee, of which he was chairman.

In teaching, he has conducted a graduate seminar in the Politics of Urban Education and teaches an undergraduate subject, *The American Political Process*, in addition to the new subject on the Supreme Court.

Dr. Menand holds a bachelor's degree in political science from Middlebury College and the PhD degree from the Maxwell School of Public Administration of Syracuse University. He was a member of the faculty of the Department of Government at Vassar College and at Dartmouth. He became Dean of Bradford College in 1956 and during his ten years in that position he served on the Board of Collegiate Authority and the Higher Educational Facilities Commission of the Commonwealth of Massachusetts.

A resident of Lexington, Dr. Menand is a native of Menands, N.Y., a town named for his great grandfather.

## Music Clubs Open Season

MIT's thriving music organizations get the downbeat this week for the 1974-75 academic year. First meetings and rehearsals are scheduled as follows:

MIT Symphony Orchestra (Professor David M. Epstein, director)—First meeting held Tuesday, Sept. 10. Additional meetings at 7:30pm today, Wednesday, Sept. 11 and Thursday, Sept. 12 in Rehearsal Room A, Kresge Auditorium.

MIT Concert Band (John D. Corley Jr., director)—First meeting held Monday, Sept. 9. First rehearsal from 8-10:30pm today, Wednesday, Sept. 11, Kresge Auditorium.

MIT Festival Jazz Band (Herbert H. Pomeroy, director)—First meeting from 5-8pm Sunday, Sept. 15, Rehearsal Room A, Kresge Auditorium.

MIT Concert Jazz Band (Paul Husby)—First meeting from 10am-1pm Sunday, Sept. 15, Rehearsal Room A, Kresge Auditorium.

MIT Chamber Music Society (Professor Marcus Thompson)—First meetings at 7:30pm today, Wednesday, Sept. 11, Rehearsal Room B, Kresge Auditorium and at the same time and place on Monday, Sept. 16.

Glee Club (John Oliver, director)—First meeting held Tuesday, Sept. 10. Additional meetings from 5-6:30pm today, Wednesday, Sept. 11 and Thursday, Sept. 12, Rehearsal Room B, Kresge Auditorium.

Scola Cantorum (William M. Brainard, president)—First meeting held Sept. 10.

MIT Choral Society (John Oliver, director)—First meeting at 7:30pm Thursday, Sept. 12, Rehearsal Room B, Kresge Auditorium.

Gospel Choir (Ricardo Hall)—First meeting at 4pm Sept. 15, Student Center, Room 407.



# THE INSTITUTE CALENDAR

September 11 through September 22

## Events of Special Interest

**AIAA/MIT/SSA Second International Symposium on the Science and Technology of Low-Speed and Motorless Flight\*** - Three-day technical conference and sailplane display sponsored by Aero/Astro and MIT Soaring Association. Wed, Sept 11-Fri, Sept 15, 9am-5pm, Kresge (conference) and Rockwell Cage (display). Tickets available at door, free to staff & students. Refreshments.

**Innovation Center Project Exposition\*\*** - Student projects recognized for their inventiveness and industrial entrepreneurship will be on display Thurs, Sept 12, 2-5pm, Rm 37-252.

**Technology and Culture Seminar Series: Merit and Equality in a Just Society. Science, Social Mythology and the Nature-Nature Controversy\*** - Stephan L. Chorover, psychology. Thurs, Sept 19, 4pm, Rm 10-250.

## Seminars and Lectures

### Wednesday, September 11

**A Study of Wall Rewet and Heat Transfer in Dispersed Vertical Flow\*** - O.C. Iloeje, G. Mechanical Engineering Doctoral Thesis Presentation. 12n, Rm 1-134.

**Collocation Methods for Reactor Physics Problems** - John Mason, G. Nuclear Engineering Doctoral Seminar. 3pm, Rm NW13-205.

**Evaluation of the Heat Transfer Performance of Three Enhanced Surfaces** (including an enhanced surface heat exchanger performance comparison method)\* - William M. Mack, Jr. G. Mechanical Engineering Doctoral Thesis Presentation. 3:30pm, Rm 1-146.

**Fuel Element Thermal-Hydraulic Investigations for a Gas Cooled Fast Reactor** - Thomas E. Eaton, G. Nuclear Engineering Doctoral Seminar. 4pm, NW13-205.

### Thursday, September 12

**Effects of Surface Conditions on Nucleation and Boiling Characteristics\*** - Avtar Singh, G. Mechanical Engineering Doctoral Thesis Presentation. 10am, Rm 5-234.

**Some Problems of Non-Linear Oscillations\*** - Professor Dr. K.V. Frolov, Institute of Mechanical Sciences, Moscow. Interdepartmental Acoustics Seminar. 4pm, Rm 5-134. Coffee 3:30pm, Rm 1-114.

**Nucleation and Metastable States: an Introduction and Some Recent Computer Simulations\*** - Dr. K. Binder, Bell Telephone Labs. Materials Science Colloquium. 4pm, Rm 13-2143.

**Level-and Line-Crossing Spectroscopy** - E. H. W. Hanle, Physical Institute, University of Giessen, West Germany. Physics Colloquium. 4:15pm, Rm 26-100. Refreshments 3:45pm, Rm 26-110.

### Friday, September 13

**Heating of Tokamak Plasma by Modified Alfvén Wave\*** - Dr. A. Hasegawa, Bell Laboratory. Plasma Dynamics Seminar. 4pm, Rm 36-428.

**Ferromagnetism in a Dipolar Ising Magnet\*** - Dr. Jens Als-Nielsen, Brookhaven National Laboratories. Materials Science Colloquium. 4pm, Rm 3-270. Coffee 3:30pm.

### Monday, September 16

**Nuclear Engineering at MIT-Welcome to Students by the Department Head** - E.A. Mason, chairman. Nuclear Engineering ANS Seminar. 3pm, Rm NW12-222.

**A Conceptual Model of an Unsaturated Porous Medium\*\*** - John Wilson, civil engineering. Civil Engineering Water Resources & Hydrodynamics Seminar. 4pm, Rm 48-319. Coffee 3:30pm, Rm 48-410.

**Decomposition of a Graph Realizing a Degree Sequence into Disjoint Spanning Trees\*** - Da Lun Wang, mathematics. Applied Mathematics Colloquium. 4pm, Rm 2-338. Coffee 3:30pm, Rm 2-349.

### Tuesday, September 17

**MIT PDP 11 Users Group\*\*** - Meeting 2:30pm, Rm 13-5002. Coffee 2pm.

**Lysis of Yeast Cell-Walls by Bacterial B-Glucanases\*** - Dr. Frank Rombouts, food science and technology, Agricultural University of Wageningen, the Netherlands. Nutrition & Food Science Microbiology & Biochemical Engineering Seminar. 4pm, Rm 16-310.

**A Visit to the Republic of China\*** - Sir William Hawthorne, Churchill College, Cambridge University, England. Aero/Astro General Seminar. 4pm, Rm 35-225. Coffee 3:30pm, Rm 33-411.

### Thursday, September 19

**Reversible Processes that Do Not Obey the Liouville Equation\*** - Dr. George N. Hatsopoulos, senior lecturer; president, Thermo Electron Corporation. Mechanical Engineering Thermodynamics Seminar. 4:10pm, Rm 3-343. Coffee 4pm.

**Neutrino Physics with the 12' ANL Bubble Chamber** - Dr. Malcolm Derrick, Argonne National Laboratory. Physics Colloquium. 4:15pm, Rm 26-100. Refreshments 3:45pm, Rm 26-110.

### Friday, September 20

**Ultrafiltration of Biological Macromolecules\*** - V. Vilker, G. Chemical Engineering Doctoral Thesis Seminar. 2pm, Rm 10-105.

**Packed Bed Melter Condenser\*** - B. Sifleet, G. Chemical Engineering Doctoral Thesis Seminar. 3pm, Rm 10-105.

## Community Meetings

**Student Art Association** - Registration for workshops Wed, Sept 11-Fri, Sept 13, 1-5pm, Stu Ctr Rm 429; also Thurs, Sept 12, 7:30-9pm, when director Mimi Luft will be there to answer questions. Classes begin week of Sept. 16.

**Preprofessional Advising and Education Office** - Announces an important meeting for interested education students: Wed, Sept 11, 5pm, Rm 24-121. Info, Rm 10-186, x3-4158.

**MIT Club of Boston\*** - Luncheon meeting with John J. Buckley, Middlesex County Sheriff. Thurs, Sept 12, 12:15pm-1:30pm, Aquarium Restaurant, Boston. Reservations, x3-3878.

**Science Library Tours\*\*** - Including an introduction to the important science reference tools. Mon, Sept 16, 3:15pm, Rm 14S-100.

**English Conversation Classes for Foreign Wives\*\*** - Beginner, intermediate and advanced classes, sponsored by Technology Matrons. Registration Tues, Sept 17, 10am-12n, Rm 10-340. Classes will meet Tues and Thurs 9:30-11:15am, for 18 sessions. Fee: \$20, babysitting \$5/family. Mrs. J. Reintjes, 484-3595; Mary Pinson, x3-3656.

**Baha'i Discussion Group\*** - Slides of the Baha'i World Center and holy places in Haifa, Israel; with Emily Kramer of Brookline, speaker. Thurs, Sept 19, 7:30pm, Rm 8-105. Refreshments. Dale, 734-0648.

## MIT Club Notes and Meetings

**Bridge Club\*** - ACBL Duplicate Bridge. Matchpoint pairs Thurs 7-10:30pm; non-masters (less than 20 master points) Fri, 10pm-12m; IMP-scored team-of-4 (advance registration required) starts Fri, Sept 12; all Stu Ctr Rm 473. Club Tournament Open Pairs Thurs, Sept 19, 7pm. Jeff, 864-5571.

**MIT/DL Bridge Club\*\*** - ACBL Duplicate Bridge. Tues, 6pm, Stu Ctr Rm 473.

**Chess Club\*\*** - Organizational meeting Sat, Sept 14, 2-5pm, Stu Ctr Rm 473. Freshmen especially welcome.

**Chinese Choral Society\*\*** - Singing Sun, 3pm, Stu Ctr Rm 473.

**Goju Karate Club\*** - Beginners enter class first week of each month. Classes Mon, Wed, 7-9pm; Fri, 7-10pm; Stu Ctr Rm 491. Terry Gibbs, 440-8631.

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

**Israeli Student Club** - Lectures Tues, 8pm, Stu Ctr Mezzanine Lge

**MIT Kung Fu Club\*\*** - Instruction in the art of Chinese boxing Northern Praying Mantis style. Tues, Thurs, 7pm, Stu Ctr Rm 407

**LSC** - Membership meetings Wed, Sept 11, 8-10pm Stu Ctr Lge.

**MIT Outing Club\*** - Mon & Thurs, 5-6pm, Stu Ctr Rm 461.

**MIT Rocket Society\*\*** - General meeting Mon, Sept 16, 7pm, Rm 50-320. A special invitation is extended to all freshmen and new graduate students.

**RUKU\*** - Russian, Slavic and Soviet Cultural Society organizational meeting. Mon, Sept 16, 8pm. Call x8549 Dorm or 494-8138 or watch posters for Rm.

**MIT Soaring Association\*** - First meeting of the year. Thurs, Sept 19, 7:30pm, Stu Ctr West Lge. Film and donuts.

**Strategic Games Society\*** - Offers opponents and discounts on merchandise to members plus gaming and periodical library. Sat 1pm-1am, Walker Rm 318. Info, Kevin Slimak, 868-5203; Robert

# Control Signal Sequence for Man-made Gene Determined

(Continued from page 1)

league, Dr. Ramamoorthy Belagaje, described current efforts to synthesize the signals and attach them to the group's man-made gene. He said that the stop signal had been built and was in the process of being attached, and that the start signal was nearing completion.

Besides Professor Khorana, co-authors of Dr. Belagaje's paper were Robert G. Lees, Dennis G. Kleid, Michael J. Gait and Kjeld E. Norris.

The MIT scientists will now examine whether the start and stop signals—which they have determined—contain all the information necessary for the cell machinery to transcribe this gene and thus utilize its information in cellular processes.

Perhaps within the next year the scientists will build the entire gene, with its control signals, and examine its function in a test tube. Still later they hope to introduce the gene into a living bacterial cell to test whether it will work.

To probe how the start and stop signals function on the completed gene, the MIT scientists will substitute different bases at various points of the start and stop signals in the gene and study how these changes affect transcription.

### Background of the Gene

The gene is the basic unit of all heredity. It consists primarily of a long, double-stranded molecule of deoxyribonucleic acid (DNA). The

two strands twist into a double helix, often described as resembling a spiral staircase.

The individual units of DNA are called nucleotides. The most commonly found nucleotides are adenine, thymine, guanine and cytosine—abbreviated "A," "T," "G" and "C."

In the double-stranded DNA molecule, each adenine on one strand pairs with a thymine on the other strand, and each cytosine on one strand pairs with a guanine on the other strand. One nucleotide is, thus, complementary to the other—naturally bonded to it because of its mutually attractive chemical form.

This complementary pairing of nucleotides (and, thus, DNA strands) is extremely valuable for biologists building genes and determining their sequences.

When information from the genes is to be transmitted into functioning protein molecules in the cell, special enzymes begin transcribing information by building a complementary strand of ribonucleic acid (RNA) along one strand of the DNA.

Like DNA, RNA consists of a string of nucleotides, each of which pairs with a nucleotide on the DNA strand. When the enzymes have completed their synthesis of the strand of RNA, the RNA strand breaks from the DNA and is used to synthesize protein molecules.

There are three types of RNA synthesized on DNA strands.

One type, called messenger RNA, represents the cell's method

of translating information from the gene into proteins. These proteins will be the workers of the cells, chiefly as enzymes which aid the cell's chemical reactions.

Another kind of RNA is ribosomal RNA. This RNA folds up after leaving the gene, to form ribosomes. These ribosomes provide a "holder" which messenger RNA uses to translate its information into protein.

But some method is needed to grab amino acids, the building blocks of proteins, and carry them to the ribosomes, where they can be incorporated into proteins specified by messenger RNA. This is the function of the third kind of RNA—transfer RNA.

Professor Khorana and his colleagues have synthesized the gene that codes for a particular kind of transfer RNA—the kind that grabs the amino acid tyrosine, brings it

to the ribosome, and allows it to be incorporated into a protein. Hence, the name of their gene is the "tyrosine transfer RNA gene."

The enzyme which synthesizes RNA on a DNA is governed by start and stop signals consisting of additional sequences of nucleotides at either end of the gene.

The start signal for the tyrosine transfer RNA gene, as determined by the MIT scientists, consists of 29 nucleotides. Particularly interesting to the scientists are the regions of symmetry, in which a number of bases in one part of the strand are complementary to another group of bases, read backward, farther down the strand.

For instance, one region of the start signal has the sequence TCAT, while further down the strand, reading backwards, is the complementary sequence AGTA.

Professor Khorana and his col-

leagues theorize that this indicates that the start signal may fold in some three-dimensional manner to offer a recognizable shape to the transcription enzyme (see Fig. 1). Similar, though less extensive elements of symmetry were found in the 22-unit stop signal.

