

AUTO CONGESTION

Special Road-Use Meters Proposed to Reduce Traffic

Special toll charges on highways, expressways and city streets would be a more effective and equitable way of reducing automobile traffic than an outright ban on travel, an MIT transportation expert believes.

David Gordon Wilson, professor of mechanical engineering, said that any system of restrictions and permits, such as proposed recently for a number of urban areas by the Environmental Protection Agency, would lead "to abuses and to other secondary effects which are unforeseen."

He said he foresaw "a mushrooming of a bureaucracy whose job was to issue permits, an attendant web of favoritism and privilege for public servants and their friends and a large increase in police duties."

Article in Ripon Forum

Dr. Wilson, who has supervised research and the drafting of legislation on inter-urban transportation and highway safety, outlined an alternative plan in an article in the summer issue of the Ripon Forum, published by the Republican Ripon Society of Cambridge.

He said that motorists could properly be charged for the right to use so-called public, toll-free roads—at least during certain times, such as rush hours—because their excise and gasoline taxes do not meet the extra community costs caused by congestion.

"The economic reality of the use of public roads is widely misunderstood," he said.

British Study Cited

A British study, he said, indicated that an automobile user in a center city during rush hours incurs public costs—for police, highway maintenance and particularly, delays to others—of \$2 per mile traveled over and above those met by the gasoline and excise taxes he pays.

Professor Wilson said that the individual deciding whether to use his car at rush hours or to travel by alternative means "weighs only his personal costs, principally the increased travel time involved."

"How dramatic, then, would be the change in the utilization of our public roads," he said, "if these motorists were, in fact, charged the additional \$2 they incur for each mile of rush hour travel."

Road-Use Meters Developed

Dr. Wilson said a toll system could be put into effect with road-use meters that have been developed in Britain.

These meters, which he said can be inexpensively produced and stuck in a visible position on the inside of the windshield of all vehicles, are advanced by the passage of the vehicle over coils placed in the road surface.

"These coils could be placed at frequent intervals, perhaps as close as 60 feet. If the meters advanced one cent each time the automobile passed a coil, a spacing of 60 feet would lead to a charge of about \$1 per mile."

Dr. Wilson said that this would be the "maximum presently foreseeable cost." The figure of \$2 per mile, derived from the British study, applied to stalled and congested conditions, which should no longer occur after the introduction of road-use meters, he said.

Way to Reduce Congestion

He said that congestion would be eliminated in the following way:

First, because the unallocated costs resulting from the use of the vehicles are very different for different roads—dropping, usually, as distance from a city center increases—the coils would be placed at different spacings in different roads. (All roads would carry signals to indicate the rates on which their charges were based.)

Second, costs vary at different times of the day, being highest at times of peak demand. Therefore, the 24-hour day would be divided into, say, three categories for different charge rates, similar to the variation of telephone charges. During rush hours, for example, all road coils would be activated. At other times during the working day, perhaps half the coils would be switched on. During the night, all except one out of every four coils would perhaps be sufficient to pay for the external costs.

Dr. Wilson said the road-use meters also could be used to eliminate parking meters, together with all the maintenance and policing that these require.

(Continued on page 8)

OPEN HOUSE SCHEDULED

First Elderly Housing Complex In MIT Program Is Completed

A ceremonial open house is scheduled for Thursday, August 9, to mark completion of the first 181 dwelling units for the elderly in MIT's Housing Program in Cambridge.

The open house will take place from 2:30-6:30 pm at the Hamilton Street building, the first of three apartment complexes to be completed. Citizens of Cambridge, particularly the elderly, and members of the MIT community will be invited guests.