### History of the Gene Synthesis

Professor Khorana and his colleagues began work on the tyrosine transfer RNA gene seven years ago, while still at the University of Wisconsin, Madison. In 1970 Professor Khorana announced synthesis of the first artificial gene, the gene for alanine transfer RNA from yeast. By construction of this gene, Professor Khorana proved that chemical and enzymatic techniques could be applied to such syntheses.

The 77-unit gene, however, could not be used for further studies, because its functioning in a living

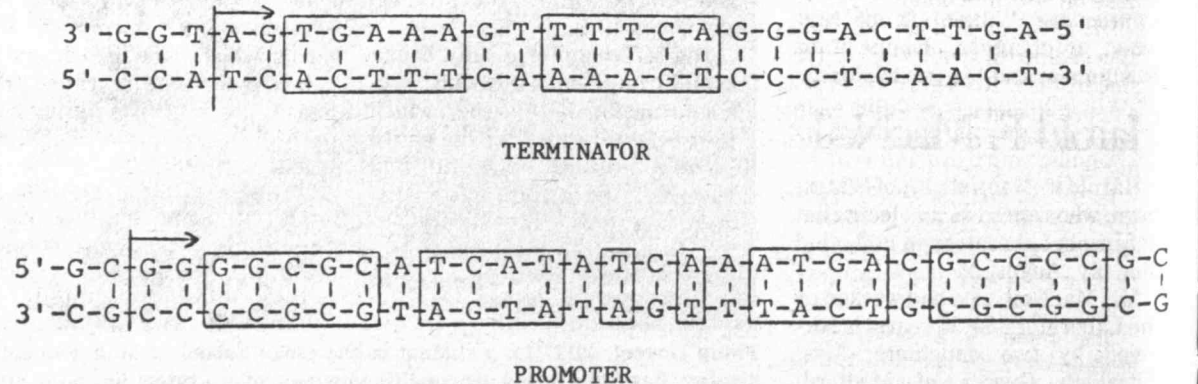


Figure 1: Nucleotide sequence of the Terminator (top) and Promoter (bottom) regions of tyrosine transfer RNA Gene showing elements of symmetry.



Sacks, 494-8889.

**Student Information Processing Board\*** - Freshmen especially welcome. Mon, 7:30pm, Rm 39-200.

**Technique\*\*** - MIT's yearbook welcomes writers, photographers and hackers. Sat, Stu Ctr Rm 451. Info, x3-2980.

**Tiddlywinks Association\*\*** - Meetings Wed, 8-11:30pm, Stu Ctr Rm 473.

**Volleyball Club\*\*** - High level instructional program designed to form intercollegiate and AAU teams in November. Sun, 2-4pm, court 3, duPont Armory.

**Waltz Workshop\*** - MIT Ballroom Dancing Club. Learn to Waltz, regardless of your level of experience. Sun, Sept 15, 2-5pm, Sala. Info, Carl Sharon, 536-1300.

## Social Events

**An Evening of Ballroom Dancing\*** - Sponsored by the MIT Ballroom Dancing Club, for anyone who likes to dance. Fri, Sept 20, 7-11pm, Sala. Semi-formal dress. Admission \$1.50, \$2.50/couples. Info, Carl Sharon or Pete Travis, 536-1300.

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

## Movies

**Romeo & Juliet\*** - Humanities Film. Wed, Sept 11, 7pm, Rm 14N-0615. Free.

**Paper Chase \*\*** - LSC. Fri, Sept 13, 7 & 9:30pm, Kresge. Admission 50 cents, ID required.

**Port of Call (Bergman)** - Fri, Sept 13, 7:30 & 9:30pm, Rm 6-120. Admission \$1.

**Catch 22\*\*** - LSC. Sat, Sept 14, 7 & 10pm, Kresge. Admission 50 cents, ID required.

**Devar\*** - Sangam. Indian movie with subtitles. Sun, Sept 15, 3:30pm, Rm 26-100. Admission 50 cents with ID. Info, x9835 Dorm. Indian refreshments.

**Those Magnificent Men in Their Flying Machines** - LSC. Sun, Sept 15, 3:30 & 7pm, Rm 10-250. Admission 50 cents.

**Because of Love; The Eunuch\*** - Chinese Students Club. With English subtitles. Sun, Sept 15, 2pm, 4pm, Kresge. Admission \$2 adults, \$1 members & children.

**Monkeys of Mysore\*** - Humanities Film on baboon behavior. Thurs, Sept 19, 4:30 & 7:30pm, Rm 14N-0615. Free.

**Monkey Business & Horsefeathers\*\*** - LSC. Fri, Sept 20, 7 & 10pm, Kresge. Admission 50 cents. ID required.

**Zorba the Greek (Cacoyannis)** - Film Society. Fri, Sept 20, 7:30 & 9:30pm, Rm 6-120. Admission \$1.

**Mary Poppins\*\*** - LSC. Sat, Sept 21, 1, 4, 7 & 10pm, Kresge. Adults must be accompanied by a child to attend 1 & 4pm performances. Admission 50 cents, ID required.

**The Court Jester** - LSC. Sun, Sept 22, 3:30 & 7pm, Rm 10-250. Admission 50 cents.

**Deedar\*** - Sangam. Indian movie with English subtitles. Sun, Sept 22, 3:30pm, Rm 26-100. Admission 50 cents with ID. Refreshments. Info, x9835 Dorm.

## Theatre and Shows

**You're A Good Man, Charlie Brown\*** - Presented by Musical Theatre Guild. Sat, Sept 14, 8pm; Sun, Sept 15, 4pm; Kresge Little. Admission \$1.50 at door.

**The National Mime Theatre\*** - First of this year's Lobby 7 Events. Wed & Thurs, Sept 18 & 19, 12n, Lobby 7. Two mimeworks concluded with a technique demonstration which will draw on audience participation.

## Dance

**Folkdancing - International:** Sun, 7:30-11pm, Sala. **Balkan:** Tues, 7:30-11pm, Stu Ctr Rm 491. **Israeli:** Thurs, 7:15-10:30pm, T-Club Lge. **Noon dancing:** Fri, 12:30-1:30pm, Kresge Oval in good weather, otherwise Bldg 7 Lobby.

**Irish Dance Workshop** - Taught by Desmond Penrose. Sat, Sept 14, 10am-5pm; party 7:30pm; Lobdell.

## Exhibitions

**In Honor of Charles Ives\*** - An exhibit of photographs, manuscripts, and other items in celebration of the centennial of the birth of Charles Ives, Oct 28, 1874. Music Library, through Wed, Sept 25.

**Hart Nautical Museum\*** - Permanent exhibit of rigged merchant and naval ship models, half models of yachts and engine models. Open daily in Bldg 5, 1st floor.

## Athletics

**Women's Volleyball Rally\*\*** - General meeting of women interested in intercollegiate volleyball team. Practices to start Mon, Sept 16. Wed, Sept 11, 7:30pm, duPont Varsity Club Lge.

**New Physical Education Course in Officiating\*\*** - Learn to officiate football or soccer beginning Thurs, Sept 12. Classes 12n-1pm, with 6 sessions in each sport. Soccer Tues & Thurs, football Mon & Wed. Credit will be offered those who referee intramurals after this course may receive more pay. Info, x3-4291.

**Sunday, September 15** - F Sailing. Dinghy Invitationals 10am, Charles River Lower Basin. **Wednesday, September 18** - Fall Golf. Phillips Andover, 12:30pm, Crystal Springs Country Club, Haverhill. **Saturday, September 21 & Sunday, September 22** - WV Sailing Single-Handed Championship, Charles River Lower Basin.

## Religious Services and Activities

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

**Baha'i Discussion Group\*\*** - Planning for upcoming year and election of officers. Thurs, Sept 12, 7:30pm, Rm 8-105. Refreshments. Dale, 734-0648.

**Campus Crusade for Christ/College Life\*** - Family time, singing, prayer, teaching from God's word. Fri, 7:30pm, Rm 37-252.

**Christian Science Organization\*** - Weekly meetings, including testimonies of healing. Tues, 7:15pm, Rm 8-314.

**Combined Christian Worship Service\*\*** - Wed, Sept 11, 7pm, Stu Ctr Mezzanine Lge.

**Eastgate Bible Study\*** - Discussing Book of John. Thurs, 8pm, Eastgate Apt 24C. Info, Ed Fielding, x3-3638.

**Hillel Services\*** - Fri: Traditional 7pm, Rm 16-134. non-Traditional 8:30pm, Chapel. Sat: Traditional 9am, Chapel. Mon-Fri, Minyan 7:30am, Rm 7-102.

**Hillel Services-Rosh Hashanah\*** - Mon, Sept 16, 6:30pm, Kresge. Tues, Sept 17, 8am, Kresge; Mincha 5:30pm; Maariv 7pm. Wed, Sept 18, 8am, Kresge; Mincha and Maariv to be announced.

**Protestant Worship Service\*** - Sun, 10:45am, Chapel.

**Roman Catholic Mass\*** - Sun, 9:15am, 12:15pm & 5:15pm, Chapel.

**United Christian Fellowship\*** - Meet for teaching, singing, sharing and prayer with the Lord. Tues, 6pm, Rm 8-105. preceded by dinner at Walker, 5pm.

**United Christian Fellowship\*** - Sunday school and nursery for infants and children during Protestant Worship Service. Sun, 10am-12:30pm, Stu Ctr Mezzanine Lge.

## Announcements

**Official Notice** - All changes in student addresses and telephone numbers must be turned into the Registrar's office, Rm E19-335, by Fri, Sept 13, for inclusion in the Student Directory. Telephone requests will not be granted.

**International Students** - You are invited to an Open House of the Boston Affairs Council, Mon, Sept 16, 5-7pm at Council headquarters, 70 Hereford St. Boston. An opportunity to meet WAC staff and members and become acquainted with program plans for 1974-75. Refreshments. RSVP 267-6674.

**Loan Notes** - Students who have received MIT loan awards for the current term must sign loan notes at the Student Loan Office, Rm E19-225. Failure to do so may result in cancellation of the award.

**MIT Tools** - Want to get-and keep-yourself in good physical condition? Now's the time and we have the classes, for credit! Self-designed fitness: Mon-Fri, 12n-1pm, 1-2pm & 5-6pm. Choose mixed classes convenient to you. Info, x3-7946.

**Technology Children's Center Nursery School\*** - Applications now being accepted for the fall. Openings are available for 5,3, or 2 mornings for children ages 2½-5 years, in Eastgate and Westgate. Call Fran Olsen, x3-5907.

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

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

Send notices for September 18 through September 29 to the Calendar Editor, Room 5-111, Ext. 3-3279, before noon Friday, September 13.

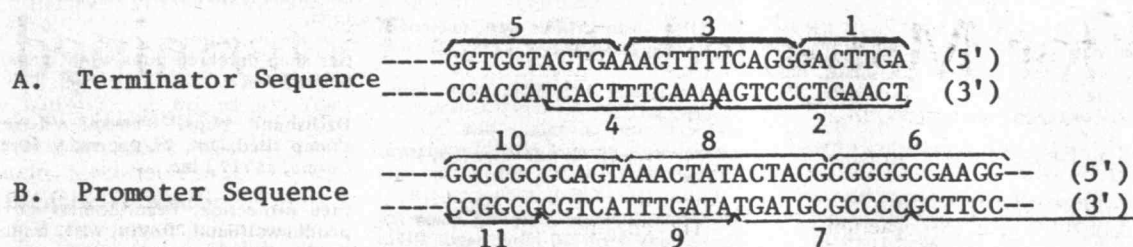


Figure 2: How the start and stop signals are synthesized.

cell could not have been detected. The cell substance for which it codes was plentiful in a yeast cell, making detection of the product of an artificial gene impossible.

Also, the scientists did not know the nature of the start and stop signals for the gene. These are vital for the cell machinery to recognize the gene and utilize its information in cell processes.

The *E. coli* gene for tyrosine transfer RNA was much easier to work with, however. Researchers in Cambridge, England, had determined the sequence of the gene, and had done extensive work with it, giving the MIT researchers a base on which to build.

Dr. Khorana and his colleagues also decided to synthesize the tyrosine transfer RNA gene because of a development which would enable them to detect the gene's functioning in a living cell.

In *E. coli* most of the genes are used for the synthesis of proteins. Occasionally a certain mutation in such a gene can result in a stop signal within a gene.

The result is a nonfunctional protein which is shorter than normal. This mutation, scientists have found, can be suppressed by a second mutation in another gene of *E. coli*. The English scientists

discovered that this second mutation was within the gene for a tyrosine transfer RNA. For this reason the second gene, which was the one synthesized by Dr. Khorana, is often called "tyrosine suppressor transfer RNA gene."

This suppressor transfer RNA cancels out the stop signal and introduces the amino acid tyrosine instead. This results in a protein of normal length which in many cases is fully functional.

Dr. Khorana and his colleagues can, thus, test the operation of their man-made gene by introducing it into the mutant bacterial cell, carried within a virus. If the gene works, the *E. coli* proteins are normal.

The MIT team originally began synthesizing only an 85-unit tyrosine transfer RNA gene, which they believed coded for the entire product transfer RNA. In 1970, however, the Cambridge, England, scientists, Drs. Sidney Altman and John Smith, found that there was an additional 41-unit segment of the gene. This total 126-unit gene coded for what was called a "precursor" transfer RNA, which was longer than a functioning transfer RNA. For some unknown reason, after the long "precursor" transfer RNA

chain is synthesized, the extra 41-unit portion is enzymatically split off, creating functioning transfer RNA. Dr. Khorana then began work on the longer 126-unit gene, with an additional aim of finding the function of the extra 41-unit portion.

### Gene and Control Signals

Professor Khorana and his colleagues build the gene and control signals by synthesizing small ten-to-fifteen unit segments of the gene from individual nucleotides. Each segment consists of a complementary portion of two opposing segments of the two-stranded molecule. Thus, each segment acted as a "splint" to attract and hold together two opposing segments, which could then be tied together by an enzyme called DNA ligase. The scientists design each part of the synthesis so that the joined segments still have a left-over single-stranded segment extending beyond the double-stranded segment. This leftover segment can be used as a splint to attach more segments of the gene. The strategy the scientists are using to synthesize the start and stop signals is shown in Figure 2.

The MIT scientists point out that their synthesis is but a beginning step in the investigations of the

gene. Their gene, plus control signals, is only 178 units long, as compared with the typical human gene which measures in millions of units.

### Control Sequences Determined

The scientists unraveled the puzzle of the gene's control sequences by using the natural gene as a guide. They first added one strand of the two-stranded natural gene to a test tube, and then introduced a segment of their man-made gene which complemented a segment bordering on the unknown natural segment. The artificial gene attracted and held the natural gene, leaving the unknown

segment extending beyond it in a single-stranded form. Then the scientists added nucleotides, one kind at a time, in the presence of an enzyme which would link the proper nucleotide to the end of the artificial strand.

When the nucleotide was added corresponding to the nucleotide on the natural gene—like a puzzle piece fitting into place—the enzyme attached the nucleotide to the artificial gene, thus telling the scientists what the unknown nucleotide was. The scientists continued with this chemical puzzle, unit-by-unit, until they had the entire sequence.

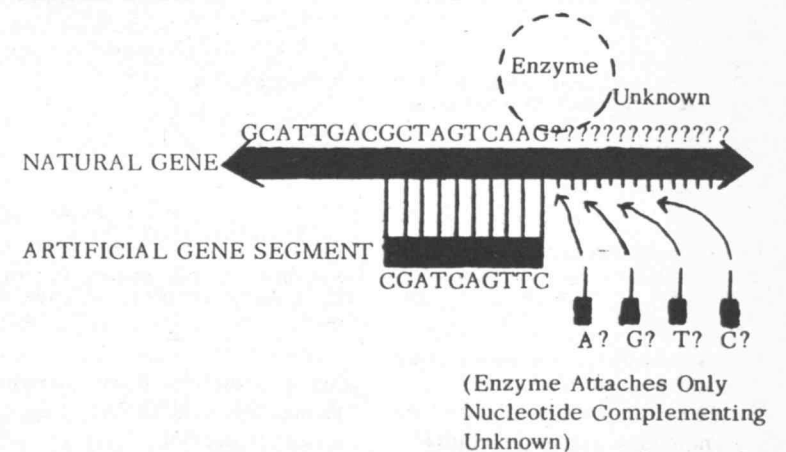


Figure 3: Diagram of how the gene sequence is determined.

### Har Gobind Khorana

Dr. Har Gobind Khorana, Alfred P. Sloan Professor of Biology at MIT, shared the 1968 Nobel Prize for his work on unraveling the genetic code. By synthesizing artificial DNA which contained reiterating sequences of nucleotides and studying how they functioned in a test-tube, he was

able to find out how the coded information in genes specifies amino acid components of proteins.

Dr. Khorana extended his work to the synthesis of long nucleotide chains and in 1970 announced synthesis of the first artificial gene—for yeast alanine transfer RNA.



# AOC Panel to Probe Food, Population and Politics Crisis

# Cadet Commander

(Continued from page 1)

Dr. Steven R. Tannenbaum, associate professor of food science, whose research activity has been concentrated in the development of new sources of calories and proteins.

Dr. F. James Levinson, assistant professor of international nutrition, director of MIT's International Nutrition Planning Program, who has spent many years in India.

Dr. Scrimshaw, Dr. Urban, Dr. Eckaus and Dr. Skolnikoff will make individual presentations, respectively, on these aspects of the world situation: food, population, economics and politics.

Dr. Tannenbaum and Dr. Levinson then will outline MIT's contributions in these areas.

Always an important factor in the life of the Alumni Association and of the Institute, the conference is especially important this year—the Centennial Year of the Alumni Association—because a prelimi-

nary report on the unique Alumni Survey will be presented at the morning session Saturday.

Institute Vice President Constantine B. Simonides, who coordinated the MIT team that planned, conducted and is evaluating the survey of alumni attitudes and opinions toward the Institute, will report at 10am in Kresge Auditorium.

The survey, developed with the aid of professional consultants, involved more than 700 alumni who were chosen in a random sample. They discussed their ideas and opinions about the Institute and its programs with trained interviewers during telephone conversations that ranged from 30 minutes to more than an hour in duration.

Max Seltzer, '18, chairman of the planning committee for the conference, has invited members of the Institute's faculty and staff to attend the Saturday sessions of the Alumni Officers Conference.

Alumni Officers will first meet Friday, Sept. 13, at a 5pm reception at the President's House, followed by cocktails at the Walker Gymnasium. Dinner will be served at 7pm in Morse Hall, Walker Memorial. Howard W. Johnson, chairman of the MIT Corporation, will address the alumni officers at 8:30pm.

The Saturday session will begin with registration at 8:15am in Kresge Auditorium. James R. Killian Jr., honorary chairman of the MIT Corporation, will greet the participants at 9:30am.

William S. Egerly, past president of the Alumni Association will give a progress report at 9:40am.

Vice President Simonides then will outline the evolution and the methods used in the survey and will give a brief preview on the findings and the implications for future planning by the Institute and Alumni Association.

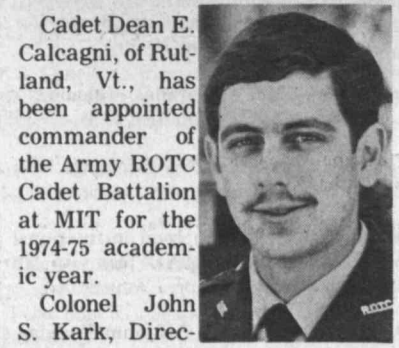
In the final hour of the morning session there will be four discus-

sion groups devoted to the questions suggested by the survey. Each group will be chaired by a vice president of the Alumni Association and will have four alumni officers representing different officer activities and geographic districts. Members of the Alumni Association staff, the MIT administration and the faculty will be present in the audience to answer questions and to comment on the use of the survey findings for future activities.

At 12:30pm the annual Awards Luncheon will begin at the Sala de Puerto Rico in the Student Center.

Luis A. Ferré, president of the Alumni Association, will be master of ceremonies and will deliver a brief address pointing out his plans for the association during the coming year.

Mr. Ferré will present the Bronze Beaver Awards and the Presidential Citations to the 1974 recipients.



Cadet Dean E. Calcagni, of Rutland, Vt., has been appointed commander of the Army ROTC Cadet Battalion at MIT for the 1974-75 academic year.

Colonel John S. Kark, Director of the Army Calcagni ROTC Program, said Calcagni's selection was based on his overall demonstrated academic performance and leadership potential over three years as a cadet, and on performance at the six-week Army ROTC Advanced Camp during June and July at Fort Bragg, N.C.

Calcagni is majoring in pre-medical studies at the Institute, and is a member of DeMolay and Sigma Phi Epsilon Fraternity. He is also a platoon leader in the MIT Pershing Rifles unit, a national organization for ROTC cadets.

## 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 Institute extension. Only Institute extensions may be listed. Members of the community who have no extensions may submit ads by coming in person to the Tech Talk office, Room 5-111, and presenting Institute identification. Ads may be telephoned to Ext. 3-3270 or mailed to room 5-105. Please submit all ads before noon, Friday, September 13.

### For Sale, Etc.

Child x-entry 140 cm skis, cable bndgs, bamboo 100 cm poles, \$15; Fabiano x-entry sz 5 1/2 N f boots; child T Black Eng slp bag, exc cond, dacron, \$8. Call, 862-1935.

Yamaha guitar w/case, G85A; whlchr; asst gold & carved jade jewelry. Call, 899-1822.

Baby carriage; stroller; hichr; rocking chr; rugs, 15x12 & 12x12; coffee tbl. Call, 494-8259.

Whirlpool 2 spd 3 cyc washer, \$50; human hr drk brn fall, \$25; Fleck broiler, \$5; Sunbeam hrdry, \$3; elec curlers, \$7. Call, 237-2192.

Minox camera plus attach, \$150; Martin D-18 guitar, best. Jerry Ponce, x3-7713.

Sears upright 15.3 cu ft freezer, exc cond, \$50. Ron, x7607 Linc.

Lined crtns, 2 pr, cheap; elec beater. Bob, 891-7967, evgs.

'72 Chrysler 20 hp outbrd, tank & hose, only run 12 hrs, just tuned, exc cond, \$500. x3-2822.

Grn shag 9x12 rug, b nw, half price, \$45. x3-1588.

KLH 11W compact stereo, fac overhauled this month, \$110. Larry, x3-5528, bef 11am.

Tennis rackets: Seamless 4 1/2 L, almost nw, \$25; Wilson T-3000, 4 5/8 M, nw nylon, \$30; Spaulding 4 5/8 M, nw nylon, \$25. Yale, x3-1623.

Lg Ger chiffonier, hvy dark wd, glass door, 3 shlvs & drwr, gd cond, \$50 or best. Susie, x3-5073.

Twn bed, Sears xtra firm, \$135 nw, \$80; 4x6 olive & mustard shag rug, \$15 Bruce, x3-1911.

Movie proj, 8mm super & reg, DeJurdual, \$50. x3-2576.

Kodak pckt instamatic 40; Kindermann developing tank; Konica Autoreflex T w/sev lenses. C. Therrien, x367 Linc.

Raleigh 3 spd sport bike, f 21" frame,

exc cond, ask \$80. x3-3651.

Old upright piano, u move, poor, still plays but nds tuning, \$20 or best. Bob, x8564 Dorm.

Plants, any day aft 6pm, 9 Ryder St, Arl. Call, 646-9682.

Ski equip: Rossignol Strato 207 cm skis, \$25; Stratix 190 cm, \$20; ski boots, m sz 9, f sz 7, \$5/ea. x477 Linc.

Best GE washer, 2 yrs, \$125; other hshld furn & appl, moving to Fla. x8-4526 Draper.

Convert baby carriage; fold wicker dressing tbl; bouncing play chr; crib w/matt & bumper; feed n'play chr; crib toy; gates. George, x8-2339 Draper.

Std car battery, gd cond, \$22. Walt, x3-1938.

Youth dining chrs, 2, \$8/ea; 86" tufted vinyl sofa, exc cond, \$195. Shey, x5763 Linc.

Radials, 1.65x13: 1 Michelin X, nw \$30; 2 Metzler stud snws, used, \$20/pr; car amfm radio, fits Fiat 124, exc cond, \$40. Lamie, x8-3045 Draper.

Wd clarinet w/case, gd cond, \$40. George, x7213 Linc, 8-5.

Raleigh deluxe sgl spd m bike, exc cond, \$25 or best. Bob, 643-0747.

Used furn of all kinds, incl baby furn. MIT Stu Furn Exchange, 25 Windsor St, 10am-2pm, Tues & Thurs, x3-4293.

M 3 spd bike, \$10; nw kryptonite lock, \$12; child bike seat, \$3; f hiking boots, 7 1/2, were \$40 nw, worn once, \$20. Call, 742-7246 evgs.

Wd desk, 5' long, \$20. Tracy, 491-5144.

Mpl BR set: 2 nite tbls, bureau w/3 dbl drwr & lg mirror, bed w/box spr & matt, exc cond, all \$250. Call, 862-7776, aft 5:30pm.

Carrier AC, 6,000 BTU, exc cond, \$85. Cy, x3-3930.

Case of Coors, best. Fred, x3-7220.

Violin, 3/4 sz, case & bow, \$60. Abigail, x5778 Linc.

Phillips m 3 spd bike, \$45. Call, 492-0780, aft 5:30.

B nw Sears 5 spd bike, nvr used, unneeded gift, cost \$90, best. Chuck, x3-7902.

Buffet-Crampon clarinet w/case, gd cond, \$155. Mike, x0375 Dorm.

Floral print fbrglas drapes, 6 mos, 120x72, \$18; pole lamp, \$12; 40x24 picture w/frame, \$10. Dave, x7689 Linc.

Lg waterbed platform & frame, \$55 or best. Kris, x9807 Dorm.

Alum storm door & scr panel, 3'x6'8", end door closer, etc, \$15. x8-1216 Draper.

MIT Flying Club membership. Gil, x7026 Linc.

Nikon lens: 1k nw 35 mm f/2 Nikkor w/skylite filter, case, front & rear caps, 6 mos grnty, \$145. Ralph, x5545 Linc.

BSR 310/X trtbl, exc cond. Mike T, 247-8355.

Blond mahog BR set: 2 end tbls, lg bureau, mirror, dresser, gd cond, best. x3-6286.

Hide-a-bed, gd cond, lk nw cstm made grn/gold stripe velvet slipcover, \$35; qn sz Simmons matt, 5 yrs, cln, \$15. Jim V, x3-2173.

Phase Linear 700 basic power amp, 350 RMS W/ch, exc cond, blu-grn meters, w/fans, Lenny, x3-1708.

Sofa, 6', \$20; 9x12 beige rug, \$12; dresser, \$8; 15" Electro-Voice Coex spkr in lg hmmdade cabs, \$95/pr. Call, 661-02966.

Mtrcycl helmet w/wind mask, hi quality, lk nw, \$20. x3-6739.

Mobile home, 40x8, on Griffiths Pond, Brewster, Mass, \$1,500. Frank, x8-3560 Draper.

Tires, 1.65x15: 2 reg, \$15; 2 stud snws, \$20. Mary, x7422 Linc.

Fugichrome color slide film, 20 exp, incl processing, \$3/roll. Ginny, x3-2380.

Adler typwrtr, elite type, 12" platen, gd cond, \$45; kryptonite bike lock, \$15. Aldrich, x3-5360.

Nikon F/FTN hard case, lk nw, \$15. Tom, x8-1510 Draper.

Ridgid vise mdl 500R, 5" jaws, nw, list \$48, \$32 or best. Tony, x8-3458 Draper.

Mahog 42x60 K tbl, \$30; Royal Arrow typwrtr w/case, \$25; m sz 11 figure skates, \$7.50; Admiral TV w/std, nds pix or other tube, \$5; twn matt, \$5; grn 9x6 rug, \$5. Jeff, x3-5877.

Dbl bed. Call, 731-8326, aft 6pm.

Avail now: dinette & 6 chrs, \$50; b&w TV w/std, \$15; toaster, \$4; Phillips 3 spd bike, b nw, \$57; avail 10/7: full sz bed & matt, \$55; b&w TV, \$25; sofa & armchrs, \$20. x3-1867.

Upright piano. Fred, x3-3406.

Rug, 9x12; 3 position recliner; both exc cond. David, 776-5100, evgs.

Garrard SL-55B trtbl w/ADC 90 Q crtrdg, \$30; wnt M Bichon Frise puppy. Joe, x3-1732.

Lg antique dk inlaid wd wrdobe, 5 drwr, cpbrd sp, \$40; pole lamp, \$5; leath & wd easy chr, \$20; m 5 spd 22" frame bike, exc cond, \$90. Call, 491-7405, evgs.

M Libertas 10 spd bike w/kryptonite lock, b nw, was \$185, now \$140. Brownell, 723-5926, aft 6pm.

Sm Delmonico refrig, exc cond, ideal dorm use, \$60 or best. Alex, 354-6598, evgs.

Fuji Spec touner 10 spd, perf cond, 2 mos, nw, w/\$22 lock, \$160, sell lock, pants clips, \$140. N. Scott, x8950 Dorm, anytime.

Blk contemp stratoliner reclining chr, \$125; child car seat, \$8; child bike seat, \$9. Donna, x3-4271.

Raleigh 3 spd f bike, 6 mos, w/chn & lock, \$60. Terry, x8984 Dorm.

Old bikes, 2, \$5/ea; manual typwrtr, \$20; fluor desk lamp, \$12; chest drwr, \$10; spr & matt, \$15. Steve, 566-2891.

Wtrbed matt, liner & heater, \$90 or best. Dennis, x3-1637.

F 3 spd bike w/bstk, almost nw, \$50. Douglas, x3-5718.

Frigidaire washer, nds work \$40 or best. Call 1-358-4698.

McIntosh MA230 integrated stereo amp, 30W/ch, \$200; KLH40 tape deck, \$150. Phil Mandel, x3-3161, lve msg.

### Vehicles

'60 T-Bird conv, rolling rock'n'roll revival, body exc cond, tan w/wht top, V8, auto, p wndw & br, runs but nds eng work, \$400. Dave, 492-0089.

'66 Dodge Coronet, wnt, 6 cyl, 70 K, incl snws, gd cond, \$250. Mark, 661-8041.

'66 VW sqbk w/sunfr, nw tires & radio, recent tune-up, some rust, \$350. Michael, x8984 Dorm.

'66 VW sqbk, 58 K, gd mech cond, roof top carrier, \$475 or best. x7267 Linc.

'66 Buick Wildcat, 4 dr, no mech problems, gd body, lo mileage, best. Call, 783-0731, aft 5pm.

'67 VW sqbk, gd cond, some rust, \$375. George, x3-6835.

'67 Fiat 1100 R, 3.5 K rebld eng, nw tires & snws, brakes & body nd work, best. Call, 864-8465.

'67 Ford Frnie Squire wgn, eng & body fair, gd tires, best. Paul, x3-1637.

'68 Olds Vista Cruiser wgn, exc cond, \$850. Levy, x3-6081.

'68 Ford cstm 4 dr 500, \$400. John, 322-8533.

'68 VW bus, 68 K, nds valve job, \$700 firm. x7785 Linc.

'68 VW bus, recent rebld eng, many nw parts, body v gd, 20 mpg, nego. Mike, x8-4456 Draper.

'70 Maverick, exc cond, 52 K, grn 2 dr, auto, am, snws, lvg contry, must sell, \$1,295 or best. x3-6033.

'70 VW sqbk, 48 K, gd cond, ask \$1,000. Jack, x8-1204 Draper.

'70 Ford LTD, hrdtp, orig owner, 32 K, exc cond. Catherine, 646-2889.

'72 VW bus, only 5 K on eng, Pirellis, \$2,700. x3-1420.

'72 Pinto, auto, ww, v gd cond, 36 K, \$1,550. Peter, x7370 Linc.

'72 Chevy Vega htchbck, grn, auto, gd cond, am, best. Diane, 876-0485, aft 5pm.

'72 Super beetle, gd cond, ask \$1,800. x3-6331.

'73 VW bus, 22K, 7 psngr, exc cond, radials w/2 radial stud snws, elec rear wndw defog, \$3,400. Bill P, x3-2811.

'50 Ford 1/2 T pick-up, gd cond, spare trans. Al Crandall, 726-2470, 9-5.

'67 Honda 305cc scrambler, gd cond, has power. Call, 783-3560.

'71 Honda SL 175 street-dirt bike, 2.9 orig K, exc cond, \$425 or best. Pat, x5447 Linc.

'73 Honda 500/4, exc cond, 6.7K, semichopped, \$1,600. Call, 256-5950, aft 6pm.

'74 Honda CB-125, b nw, won in raffle, list \$630, guar incl, \$575. Bob, x8-3361 Draper.

### Housing

Camb, BR apt btwn Cent & Harv Sq,

unfurn, \$186 incl ht. Mike, x3-1868.

Chestnut Hill, 44 Circuit Rd, lg furn rm w/priv B, no K priv, Riverside T, pd babysitting required, \$100/mo. x3-5117.

Foxboro, 35 min Bos, ovrsz raised ranch, 6yrs, 21,400 sq ft w/landscaped lot, beaut cntry, 4 BR, lg K, DR, lg frpl LR, 1 1/2 B finished bsmnt, porch, garage under, gas ht, mint cond, east access major hiways. Call, 339-3442.

Lex, 4-5 BR spltt lvl, 3/4 acre wded lot, 2 car garage, 2 1/2 B, space rms, plentiful storage, qt, beaut for prof, \$83,000, principles only. Cindy, x0523 Dorm.

Wtrtown, lg nw mod 5 rm apt in 2 fam hse, all xtras & fine touches incl 2 B, bsmnt, must see to appreciate, nr T, adults, no pets, \$350. Jane, x8-3386 Draper.

Southern NH, beaut Victorian hse, 76 mi Bos, barn, stained glass wndws, slate roof. Dohrmann, x3-3127.

### Animals

Beaut blk & slvr AKC Ger shep pups, exc pedigree, mthr champ blood lines. Frances, x3-6733.

AKC gldn retrievers, m or f, born 7/21, all shots, \$125. Alice Haydon, x376 Linc.

Ger shep purebred pups w/out papers, \$85. x3-4523.

Dachshund pups, 8 wks, std red, champ sired, 2m, 2f, papers, \$140/ea. Donna, x5717 Linc.

Free protection, beaut-homely 60 lb poodle-wolffound, frndly, wise, trained (heel, sit, stay, come, down, std), healthy, impresses muggers & burglars, w/free leash, food, book, etc. Call, 536-4955, aft 5.

Gorgeous siamese kittens, 4, \$15/ea. Gael, x8-3710 Draper.

### Lost and Found

Lost: gold watch engraved MEB 10/5/68, on Kresge Lawn nr Amherst St. Mike, x3-4933.

Found: 11 rolls unexposed b&w film. x3-4629.

### Wanted

Wd hichr. Patty, x3-1501, 9am-1pm.

Hseplants, price nego on sz, type, pt. Chris, x3-3145.

Reliable babysitter for 8 yr old, vcnty Fayerweather Sch, from aft sch-5:45pm. Sherry, x3-7805.

M rmmate, grad stu pref, BR in 3 BR apt w/LR, lg K, lg back & sm front porch, dw, wash & dry in bldg, 11 Silvey Pl, Som, nr Porter Sq avail btwn 9/20 & 10/1 \$100/ea. Call, 628-3967.

Researcher w/bkgrnd in econ or mgmt wanted immed for 3 mos or more, work involves industrial organization analysis of housing sector during pre-publication phase of Fed govt contract. x3-3747.

Babysitter 5 morn/wk for charming 8 mos boy in my home. Call, 876-7945.

F rmmate, 24+, share apt on tree-lined st nr Inman Sq, pref indep, congenial, neat person, no pets, \$110 + util, phone. Call, 491-0655.



Skydivers: nw MIT stu-250 FF's, RW/Acc freak, Rigger-seeks area jumpers. Kirk, x0324 Dorm.

Used washing machine. Dennis, x3-7085.

Tbl type wd desk, at least 48" long. Lily, x3-1421.

M or f to share lg 3 BR Camb apt w/2 work f in 3 fam hse, pref person w/9-5 schedule for carpool, 20 min walk MIT, have cat, \$35/mo/ea + ht & util. Karen, x3-2281.

M or f rmmate for lg hse in cntry, land, frpls, B, 5 min Camb, 20 min Bos, avail now, \$115. x196-548 EDC.

Rmmta, f non-smoker, 25-30, share Arl apt, \$112.50 incl ht. Caroline Tompkins, x3-2054.

Elec test equip, incl FM/MPX generator, NTSC or keyed rainbow TV gen, TV/FM crystal alignment seep-gen; also recent mags, incl pre-'73 Audio, pre-'68 Hi Fi/Stereo Review, etc. Harry, x5811 Linc, lve msg.

Portacrib, gd cond. Call, 277-9391.

Lg desk, pref old. Cindy, x3-4580.

Rider to Chicago mid-Sept (9/16-9/18), pref share driving. Hermann, x3-5483.

Child & infant care in exch for rm & brd & salary, Newton. x3-2917.

Strong mtl storage trnk, must lock. x3-7301.

Rmmta for attractive 2 BR Northgate apt, 5 min Harv Sq, at MIT & transp, \$100 incl everything. Don, 491-2108, aft 5:30pm.

## Carpools

Carpool for 2 people from crnr Harv St & Comm Ave, Bkline, to MIT, 9-5. Reva, x3-3257.

Newport, RI-MIT & back, 8-5, M-F. Dee, x3-2376.

Anyone interested in carpool Newton-MIT daily, 9-5. Lee-Or, x3-2454.

N Wayland, Linc area-MIT, 8-5. Lanny, x3-2691.

Want to form or join carpool from Concord. Charles Davis, x3-3911.

Wrtown-Bel, for 2 people, from crnr Lex St & Main St or Lex & Bel St. Mike Perlmutter, x3-3697.

Som, Elec Ave or Tufts College area, 8-5, w/ share exp. x3-5885.

Malden-MIT, 9-5, either drive or ride. Mrs. Tong, x3-5806.

Ride from Oct 1 every Tues & Thurs aft, MIT-Arl, \$1 for ride. Susan, x3-4850.

Mtrcyl commuter nds foul weather ride Burl-MIT, any hrs, w/ pay. Tom Papanek, x3-2237.

## Miscellaneous

Wl do theses & gen typing. Nina, x8-3333 Draper.

Teacher, M Ed (elem ed, learning disabilities) w/ tutor chldrn in reading, arith. Laurie Jensen, 492-1657.

Typing: manu, reports, theses, tech & stat. Denise, x3-4162.

Rcldr lessons, beg & intermed, tchr w/8 yrs playing experience, reas rates. Larry, x3-3263.

Note to parking sticker swappers: please remember to inform your supervisor and the Campus Patrol of the exchange you have made so that their records accurately reflect your new parking area.

Wl trade Windsor for West sticker. Jane, x3-4912.

## Positions Available

This list includes all non-academic jobs currently available on the MIT campus. Duplicate lists are posted each Tuesday preceding Tech Talk publication date on the women's kiosk in Building 7, outside the Office of Minority Affairs, 10-211, and in the Personnel office E19-239, on the day of Tech Talk publication. Personnel interviewers will refer any qualified applicants on all biweekly jobs Grades I-IV as soon as possible after their receipt in Personnel. Employees at the institute should continue to contact their Personnel Officers to apply for positions for which they feel they qualify.

Virginia Bishop 3-1591  
Mike Parr 3-4266  
Philip Knight 3-4267  
(secretary - Joy Dukowitz)  
Sally Hansen 3-4275  
Jack Newcomb 3-4269

Evelyn Perez 3-2928  
(secretary - Mary Ann Foti)

Dick Higham 3-4278  
Pat Williams 3-1594  
Claudia Liebesny 3-1595  
(secretary - Dixie Chin)

New applicants should call the Personnel Office on extension 3-4251.

**Administrative Staff-Assistant Director, Science Writer** for the News Office will write, coordinate, rewrite for popular readership news having to do with results of research in areas of science, engineering and technology. Deal with news media, provide administrative officers and faculty with advice regarding news preparation and dissemination. Handle non-scientific or technical news as office work load may require. Must be curious and able to generate news stories that will interest the public. Must be college graduate with five years or more as science writer for major metropolitan newspaper or equivalent. Please submit resume. 74-1137-R (9/11).

**DSR Staff** for the Center for International Studies will compile materials, perform analysis, draft reports, arrange international meetings. Research and writing ability and experience with nutrition programs required. Some typing ability desirable. 74-1124-A (9/11).

**DSR Staff-Temporary** for the Joint Center for Urban Studies will supervise the work of graduate research assistants working on topics related to public sector labor relations in Boston. Ph.D. or work toward advanced degrees required. Experience with research on municipal employee labor relations, and as a supervisor important. Job duration: approximately 6 months. 74-1126-A (9/11).

**DSR Staff** at the National Magnet Laboratory will work on the Alcator thermonuclear experiment. Conceive, design, and carry out plasma diagnostic experiments using neutron, x-ray, optical, electrical, magnetic and microwave techniques. Will aid in the analysis and assessment of data. Ph.D. in plasma physics or related area required; familiarity with tokamak devices desirable. 74-1136-A (9/11).

**DSR Staff-Physical Chemist** in the Research Laboratory of Electronics must be experienced in molecular beam techniques and surface science to conduct experiments on semiconductors and related materials. Ph.D. in Physical Chemistry required. 74-1110-A (9/4).

**DSR Staff-Scientific Programmer** in Earth and Planetary Sciences will work on analysis of celestial mechanics data from Mariner 9, MVM, Viking, Pioneer Venus Probes and other space related projects. Design, write, modify and run FORTRAN data-analysis program. Advanced knowledge of FORTRAN required. Background in math, physics, engineering; knowledge of IBM/360 JCL and assembler useful. Submit resumes. 74-1114-A (9/4).

**Technical Assistant-Academic Staff** in Physics will develop and maintain experiments in an undergraduate teaching laboratory. Work involves electronics, vacuum technology, optics, and small machine shop equipment. BS in Physics or EE desirable. 74-937-R (8/14).

**DSR Staff** for the Center for Cancer Research will perform a variety of duties in an immunologically oriented laboratory. Techniques will include a wide range of immunological methods and protein chemical fractionations using columns, polyacrylamide gels, high voltage paper electrophoresis, isoelectric focusing, radioactive labeling. Bleed, inject, prepare cells from mice and rabbits; maintain cell and organ cultures. Applicant should have considerable laboratory work experience; Master's degree preferred. Superior manual dexterity required for performing a wide range of techniques. 74-885-R (8/7).

**Placement Counselor-Administrative Staff-Part-Time** will coordinate the Family Day Care program of child care in the home. Interview participants; help with licensing; keep records; manage the budget for the program; arrange workshops, discussion groups, lectures. Interviewing skill, knowledge of growth and development in preschool aged children, minimum one year experience with family day care or similar type of program required. Ability to work independently important; Spanish very helpful. Half-time position. 74-1032-R (8/28).

**DSR Staff** in the Cell Culture Center will perform mass cell production and other cell culture techniques. Duties will include some virology techniques including infection of cells, propagation and titration of viruses. Cell culture experience mandatory; Bachelor's degree preferred. 74-1029-A (8/28).

**DSR Staff** in the Cell Culture Center will perform mass cell production and other cell culture techniques including infection of cells, propagation and titration of viruses. Bachelor's degree

in Biology or experience in cell culture required. 74-1030-A, 74-1035-A (8/28).

**DSR Staff-Temporary** in the Research Laboratory of Electronics will work on molecular beam stabilized Argon laser for ultrahigh resolution spectroscopy. Ph.D. in Physics or equivalent required. Temporary 9/74-8/31/75. 74-1072-A (8/28).

**Administrative Staff-Assistant Director** for a program which provides member industrial firms direct and convenient access to the Institute's educational and research programs, while at the same time providing the Institute with unrestricted financial assistance and professional relationships. Primary responsibility is liaison function between MIT faculty and research staff and representatives of participating companies. Requirements include bachelor's degree (MIT preferred), approximately two years of technical experience (preferably engineering) and management perspective (MBA preferred) and ability to deal with executives of small to medium-size corporations. 74-1080-R (8/28).

**Meteorologist/Programmer-DST Staff** in Meteorology will be responsible for running computer model of the stratosphere which is being used to assess ozone chambers associated with high latitude aircraft and the space shuttle and to produce output displays. Will adapt present code to Iliac IV computer. BS in Mathematics, strong experience of FORTRAN programming required. Some meteorological experience required. 74-1082-R (8/28).

**Technical Assistant-Academic Staff** in Nutrition and Food Science will perform specialized and routine chemical analyses on body fluids; responsible for operation and maintenance of mass spectrometer. A college degree in Chemistry or Biology required. Laboratory experience preferred. 74-1047-R (8/28).

**DSR Staff** in the Joint Center for Urban Studies will work on the National Housing Goals project. Review theory and existing models; assist in developing theory and forecasts requiring extensive computer analysis of data; design and implement computer model documenting all stages of the work. Demonstrated skill in quantitative urban/social science research required. (Masters degree or equivalent). Working knowledge of FORTRAN IV, familiarity with computer analysis of U.S. census data important. 74-958-R (8/14).

**DSR Staff** in the Cell Culture Center will assist in the preparation of cell culture media including all aspects of quality control. Knowledge of sterile technique and tissue culture desired. BS degree or coursework and laboratory experience required. 74-886-A (8/7).

**DSR Staff** at Civil Engineering will develop federal criteria for allocation of mass transit funds. MS in transportation Systems Analyses required; knowledge of economic criteria, experience in urban transportation systematic analyses, familiarity with DODOTRANS computer models important. Excellent writing and communication skills essential. Some travel necessary; will work with federal, state, and local officials, faculty and students. 74-927-A (8/7).

**DSR Staff Engineer** in Earth and Planetary Science will be responsible for design, construction, and operation of prototype instruments to be used on ground-based telescopes and spacecraft for remote study of planets and other celestial bodies. Degree or strong background in EE required. Familiarity with charge couple and charge integrating devices, silicon vidicones, digital and analog circuit design, astronomical facilities necessary. 74-929-R (8/7).

**DSR Staff** in the Arteriosclerosis Center will assist in laboratory research studies involving biochemical procedures for the determination, in VIVO, of lipoprotein turnover rates. Duties also include ultracentrifugation, immunological techniques and various forms of electrophoresis. BS in chemistry or Biology required; some laboratory experience helpful. 74-841-R (7/31).

**DSR Staff** in the Energy Laboratory will design, build, and operate large scale heat transfer apparatus. Graduate degree in heat transfer; extensive experience in designing, instrumenting, and conducting laboratory tests in heat transfer experiments with a minimum of supervision required. 74-858a-A (7/31).

**Biomedical Engineer-DSR Staff** in the Mechanical Engineering Department will join MIT researchers, and Children's Hospital medical staff to work on the conception of diagnostic and therapeutic devices and processes for human rehabilitation. Supervise technicians, participate in the supervision of theses and student projects. Education in biomedical engineering required. Mechanical and/or electrical engineering, experience in engineer-physician collaboration very desirable.

Innovation, creativity, ability to core-search essential. Possibility of lecturer appointment in Mechanical Engineering. 74-869-R (7/31).

**DSR Staff** in Civil Engineering will work on transportation planning in developing countries. Will spend at least 3 months a year in Africa. MS in Civil Engineering, highway construction experience required. Familiarity with systems engineering, transportation economics, computer programming, transportation modeling important. Candidate must be a US citizen because of foreign travel involved. 74-805-A (7/24).

**DSR Staff Economic Advisor** at the Joint Center for Urban Studies will advise the Presidents of MIT and Harvard on the state of the economy and labor force of Cambridge, and prospects for future economic development; evaluate and develop economic development proposals; review and evaluate proposals in fields of health, education, housing, transportation, and community development in view of their impact on the local economy. Will be assisted by an advisory committee of faculty and administration members from both institutions. Doctoral degree or equivalent experience in urban economics, manpower, community development required. Ability to work effectively with local government and university officials. Ability to plan and conduct research. 74-753-A (7/17).

**DSR Staff member** in the Electronic Systems Lab will study the application of modern control theory to optimize freeway traffic flow. Develop mathematical models and feedback control algorithms. Evaluate feasibility of using other control policies with existing freeways. Ph.D. in Systems related discipline, including working knowledge of techniques in stochastic optimal control theory, state estimation, etc. Familiarity with vehicular traffic flow theory, state estimation, etc. Familiarity with vehicular traffic flow highly desirable; practical experience in electronic traffic sensors and signal processing helpful. 74-778-A (7/17).

**Technical Assistant-Academic Staff** in Biology will work on a project concerned with the analysis of macro molecular changes in differentiating myoblasts. Will use cell and tissue culture techniques, electrophoresis, labeling with radioactive isotopes and general biochemical methods. Minimum BS degree in Biology, Biochemistry or related fields; laboratory experience essential. Previous tissue culture experience preferred. 74-759-R (7/10).

**Administrative Staff-Editorial Manager** in the Institute Information Services will coordinate the organization, design, editing, production, mailing, and budgeting for the General Catalogue, the President and Chancellor's report and other issues of the MIT Bulletin. Additional duties involve work on various projects, ad hoc special reports in association with the Analytical Studies and Planning Group. Bachelor's degree required; graduate work or equivalent experience preferred. Editorial and proofreading skills, excellent command of the English language required. Knowledge and experience with various aspects of graphic design and production very helpful. Ability to organize detailed information regarding academic and other activities, to work with large numbers of people throughout the Institute, and to plan and execute publishing tasks under pressure of deadlines important. 74-692-R (6/19).

**Staff Recruiter** (Admin. Staff) will report to the Employment Officer; will be responsible for coordination of search for well-qualified persons to fill nonacademic staff positions. Particular emphasis will be given to assisting laboratories, centers, and departments in fulfilling Affirmative Action Plans with respect to research staff openings. Person will work closely with Personnel Officers and departments in defining description of positions and qualifications required. Frequent travel will be expected. Experience in Personnel and/or recruiting required. Technical background with degree in Engineering or Science preferred. Please submit resume. 73-643-A (6/26).

**DSR Staff Physicist** in the Research Laboratory of Electronics will work on development of radio interferometry. The project will combine development of computer-controlled electronic systems and participation in the observations. Ph.D. Physicist with several years experience in radio astronomy or allied field required. 74-626-R (6/5).

**DSR Staff** in the Energy Lab will assist in the construction of a mathematical energy model for US supply and econometric model building and analysis of energy sectors. BS degree in Economics with econometrics and mathematics background desired. Experience in FORTRAN programming and use of Econometric Software Package necessary. Communication skills important. 74-602-A (5/29).

**DSR Staff** in the Energy Lab will

develop a metal-air fuel cell preprototype and conduct research into powdered metal electrodes. MS in electrochemistry or chemical engineering; knowledge of electrochemistry, semiconductors; experience in fluid mechanics, academic or industrial exposure to metal-metal oxide systems required. 74-605-A (5/29).

**DSR Staff** in the Energy Lab must have minimum of 5 yrs experience in defining, securing support, organizing and supervising research in heat transfer related to energy production and utilization. Familiarity with MIT; experience in supervising student theses research and staff; Ph.D. in Mechanical Engineering required. 74-359-A (5/1).

**Administrative Staff-Assistant Director** of the Alumni Fund will be responsible for staff support to alumni boards and committees engaged in the annual solicitation programs. Duties require extensive interaction with senior alumni and corporation executives throughout the country, at MIT. Individual must be an alumnus/alumna of MIT. Position entails a moderate amount of travel. 74-347-R (4/24).

**Marketing Director-Administrative Staff** at the MIT Press must have experience and skills in some or all of scientific/technical, international, research and planning, trade and library relations. Innovation, creativity, adaptability for goals; ability to work as part of publishing team in a university environment. Please submit resume with educational background; accompanying letter must describe in detail marketing methods in achievements. 74-313-R (4/17).

**Programming Analyst-Administrative Staff** for the MIT Information Processing Center must have experience and knowledge of large-scale time-sharing systems. FORTRAN, JCL, and PL/1 language and communication skills required. Assist users working by providing programming information and debugging help. Produce user documentation, serve as Programming Assistant and Consultant; conduct seminars, workshops, short courses. Implement and maintain software items such as the debugging compilers and plotting packages. 74-887-R (8/7).

**Senior Programmer Analyst-DSR Staff** in the Joint Center for Urban Studies will work on a large scale simulation of complex social systems attempting to explain and anticipate the process by which neighborhoods evolve. Familiarity with time-sharing, and with the substance of the study through knowledge of FORTRAN required. Willingness to learn the operating characteristics of the computer installation important. Neighborhood Evolution and Decay Project; 33 month duration. 74-873-R (7/31) Simulation Model of Migration Project, 20 month duration. 74-874-R (7/31).

**Systems Analyst (DSR)** in Laboratory of Architecture & Planning (Overlap Project) will implement series of mathematical programs originally developed in FORTRAN for other computers and command interfaces for routines. Participate in level design; some original design of mathematical and other routines. Fluency in FORTRAN and PL/1, including knowledge of IBM or Univac and Multics version of FORTRAN. Knowledge of Multics command, programming and debugging environment. Ability to deal with major issues in mathematical programming. 74-795-A (7/17).

**Applications Analyst-Administrative Staff** at the Information Processing Center will work in the Application Services group to advise users on procedures and techniques in setting up a statistical problem for computer solution. The equivalent of a master's degree in statistics or social science with statistical training required. Experience in programming and solving problems is essential. 74-403-R (5/8).

**DSR Staff Systems Programmer** at Project MAC will perform system analysis and system programming on a research version of Multics operating system. SM or EE degree required; 2-3 years programming experience in the supervisor of some advanced operating system required. Ability to contribute to research and work with students important. 74-1234-R (11/14).

**Applications Analyst-Administrative Staff** in the Application Services of the Information Processing Center-full or part-time-will assist users of the Center's computer systems by modifying, installing, and testing programs for various purposes, writing descriptions of them, and consulting on their use. The Application Service's responsibilities include statistics, numerical analysis, simulation, linear programming, and special-purpose languages. Will also consult on general aspects of the systems and teach occasional short non-credit courses. Graduate-level study or equivalent experience in computer science or in some area of computer application required. Experience with an algebraic programming

(Continued on page 10)



# Positions Available

(Continued from page 9)

language, particularly PL/1 or FORTRAN, and at least one application area is essential. Adaptability to new subjects and program tools is an important asset. 74-1026-R (8/28).

**Computer Operator IV** for the Office of Administrative Information Systems will operate the IBM 37-135-145 and all peripheral equipment including disk/tape drives, card reader/punch, printers, etc. Minimum one year experience required. Knowledge of DOS Job Control, Multi Programming experience important. 74-1066-R (8/28).

**Computer Operator IV** in the Office of Administrative Information Systems will operate the IBM 37-135 Computer console messages. Report operational problems, take corrective action where called for; process production and testing as scheduled. Minimum 1 year operations experience preferably IBM 360 or 370, DOS multi programming or DOS/VS environment required. 74-620-R (6/5).

**Senior Key Punch Operator III** in the Office of Administrative Information Systems will operate the IBM 029 keypunch machine. Punch into computer input cards formatted and unformatted documents. Minimum 2 years experience operating IBM 029 or comparable equipment. 74-764-R (7/10).

**Infirmiry Staff Nurse-Exempt-Part-Time** will do bedside nursing in the MIT infirmiry. Individual must be a Massachusetts Registered Nurse with 1-2 years experience in a Medical/Surgical Unit. Capability of providing first aid and emergency treatment for the emergency clinic required. Ability to work with students essential. Three day week: 7-3, 3-11 rotating shift. 74-990-R (8/28). Three day week Sat, Sun., evening during week. 74-1070-R (8/28).

**Engineering Assistant-Exempt** in the National Magnet Laboratory will set up experiments and take measurements of magnetic fields produced by humans and animals. Will work with hospital medical groups. Experience in biomedical research; strong experience in low-frequency electronics; knowledge of magnetics and cryogenics required. Flexible schedule necessary for occasional evening or weekend work. 74-1033-R (8/28).

**Nurse-Exempt** in the Clinical Research Center will work under close supervision of the Head Nurse and investigators. Responsible for general specialized nursing procedures and medications in a twelve-bed research unit. Work with laboratory and dietary units; must keep accurate charts and observations on patients' condition. Must have R.N., Mass. registration, previous nursing experience; must be extremely reliable and conscientious; able to assume "take charge" duties when required. Evening shift: 4pm-12midnight. 74-902-R (8/7).

**Infirmiry Staff Nurse-Exempt** Bedside nurse in MIT Infirmiry. Must be capable of administering first-aid and emergency treatment. Registered Nurse with 1 1/2 years experience, preferably in medical/surgical unit. 3-11pm shift. 74-1019-R (8/21).

**Assistant Advertising Manager-Exempt** for the Alumni Association, *Technology Review*, will research, prepare and produce sales support material. Maintain records; bill advertisers; prepare income reports. Typing, shorthand or speedwriting, composition skills needed for preparing correspondence. Ability to organize required. Previous advertising experience helpful. 74-1009-R (8/21).

**Food Production Supervisor-Exempt** in Food Service will be responsible for all operations of the Kitchen and its food production personnel: daily production, inventory control, quality control and sanitation. Assist in menu planning and estimating food quantities. Manage administrative details in areas of personnel, payroll, budgeting, purchasing. Degree or experience in food production, menu planning, and operation of a food production facility required. Ability to train personnel important. Hours 6am-3pm, 74-837-A (7/24). 2nd opening: irregular hours and weekends.

**Area Food Supervisor-Exempt** in Food Service will be responsible for the unit serving areas: flow of food and utensils during meal periods; portion controls, sanitation. Will train and supervise pantry employees. Technical knowledge of food production; ability to work under pressure, irregular hours and weekends required. 74-455-A (5/22), 74-835-A, 74-836-A (7/24).

**Building Services Assistant-Exempt** for Physical Plant will supervise custodians, polishers and other Building Services hourly personnel. Requires

working on various shifts for indefinite periods of time. Minimum of 2 years supervisory experience is required. 40 hour work week. 74-696-R (6/19).

**Administrative Assistant V** in Earth and Planetary Science will handle administrative duties for a large research group; monitor research accounts, prepare proposals, monitor contract compliance. Organize office, supervise two secretaries. Act as liaison between other departments of the Institute. Strong administrative skills, maturity, ability to work in busy atmosphere required. Ability to work with figures important; editorial skills helpful. Institute experience desirable. 74-1134-R (9/11).

**Technical Assistant V** in Earth and Planetary Science will provide support to researchers and programmers working on the analysis of data from space related projects. Set up computer run, evaluate results, assist in data management and program modification. Ability to handle details, take directions from several people required. Knowledge of FORTRAN, IBM/360 JCL, keypunching; background in astronomy, math, physics, engineering useful. Resumes only. 74-1115-A (9/4).

**Senior Secretary V** will perform secretarial and editorial duties for the Foundation Scientist, Neurosciences Research Program. Type scientific manuscripts; prepare bibliographies; maintain reference files; excellent secretarial and editorial skills required; shorthand preferred; willingness to learn scientific terminology and interest in the sciences of brain and behavior important. MIT experience helpful. 74-952-R (8/7).

**Technical Assistant IV-Part-Time** in Psychology will help design and run psycholinguistic experiments in the perception and production of speech and analyze data. Background in linguistics and phonetics required; working knowledge of acoustics/physics desirable. Familiarity with recent work in the field and lab equipment helpful. 20 hour work week. 74-1129-R (9/11).

**Technical Assistant IV** to a Psychology professor will assist with research in physiological psychology. Test, analyze videotapes of hamster behavior; maintain the animal colony and videotape equipment; assist with small animal surgery. Individual must have detailed knowledge of types of behavioral responses which appear during testing; understanding of operation and maintenance of videotape systems; ability to work independently required. 74-1133-R (9/11)

**Secretary IV or Senior Secretary V** in the Office of Minority Affairs will handle general secretarial and administrative duties, organize and maintain files and records; monitor office accounts; schedule travel, meetings; answer routine correspondence, perform reception functions; prepare statistical reports. Excellent typing, shorthand required; ability to work independently, to organize; tact, maturity, poise, discretion essential in dealing with sensitive concerns of the office. 74-1132-R (9/11).

**Secretary IV or Senior Secretary V-Part-Time** will handle a variety of secretarial and administrative details at the President's home at Watertown. Schedule appointments for Mrs. Wiesner and for the President's House at 111 Memorial Drive; arrange travel, transcribe correspondence, maintain extensive files. Work closely with Dr. Wiesner's secretary; act as liaison for Mrs. Wiesner with other MIT offices, community agencies and businesses. Keep payroll, and other records; attend meetings, when required; write and address invitations for Institute events. Excellent typing skills required. Discretion, honesty and tact essential to work in a private home. 25 hour work week. 74-315-R (8/14).

**Secretary IV** in Medical will handle secretarial duties for two psychiatrists and assist with support for the part time psychiatric staff and fellows. Transcribe patient case histories; maintain accurate records and schedules. Excellent typing required; maturity, ability to work under pressure and to deal with patients important. 37 1/2 hour work week. 74-685-R (6/19).

**Secretary IV Part-Time** in Civil Engineering will handle general secretarial duties; maintain records and files; type correspondence, reports, course material, assist with tabulating evaluations. Good typing, shorthand and/or speed writing required. 20 hour work week. 74-1128-R (9/11).

**Secretary IV** in the Treasurer's Office will handle all general secretarial duties and assist with a variety of administrative functions, coordinate the work of a part-time secretary. Capability to grasp the basics of the insurance industry, to deal with legal terminology, to acquire a working knowledge in these areas required. Excellent typing, shorthand, organizational skills required. Ability to work under pressure, establish priorities important. 74-1135-R (9/11).

**Secretary IV** will perform secretarial

and reception duties for the Medical Department's Specialty Clinics. Transcribe dictation for Dermatology and Allergy Clinic, schedule appointments. Good typing, ability to transcribe medical dictation required. Previous medical secretarial experience preferred. 37 1/2 hour work week. 8:30-5. 73-1112-R (9/4).

**Secretary IV** for a group of Sloan faculty members will handle a variety of secretarial duties; type manuscripts, letters (some technical); edit and prepare reports; maintain course and student records. Excellent typing, dictaphone skills, knowledge of office procedures, grammar, punctuation required. 74-1100-R (9/14).

**Secretary IV Part-Time** for a Metallurgy and Materials Science professor will type course material, technical manuscripts; schedule travel, appointments; independently answer some correspondence. Previous office experience, good typing essential. Technical typing skills, shorthand and/or speedwriting helpful. This is a non-smoking office. 10-20 hour work week. 74-1099-R (9/4).

**Secretary IV** to several Mechanical Engineering professors will handle correspondence, travel arrangements, coffee seminars. Excellent typing, shorthand/dictaphone skills, knowledge of bookkeeping required. Technical typing ability and secretarial schooling or experience preferred. This position is available for "job sharing." 74-1031-R (8/28).

**Secretary IV-Part-Time** in Nutrition and Food Science will type proposals, reports, correspondence from rough and finished drafts; handle all general duties. Good typing, dictaphone skills required. Some knowledge of biological and/or chemical terminology helpful. 20 hour work week; possibility of increase to 35 hours. 74-1073-A (8/28).

**Secretary IV** for the Harvard-MIT Program in Health Sciences and Technology will type correspondence and proposals, handle general office duties, schedule travel. Excellent typing and good office skills required (shorthand desirable). Previous experience necessary, MIT experience preferred. 37 1/2 hour work week. 74-1071-R (8/28).

**Secretary IV** to the Assistant Dean for Student Affairs will type a variety of materials from dictaphone, provide secretarial support for fraternity-related affairs and assist with overflow work for two other staff members. Excellent typing and dictaphone skills required; ability to deal effectively with students to organize in the midst of confusion necessary. 74-1086-A (8/28).

**Secretary IV** to the Director of the new Cell Culture Center will handle general secretarial duties; organize and maintain files; monitor budget records; type and proofread manuscripts. Strong typing, organizational skills required; MIT experience preferred for setting up office in new center. 74-888-A (8/7).

**Secretary IV** in the Center for Cancer Research will handle general secretarial duties; type manuscripts and letters. Maintain research grant records; schedule travel, meetings. Excellent typing, dictaphone skills required. Editorial skills, ability to compose letters, familiarity with biomedical terminology desirable. Familiarity with MIT procedures preferred. 74-963-R (8/21).

**Secretary IV** for several Nutrition and Food and Science Faculty will handle general secretarial duties; assist with the preparation of scientific manuscripts for publication; type technical material involving tables and scientific terminology. Excellent typing, organizational ability essential. Knowledge of biological and/or chemical terminology helpful. 74-982-R (8/21).

**Secretary IV** in Earth and Planetary Science will handle a variety of secretarial duties of a group of seismology professors and their research staff. Type and edit manuscripts, correspondence, class material (some technical); independently compose some correspondence; handle purchasing and accounting procedures. Excellent typing, editing, proofreading, grammar, spelling essential. Willingness to work independently occasionally under pressure important. 74-993-R (8/21).

**Secretary IV** to the Head of the Engineering Library will handle all general secretarial duties as well as act as receptionist for library visitors; compile financial statements; responsible for several payrolls and petty cash. Good secretarial training and experience desired. Accounting or bookkeeping skills are necessary. 74-994-R (8/21).

**Secretary IV** to Assistant Directors Development Office. Handle files, mail, calendars, error-free typing for correspondence. Will produce final reports for senior Institute officials. Some editing. Excellent secretarial skills, shorthand preferred. Discretion, tact, ability to interact with Institute personnel at all levels. 74-1015-R (8/21).

**Secretary IV** will handle standard secretarial duties for a group of Mechanical Engineering professors. Schedule travel, appointments, seminars; type correspondence, monitor accounts; secretarial training or experience, shorthand/dictaphone, technical typing skills required. Ability to communicate and to deal with students and staff important. These positions are available for "job-sharing." 74-949-R, 74-950-R, 74-951-R (8/14).

**Secretary IV Part-Time** in the Medical Department will provide typing and telephone support for the Psychiatry Service. Transcribe patient case histories, type correspondence, reports; assist with other duties as necessary. Excellent typing required. Maturity in dealing with the sensitivity of patient needs is essential. 74-956-A (8/14).

**Secretary IV** in the Chairman's Office will handle a wide variety of secretarial and administrative tasks under the direction of a senior secretary. Schedule meetings, organize and maintain files for correspondence and committee work related to MIT external community relations. Excellent typing and organizational skills essential. Ability to maintain communications with top level offices of the Institute and with the greater Boston community desired. 74-890-R (7/31).

**Secretary IV** in Political Science will handle all general office duties for a busy group of professors. Type correspondence, manuscripts, from drafts of tapes, arrange travel, meetings, appointments; contact with students. Excellent secretarial skills essential (shorthand helpful); previous experience, ability to establish priorities important. 74-892-R (8/7).

**Secretary IV** for several professors in Political Science will handle all general secretarial duties; type manuscripts, class material (some with mathematical symbols). Excellent typing skills required; ability to work under pressure in busy office is important. There is much student contact in this job. 74-893-R (8/7).

**Secretary IV** in Political Science will assist the Administrative Officer and type a variety of material pertinent to the department's administration. Prepare for signature; adjustment reports, appointments, vouchers, requisitions, etc. Assist in collecting data for budgets and reports. Good typing skills, knowledge and experience with accounting procedures, ability to work in a busy environment required. Familiarity with MIT helpful. Position is intended to be full-time, but there is some flexibility for part-time. (24-30 hours). 74-895-A (8/7).

**Secretary IV** to a Civil Engineering professor will handle general secretarial duties; admissions materials and various department publicity information; maintain research and account records; independently answer some correspondence. Good organizational and typing skills required; ability to work independently and under constraints of deadlines important. 74-898-R (8/7).

**Secretary IV** to the head of the History section of the Humanities Department will transcribe notes for correspondence, act as liaison between the section and its head, organize seminars, type manuscripts, and handle other general secretarial duties. Excellent typing and shorthand skills, previous secretarial experience and training required. The ability to organize, recognize priorities, handle responsibilities are needed to maintain smooth operation of the section. 74-917-R (8/7).

**Secretary IV** in the office of the Secretary of the Institute will handle standard secretarial duties, plus liaison with Corporation and committee members, officers of MIT, department heads and faculty; prepare correspondence, large mailings, annual publications. Excellent secretarial skills, training and/or experience required. Initiative, integrity, discretion important. Knowledge of MIT valuable. 74-918-R (8/7).

**Secretary IV** will handle secretarial duties for two Biology professors. Type manuscripts, correspondence, monitor accounts. Good typing, ability to work with figures and under pressure required. Secretarial experience preferred. 74-928-R (8/7).

**Secretary IV** to a professor in Metallurgy and Materials Science will handle variety of general secretarial duties; monitor accounts; schedule seminars, travel; handle correspondence independently; type manuscripts, proposals, reports. Good typing, organizational skills required; shorthand or speedwriting preferred; ability to work with figures and to deal with students, staff, faculty important. 74-854-R (7/31).

**Secretary IV** in the Office of Sponsored Programs will type correspondence; maintain records of grants, contracts and proposals; take and transcribe dictation; handle a variety of other duties. Good typing required; shorthand preferred. Previous office experience; organizational ability important. MIT experience desirable. 74-863-R (7/31).

**Secretary IV** in the Laboratory for Nuclear Science will handle all general secretarial duties for an active high energy physics group. Excellent typing needed for memos, reports, correspondence, papers, (some technical). Short-hand skills desirable but not essential. Ability to work independently; good organizational skills important. 74-807-R (7/24).

**Secretary IV** at Endicott House Dedham, MA, will handle a variety of general secretarial duties: prepare payrolls for hourly and voucher employees, prepare and type bills, maintain inventory of supplies, schedule reservations, welcome visitors. Accurate typing and bookkeeping skills essential; ability to work independently and with guests and staff in a high pressure environment important. 40 hour work week. 74-823-R (7/24).

**Secretary IV** in the Arteriosclerosis Center will perform general secretarial duties for medical doctors and other staff members; transcribe letters; schedule appointments; type abstracts and manuscripts. Good typing, ability to work independently required. Secretarial school graduate with previous experience desired (preferably in a medical setting). 74-670-R (6/19).

**Secretary IV** for Mechanical Engineering will handle general secretarial duties for several professors in thermodynamics. Type technical reports and manuscripts; maintain accounts. Excellent typing required, technical typist preferred; knowledge of office procedures; ability to organize, set priorities important. 74-256-R (6/5).

**Secretary IV** to the Institute Secretary for Foundations will be responsible for budget accounting, file maintenance; research in reference materials, main communications and smooth relations with top level offices of the Institute. Excellent secretarial skills, ability to organize and use discretion required. Knowledge of MIT desirable. 74-332-R (4/24).

**Secretary IV** in the office of Administrative Information systems will handle general secretarial duties; maintain inventory of technical manuals, program test logs, files; type memos, reports, documents. Excellent typing, dictation skills required. Knowledge of English grammar and general office procedures important. 74-617-R (6/5).

**Editorial Secretary IV** in MIT News Office. Write, research and type hometown news releases; release hometown newspaper addresses and address and mail releases. Research and prepare biographical sketches on faculty and administration members. Other reporting/writing assignments as needed. Should have fast, accurate typing skills, good command of English language. Experience desired. 74-1189-R (8/28).

**Secretary III-IV Temporary** in Political Science will handle secretarial duties; type reports, correspondence, papers; assist with file maintenance; schedule meetings, appointments. Knowledge or willingness to learn on-line editing for computer. Good secretarial skills, ability to work under pressure, good judgment and discretion required. Job is temporary until August 1975. 74-1131-A (9/11).

**Secretary III-IV** (Temporary/nine month job) in the Humanities Department will work in Kresge for the Music Section and Dramashop. Act as liaison between students and music organizations at MIT; responsible for concert productions - programs, tickets and distribution, publicity, and some book-keeping. An experienced typist with interest in music and/or drama is desired. Sept. through May. 74-638-R (6/12).

**Secretary III-IV** for several professors and research staff in the Center for Space Research. Type proposals, correspondence, articles for publication; schedule travel and appointments. Good typing skills (technical), ability to work under pressure required. 74-1043-R, 74-1044-R (8/28).

**Secretary III-IV** to three Nuclear Engineering professors will type technical reports, proposals, class notes, manuscripts, correspondence from handwritten drafts and dictaphone and/or shorthand desirable. 74-1103-R (9/4).

**Secretary III-IV** in Metallurgy and Materials Science will handle secretarial and liaison duties for the staff and students of a large undergraduate course. Good typing (technical typing helpful), ability to work under pressure in a very busy office required. Flexibility, ability to set priorities important. Temporary until 12/30/74. 74-1120-A (9/4).

**Secretary IV** in Nutrition and Food Science will type proposals, reports, correspondence from rough and finished drafts; handle all general duties. Good typing, dictaphone skills required. Some knowledge of biological and/or chemical terminology helpful. 74-1074-A (8/28).

**Secretary III-IV** to the Assistant Dean of the Graduate School for Minority Affairs will work with students' and



faculty members from various ethnic, cultural, and economic backgrounds. Handle all general secretarial duties in one-person office; take dictation, type correspondence, reports. Excellent typing skills (70wpm); previous experience (MIT preferred); ability to work independently required. 74-1049-R (8/28).

*Secretary III-IV* to two Physics faculty members and Executive Officer will assist with all secretarial duties in the headquarters office. Good typing, shorthand skills; ability to work independently required. 74-1081-R (8/28).

*Secretary III-IV* in Civil Engineering will type correspondence, proposals, reports, class notes from handwritten, typed drafts, dictaphone. Schedule travel, meetings, appointments. Excellent typing, willingness to work under the pressure of deadlines required. 74-1085-R (8/28).

*Secretary III-IV* in the Analytical Studies & Planning Group will work on official Institute publications such as the General Catalogue, Courses and Degree Programs, Report of the President; and assist with general secretarial duties within the Analytical Studies and Planning Group. Excellent typing and proofreading skills, willingness to work under pressure of deadlines required. Some experience with production and layout is helpful to work as part of an editing production team. 9:00-5:30; 37½ hour work week. 74-984-R (8/21).

*Secretary III-IV* in the Center for Advanced Engineering Studies will handle all general secretarial duties for the marketing area of the Center; act as liaison between separate areas of the Center and its customers; monitor office accounts. Excellent typing required; ability to deal with a variety of activities and people of a very busy office important. 74-988-R (8/21).

*Secretary III-IV* in Personnel will work for the Employment Officer and two Personnel Assistants. Good typing skills needed for correspondence, memos, form letter, reports; maintain special files; assist in arranging schedules for recruiting; handle employee cases, references, applicants for Personnel Assistants. Ability to work independently; maintain a variety of schedules and procedures. Flexibility, experience, and interest in being a part of an active group is necessary. 74-969-R (8/14).

*Secretary III-IV* in Nuclear Engineering will handle general secretarial duties for several faculty and staff; type class materials, correspondence, manuscripts, reports from handwritten notes, transcription and dictaphone. Schedule travel, appointments, meetings. Good typing, organizational skills required; experience with dictaphone, technical typing, shorthand desired. 74-959-A (8/14).

*Secretary III-IV* to two faculty members in Electrical Engineering will type class notes, reports, proposals (some technical); schedule meetings, appointments, travel. Technical typing skills required; initiative and the ability to work with a minimum of supervision important. 74-843-R (7/31).

*Secretary III-IV* in Ocean Engineering will handle general secretarial duties. Type correspondence, class notes, reports, proposals; arrange meetings, appointments, travel. Good technical typing skills, ability to work under pressure important. Familiarity with MIT procedures preferred. 74-909-R (8/7).

*Secretary III-IV* for a group of Nuclear Engineering professors will type articles, proposals, class notes, correspondence from handwritten drafts, dictaphone; handle other general office duties. Good typing, knowledge of office procedures required; technical typing and shorthand skills desirable. Ability to organize and work independently important. 74-916-R (8/7).

*Secretary III* to several staff members of the Center for Theoretical Physics. Excellent typing needed for technical reports, manuscripts and correspondence (technical typing skills helpful); ability to work effectively with students, guests, and faculty important. 74-833-R (8/7).

*Secretary III-IV* in Physics Dept. Theoretical Center will work for three-four busy professors. Ability to handle some pressure, decide work priorities, type technical manuscripts and papers, cover phones as needed. Typing skills must be excellent; shorthand desired, willingness to learn. 74-903-R (8/7).

*Secretary III-IV* for three professors at the Sloan School will handle general secretarial duties in one-person office; make travel arrangements; type and arrange duplication of course materials including manuscript and technical typing. Secretarial training, experience in technical typing, and ability to organize and work with a minimum of supervision required. 74-829-R (7/24).

*Secretary III* in Chemical Engineering will type quizzes, reports, technical manuscripts, proposals for three

faculty members. Will arrange appointments, maintain student records, act as receptionist for the office. Dictation from tapes; technical typing experience preferred. Prompt, dependable individual with ability to follow through on details desired. 74-1104-R, 74-1105-R (9/4).

*Secretary III* in the Institute Information Office, Design Services will handle general secretarial duties; maintain records and accounts; do some proofreading and other duties related to the production of graphic design. Accurate typing and a good command of English required. 74-923-A (8/7).

*Secretary III* in Biology Headquarters will handle correspondence, memoranda, typing of class notes and quizzes for the Undergraduate Officer; assist with the registration process; maintain files. Accurate typing required; ability to deal with students, faculty and staff important. 74-1067-R (8/28).

*Secretary III* in Career Planning and Placement will type correspondence, interview notes for Alumni Placement Officer, Associate Director. Schedule appointments; receive alumni and company representatives; maintain files and records. Good typing, ability to work with details required. Flexibility, maturity, tact important. 74-1078-R (8/28).

*Secretary III-Temporary* in the Dean's Office, School of Humanities and Social Science will assist with a variety of duties; type material from dictaphone; answer and redirect questions from students and faculty; maintain files. Excellent typing, dictaphone skills required. Flexibility, tact important in dealing with a large number of people. Temporary 2-4 months. 74-1084-A (8/28).

*Secretary III* to the Head of the Atomic and Solid State Division in Physics. Handle general secretarial duties, type correspondence reports (some technical), answer questions from students and faculty. Good typing and shorthand required; previous secretarial experience preferred. 74-961-R (8/14).

*Secretary III* to an Urban Studies and Planning professor will type manuscripts, correspondence and reports; maintain office files; set up appointments; arrange travel. Excellent typing, previous secretarial experience, dictaphone skills essential. 74-972-R (8/14).

*Secretary III* Secretary to Associate Director of Admissions and Associate Advisor to Foreign students. Compose and type letters, prepare immigration forms, etc. At least three years of clerical experience. Excellent skills, ability to organize, cope with interruptions. Some seasonal pressure. Tact in dealing with students. 74-798-R (7/17).

*Secretary III* in the Research Laboratory of Electronics will take shorthand, handle correspondence, make appointments, type course notes, problem sets, quizzes, some involving technical typing; will maintain a small library for journals and technical reports. Some secretarial experience or schooling required. 74-634-R (6/5).

*Senior Clerk IV* in the Committee on the Visual Arts will assist in the research, evaluation, selection and installation of exhibits in and around the Hayden Gallery. Will include some responsibility for curatorial assignments for MIT collections. Strong background in Art History required. Candidates must have some gallery experience. 74-1028-R (8/28).

*Technical Typist III* will assist in the production of the Neurosciences Research Program Bulletin through use of IBM/MTST composer system. Type manuscripts; adapt format, scientific symbols, tabulations, etc. to style of the Bulletin; proofread copy; check bibliographic format. Good typing skills essential; knowledge of publications procedures. Applicant can be trained on MTST. Off-campus location (Brookline); own transportation desirable. 74-985-R (8/28).

*Senior Clerk IV* in the Summer Sessions Office will handle a variety of clerical duties; type letters and memos, distribute mail, keep inventory of office supplies, file purchase orders, process bills and keep track of applications for programs. Will also assist with summer registration and training office assistant. Excellent typing required; ability to work under pressure. 74-798-R (7/17).

*Senior Clerk III* in the Development Office will maintain central fund raising files, acknowledgment system; review data and post on donor cards; assist with investigation and evaluation of donors and prospects. Flexibility, ability to work with details, accurate typing required. Previous office experience desired. 74-954-R (8/14).

*Senior Clerk III* Assistant to Corporations Analyst will handle information requests from senior Institute Officers regarding fund-raising objectives. Help maintain files, evaluate donors and

prospects, write background memoranda. Excellent opportunity for promotion. Excellent skills; dictaphone. Mature and experienced individual. 74-801-R (7/17).

*Senior Clerk III* in Microreproduction Laboratory (Libraries) will process requests for microfilm and photocopies; type invoices, work orders; prepare statements for the Accounting Office. Ability to assist customers over the phone and in person is essential; accurate typing skills required; book-keeping knowledge helpful. 74-1092-R (9/4).

*Senior Clerk III* in Medical will handle reception duties at the first floor reception desk. Answer phones, schedule appointments, handle a variety of clerical duties. Mature, responsible individual with previous work experience and success in dealing with the public is needed. Light typing required. 37½ hour work week, 8:30-5:00. 74-1116-R (9/4).

*Technical Typist III* in Chemical Engineering will type large volumes of reports, manuscripts and proposals from rough drafts using a magnetic tape typewriter. Excellent typing skills required; ability to handle equations and chemical symbols, punctuation and paragraphing necessary. 74-741-R (7/10).

*Senior Clerk III Full-Time* and *Part-Time* at the Architecture Department Film Section must be familiar with the use of Sync-sound filming and editing equipment. Check and repair film equipment, sound transfer and mixing. Answer student questions, assist with classes. P.T. hours to be arranged. 74-912-R, 74-913-R (8/7).

*Clerk-Typist II-Temporary* in the Admissions Office will perform general clerical duties; answer busy phones; open, sort, deliver over 180,000 pieces of mail yearly. Accurate typing skills, ability to work in a busy office with a variety of details important. 9 month opening: 9/74-5/75. 74-1017-R (8/28).

*Clerk-Typist II* in the Information Processing Center will distribute publications; maintain and update collections of reference manuals, mailing lists. Good typing needed for training in the use of the MTST and technical/statistical typing. Ability to deal with people important; (a lot of public contact in this job). 74-1046-R (8/28).

*Sr. Library Assistant IV* in the Libraries Catalogue Department will assist in the maintenance of the Subject Authority File. Establish new headings, type cards for references. Accurate typing, ability to follow complex directions required. College background, library experience of value. 74-1093-R (9/4).

*Senior Library Assistant IV Part-Time* in the Serials Department of the Libraries. Prepare and edit data for publication of the MIT Serials & Journal guide, assist with serials cataloging process. Library experience essential; attitude for computer applications; typing helpful. 20 hour work week. 9am-1pm, M-F. 74-1122-R (9/4).

*Senior Library Assistant IV* in the Library Catalogue Department will be responsible for descriptive cataloging of MIT theses, input theses and technical report literature on the OCLC 100 computer terminal. Accurate typing; ability to accurately follow complex directions; college graduate preferred.; background in library science desired. 74-1008-R (8/21).

*Library General Assistant III-Temporary* will participate in the circulation desk functions in the Science and Humanities Libraries; tabulate statistics, type charge cards and other materials. Neatness and accuracy essential for detail work of the circulation routines. Typing skills required; ability to establish and maintain good library-reader relations important. Tues-Fri: 10-6; Sat: 9-5. Nine month position. 74-1121-R (9/4).

*Library General Assistant III-Temporary* in the Library Catalogue Department will type master catalogue entry on the OCLC 100 terminal; perform clerical aspects of reclassification, and other varied duties. Above-average typing skills required; capacity for details important; college or business school background and previous library experience helpful. Minimum duration: 3 weeks. 74-1040-R (8/28).

*Library General Assistant III* in the Library Catalogue Department will type master catalogue entry on the OCLC 100 terminal; perform clerical aspects of reclassification and other varied duties. Above-average typing skills required; capacity for details important. College or business school background and previous library experience helpful. 74-942-R (8/14). 74-1039-R (8/28).

*Clerk-Typist II or Senior Clerk III* in the Office of Sponsored Programs Property Section will type a variety of letters and forms; maintain log books; prepare mailings of property cards; up-date mailing lists; proofread and

make corrections on computer lists and cards. Good typing, accuracy and neatness required. Some accounting office or clerical experience desired. 74-862-R (7/31).

*Microfilm Assistant II or III* in the Microreproduction Laboratory will be trained in the techniques of micrographic: planetary and rotary camera filming, microfiche production, photographic enlarging, and other methods. Candidate should have an interest in technical photography, mechanical aptitude, and a willingness to learn. Some experience in microphotography desirable. 40 hour work week. 74-1091-R (9/4).

*Clerk II Part-Time* for the Joint Center for Urban Studies will collect and sort data for a study of seasonal and cyclical fluctuations in residential construction, Economics background helpful. 20 hour work week. 74-1108-A (9/11).

*Jr. Payroll Clerk II* in the Comptroller's Accounting Office will mail various monthly payroll accounting printouts; assist in the cashier's Office; file and research terminated accounts. Light typing skills required; previous office experience or high school bookkeeping courses necessary. 74-1127-R (9/11).

*Clerk-Typist II* in the Comptroller's Accounting Office, Student Loan Section, will maintain files of student loans; will explain repayment terms to borrowers; assist borrowers in signing loan notes. Good typing, adding machine and filing skills required. 74-1118-R (9/4).

*Nurse Aide* in the Medical Department's OBS/GYN Service will assist with routine examinations and special procedures. Weigh patients, take blood pressures, obtain laboratory samples, do venipuncture. Will also schedule appointments, prepare charts, records, lab requests. Maturity and ability to deal effectively with patients and staff required. Previous nurse aid experience performing medical assisting preferred. 74-1111-A (9/4).

*Jr. Dietary Aide II* for the Clinical Research Center will be responsible for all procedures used in preparing, weighing, cooking and serving food for 10-20 patients on metabolic diets. Experience in handling of foods preferred. Ability to work independently required. 40 hr work week. 74-1077-R (8/28).

*2nd Class Engineer* must have a Mass second class Engineer's license or higher. Individual must be willing to work on any shift. 74-182-R (11/24).

*3rd Class Engineer* at the Power Plant may work any and all shifts and do all kinds of work, consistent with self sufficiency of the Plant. Mass. Third Class Stationary Engineer's license or a license of a higher grade required. Experience on high pressure boilers, oil and gas fired with automatic combustion controls, turbine driven auxiliaries: AC and DC generation, switchboard, and fed water control required. Some experience on turbine-driven refrigeration equipment is desirable. 74-422-A (5/29).

*Reactor Operator IV* in Nuclear Engineering will serve as shift operator on the MIT Reactor after passing A.E.C. Operator's Examination. Monitor operation of a 5MW reactor; assist with various technical tasks; maintain logs and check sheets. 3-4 years experience in the Nuclear field will be necessary for preparing for operator's licensing. Knowledge of electronic circuits helpful. Ability to work under pressure of emergencies important. 40 hour work week. 74-766-R (7/10).

*Campus Patrolwoman/Patrolman* Minimum 3-5 years experience required in all phases of law enforcement to include knowledge of court procedures and case preparation, investigation of criminal and other complaints and reporting on same. Rotating shift/40 hour work week. 74-946-R, 74-947-R, 74-948-R (8/14).

*Senior Stock Clerk* in Graphic Arts will perform all stock room functions, initiate orders for stock; keep reserve stock room records; check requisitions for descriptions. Prepare printed material for delivery to MIT departments and outside vendors. Check slips and purchase orders and forward them to the G.A. accounting office. Must have full knowledge of commercial printing paper including; types, finishes, grains, properties, etc. Must be able to use power cutter and work from material cards. Graduation from high school of its equivalent and two years applicable experience required. 40 hour work week. 74-350-R (7/31).

*Tech A (E-M)* for the Radioactivity Center will assist in laboratory, research, or analytical work; operate technical experimental apparatus; maintain electronic equipment associated with controlled low-background facility, breath radon, thoron equipment. Troubleshoot nuclear pulse instrumentation, construct, wire, perform routine tasks associated with measurement of subjects and administration of laboratory. Strong background in pulse and digital circuits; experience in use of oscillo-

scopes and test instruments required. 74-922-R (8/28).

*Waitresses/Waiters-Part-Time* at the Faculty Club will set up silver and china on dining room tables. Take number orders; serve food and beverages. Clear, clean and reset tables. Experience helpful, but not necessary. Shifts: M-F 11am-3pm; 5pm-9pm. All positions may require weekend work. 74-1050-R, 74-1051-R, 74-1052-R, 74-1053-R, 74-1054-R, 74-1055-R, 74-1056-R, 74-1057-R, 74-1058-R, 74-1059-R, 74-1062-R, 74-1063-R, 74-1064-R (8/28).

*Laboratory Assistant Part-Time* in Biology will sterilize, wash, clean and prepare glassware for use in experiments. Maturity, reliability, ability to follow directions required. Previous experience in scientific glass washing desirable. 20 hour work week. 74-1102-R (9/4).

*Cashier II* will be responsible for general cashier duties for the MIT Food Service. Will also perform related clerical duties, assist customers, prepare accounting forms. Ability to work with the public, reliability essential. 40 hour work week: 10:15am-7:15pm. 74-1107-A (9/4).

*Counter Person* at the Student Center will be responsible for the set up of the service area; serve from the Hot Food Counter. Ability to understand English required. Must be able to work weekends. 10:30am-7:30pm M-W, Sat-Sun, (40 hrs), 74-997-A; 10:30am-7:30pm Sat-Sun, Part-time (16 hrs), 74-998-A (9/4).

*Kitchenperson* at the Faculty Club will sweep, mop kitchen floor; empty trash; wash pots and pans; clean serving table, range and broiler, strain grease in fryers. Steady work record desirable; experience in kitchen helpful. 4pm-12midnight, M-F; some weekends. 74-1065-R (8/28).

*Kitchenperson* will wash pots, pans, small and large scale equipment for the Dining Service. Sweep and mop floors; empty trash; perform general cleaning. 40 hour work week; M-W 11am-8pm, Sat-Sun 11am-8pm. 74-1001-A (9/4).

*Cook's Helper* for the MIT Dining Service will cook vegetables and prepare salads and complete other assignments. Must be able to read and understand English in order to follow recipes. 40 hour work week, 6am-3pm. 74-999-R (9/4).

*Cook's Helper* for the Dining Service will set up food service counters for breakfast; assists breakfast and lunch cooks in preparing meals. Must be able to read and understand English in order to follow recipes. 40 hour work week, 7am-4pm. 74-1000-R (9/4).

*Truck Driver* for Physical Plant must have an unrestricted Class 1 or 2 Mass. Driver's License. One year experience in the operation of mechanical equipment such as: snow equipment and trucks. Ability to pass special physical examination required. Mechanical ability desired. Will work a schedule other than M-F and on shifts determined by needs. 74-726-R (9/11).

*Mover* for Physical Plant will transport various materials and equipment (medium or heavy nature) to designated locations; assist with snow removal. One year experience in general moving procedures, rigging, loading and unloading heavy equipment; ability to pass special physical examination, unrestricted Mass. Driver's license required. Experience in special handling of equipment such as oil filled transformers etc. desired. 74-773-R (9/11).

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

|           |                        |
|-----------|------------------------|
| 74-858b-R | Admin. Staff           |
| 74-892-R  | Sec. IV                |
| 74-1060-R | Waitress/Waiter        |
| 74-1042-R | Sec. III               |
| 74-953-R  | Sec. IV                |
| 74-857-R  | Sec. IV                |
| 74-731-A  | Sec. III               |
| 74-1123-R | Lib. Gen. Asst. III    |
| 74-1096-R | Sec. IV                |
| 74-931-R  | Clerk II P.T.          |
| 74-888-R  | Sec. IV                |
| 74-992-R  | Sec. IV                |
| 74-1061-R | Waitress/Waiter        |
| 74-986-R  | Sr. Lib. Asst. IV      |
| 74-934-A  | Ed. Sec. IV P.T.       |
| 74-1021-A | Sec. IV                |
| 74-983-A  | DSR Staff              |
| 74-991-R  | Acct. Machne Oprtr III |
| 74-967-R  | Sr. Sec. V             |
| 74-940-A  | Sec. IV                |
| 74-1003-R | Gen. Helper cancel     |
| 74-673-R  | Sec. III-IV            |
| 74-953-R  | Sec. IV                |
| 74-1113-R | Comptr. Oprtr III-IV   |

The following positions are on HOLD pending final decisions:

|           |                          |
|-----------|--------------------------|
| 74-293-R  | Sec. IV                  |
| 74-1079-R | Sec. III                 |
| 74-852-R  | Tech. Asst. V            |
| 74-1087-R | Clerk-Mssngr. II-III     |
| 74-970-R  | Doc. Coord. Exempt       |
| 74-695-R  | Bldg. Svcs. Asst. Exempt |
| 74-351-R  | Sr. Offset Prsrnsn.      |



## Kranz Exhibit To Open Hayden Gallery Season

An exhibition of the work of the eminent German artist Kurt Kranz will go on display Sept. 23 as the inaugural event in the 1974 fall schedule of exhibitions in MIT's Hayden Gallery.

The presentation of *Kurt Kranz: Bauhaus and Today* will offer more than 80 pieces selected to permit viewers to examine the artist's mature work from the mid-1960s onward against a backdrop of his experiments of the early 1930s at the Dessau Bauhaus.

The show will have a public opening from 8-10pm Monday, Sept. 23, with Mr. Kranz present, and will run through Oct. 12. An illustrated catalogue of the exhibition with texts by Eduard Sekler, Alfred Moir, John David Farmer and George Hickey will be available to gallery visitors. Hayden Gallery is open every day from 10am-4pm and from 6-9pm Tuesdays.

Born in Germany in 1910, Kranz joined the Dessau Bauhaus in 1930 after founding director Walter Gropius and many others of the "first generation" in Weimar had left. Kranz' teachers at the Bauhaus included Josef Albers, Paul Klee, Wassily Kandinsky and Herbert Bayer.

When the Bauhaus was disbanded in 1933, Kranz became director of Bayer's commercial design studio in Berlin. After spending the war years in Norway and Finland, he returned to Germany and in 1958 became a professor of art at the Hamburg Art Academy.

Kranz has held teaching appointments at several American universities, including Harvard, Tulane and the University of California. Outside Germany, his work has been shown most extensively in the US and Japan. He is represented in major private and public collections, including those of David Rockefeller, the Boston Museum of Fine Arts, and the Art Institute of Chicago.

Background notes prepared by the Committee on the Visual Arts for the exhibition describe the nature and evolution of Kranz' work:

"In a variety of media—including painting, drawing, photomontage, watercolor, silkscreen, mixed media and film—the essence of Kranz' art is his concern with kinesthetics and form sequence, or seriality.

"Seriality, loosely defined, is a phenomenon of the American art scene of the Sixties, and many American painters, beginning with Ad Reinhardt and including Morris Louis, Frank Stella, Kenneth Noland, Ellsworth Kelly, Andy Warhol and sculptor Larry Bell, have been identified with its proliferation. Josef Albers, who was one of Kranz' teachers, has been generally credited as the inspirational force behind serial thinking in America. Kranz can now also be appreciated as a pioneer of serialism.

"An impeccable sense of craftsmanship and a constructivist's penchant for mathematical theory, objectivity and systemization can be seen as his Bauhaus legacy, but Kranz' poetic inspiration determines the individual character of his work. 'We construct,' he has written, 'and intuition remains a good thing after all.'

"One of Kranz' very earliest experiments with abstract pictorial sequence, *Black: White*, executed about 1927 even before he entered the Bauhaus, will be on view along with other studies using color film theory developed at the Bauhaus, and four films made in Canada in

1972 and based on these works will be shown.

"Kranz' surrealist-related photo-montages of the Bauhaus period, under the influence of Moholy-Nagy and Bayer, are illuminating in light of Kranz' recent mixed-media assemblages. Again utilizing form sequence to move from abstract to pictorial representations, concrete three-dimensional objects are included in contexts that recall surrealist juxtapositions and transformations.

"The step from virtual to actual movement is accomplished by Kranz in his abstract paintings with sliding panels. Kranz had become interested in color in the late Forties, developing the color praxis theory he is well-known for in academic circles. Within a combinatoric system which Kranz has carefully devised on a mathematical basis, the viewer/participant may share in the creative process but within limits dictated by the artist. Kranz extends the same principles to folding objects in different media."

The exhibition was organized by Stephen Reichard for circulation by the Smithsonian Institution with support of the Goethe House New York and is sponsored at Hayden Gallery by the MIT Committee on the Visual Arts.

## Gannett Newspaper Study

(Continued from page 1) ed program at MIT will be to encourage young technologists to consider newspaper careers.

The program also will be aimed at making practicing engineers aware of what the newspaper industry still needs in the way of more advanced technology and at making newspaper professionals aware of the impact technology is having on their own careers.

Under the MIT/Gannett Foundation Graduate Fellowship Program, two Gannett Fellowships will be awarded each year to students entering the graduate school who have an expressed interest in technology as it relates to the newspaper business.

Each fellowship will be renewable for one additional year, meaning that the holder will have ample time to complete requirements for the Master of Science degree and possibly for a professional degree beyond the master's level.

Fellowship recipients will be expected to develop strong ties with MIT faculty engaged in research in newspaper technology or in areas that are applicable to newspaper problems.

Several groups at MIT are presently engaged in newspaper-related research in such areas as computer and communications technology for the benefit of the production and editorial sides of the business, the development of integrated computerized information management systems as a

# Tribus to Become CAES Director

(Continued from page 1) areas such as transportation, energy, communications, environmental control and utilization of natural resources.

"As broadened interests in undergraduate and graduate education within the School of Engineering evolve," Dean Keil said, "we can expect a corresponding change in the education of professionals who are already at work in industry and government. Likewise, developments within the Center organized around technological aspects of large social issues and aimed at practicing engineers, scientists and technical managers can have an important impact on graduate and undergraduate programs offered by the School of Engineering."

The Center had its origin in a suggestion by the late Mr. Sloan, then chairman of the Alfred P. Sloan Foundation and honorary chairman of the board of General Motors Corporation and an 1895 graduate of MIT. Mr. Sloan often encouraged new and innovative programs at MIT and in 1962 he identified to then MIT Chairman James R. Killian, Jr., "a national need and opportunity by which graduate engineers could increase their competence by intensive education in the modern concepts and discoveries of science."

The Sloan Foundation, following a study led by Professor Gordon

Brown, then MIT Dean of Engineering, made a \$5,000,000 grant to MIT to establish the Center, including construction of a building especially designed for continuing education programs. Under its first director, Dr. Harold S. Mickley, the Center made important progress both in providing opportunities for practicing engineers, scientists and technical managers to return to the campus and in providing continuing educational systems used in the field at or near their places of employment.



Dr. Tribus

The CAES operates several programs.

One is the Practicing Engineer Advanced Study Program which enables engineers and scientists nominated by their companies to spend a sort of "industrial sabbatical" for one or two terms at MIT. While at the university, they work at depth in technological areas pertinent to their professions through study programs structured to their individual needs. Fifty such professionals are presently studying under the program which has had more than 300 enrollees since it began in 1963.

A second program deals with systematic policy analysis. It was begun in 1967 and provides similar mid-career opportunities for government employees at the federal and state levels. About 10 individuals take advantage of this program each year.

CAES also produces self-study subjects for larger numbers of working professionals who cannot leave their jobs. Each subject is a multi-media package that includes a pretest, a study guide, lectures and demonstrations on film or videotape, lecture notes, a text, detailed solutions to problems, and a certificate of satisfactory completion. The system can be used by individuals for self-paced studies or by groups in regularly scheduled classroom sessions.

During 1971, CAES offered its first four subjects in the self-study format to industry. Enrollments climbed rapidly during the second half of the year and totalled nearly 1,000 by year's end. The Center now has a total of 18 subjects available for distribution and development is underway on six more.

As director of CAES, Professor Tribus will serve as a member of the MIT Engineering Council and participate in the Council's decisions with respect to tenure and promotion.

Dr. Tribus, 53, received the BSc degree in chemistry from the University of California, Berkeley in 1942 and the PhD, in engineering, from the University of California, Los Angeles in 1949. He was an instructor in engineering at UCLA from 1946 to 1950, in charge of all instruction in thermodynamics.

Dr. Tribus joined the General Electric Co. in 1950 and from 1951 to 1953, at the invitation of the US Air Force, was Director of Icing

Research at the University of Michigan. Dr. Tribus returned to UCLA in 1953 as associate professor of engineering specializing in heat transfer and thermodynamics, statistical mechanics, heat transfer and the principles of design.

In 1961, he became Dean of the Thayer School of Engineering at Dartmouth College. There he introduced one of the most innovative engineering education programs in the US: one option of this program emphasized engineering science; the other, engineering design. In the design program, his students participated in clinical experiences and were evaluated on the basis of their original designs. At Dartmouth his interests became even broader; he became interested in water resources, the process of innovation, and the decision theory basis of choice.

In 1969, Dr. Tribus became Assistant Secretary of Commerce for Science and Technology, where he was in charge of the National Bureau of Standards, the Environmental Sciences Administration (now the National Oceanic and Atmospheric Administration), the Patent Office, the National Technical Information Services, the Office of Telecommunications and the Office of State Technical Services. During this period he was Chairman of the Interdepartmental Committee on Atmospheric Science and a member of the Federal Council for Science and Technology.

Dr. Tribus joined Xerox in 1970 as senior vice president of the Information Technology Group and manager of the Research and Engineering Division. He was in charge of research and development in the United States and in Europe for the copier/duplicator portion of Xerox's product line. At the present time he is a vice president in Xerox's corporate research group.

Dr. Tribus' awards and honors include honorary degrees from Dartmouth, Rockford College and Oakland University; the Wright Brothers Medal of the Society of Automotive Engineers in 1945; the Thurman H. Bane Award of the Institute of Aero-Space Sciences in 1946; the Alfred Nobel Prize of the Engineering Founder Societies in 1952; the Designer of the Year Award of Product Engineering Magazine in 1967; the Heat Transfer Division Award of the American Society of Mechanical Engineers in 1968; the Technical Achievement Certificate of the Washington, D.C., Section of the American Society of Mechanical Engineers in 1971; and the Engineering Alumnus of the Year 1971-72 Award of the University of California, Los Angeles, in 1972.

Dr. Tribus is a Fellow of the American Society of Mechanical Engineers, a member of the National Academy of Engineering, and vice-chairman of its Committee on Public Engineering Policy. He is a member of the American Society for Engineering Education, the National Society for Professional Engineers, the Institute of Electrical and Electronic Engineers, Phi Beta Kappa and Sigma Xi. He has served on sub-committees of the National Advisory Committee for Aeronautics, the Advisory Group on Aeronautical Research and Development of the North Atlantic Treaty Organization, the Commerce Technical Advisory Board of the United States Department of Commerce and the National Advisory Committee on Oceans and Atmosphere. Dr. Tribus is a member of the Board of Directors of the Rochester Engineering Society, SCORE, Inc. (Student Competition on Relevant Engineering) and of the Board of Governors of the Technion in Haifa, Israel.

## Fuel Price Watch



Following are comparative prices of various fuels over the past four years. The prices are supplied by Office of Environmental Engineer, MIT Department of Physical Plant, and are published regularly in *Tech Talk* so MIT people will have a frequent guide to how prices have been climbing and to why energy conservation is important at home and at the Institute.

| Date       | Industrial Oil (#6) | Steam Per klb | Electricity Per kWh | Home Oil (#2) Per gal |
|------------|---------------------|---------------|---------------------|-----------------------|
| Sept. 1974 | \$13.85             | \$4.25        | \$.0300             | 33.5 ¢                |
| Sept. 1973 | 5.62                | 1.75          | .0175               | 23.5                  |
| Sept. 1970 | 1.85                | .87           | .0130               | 5.9                   |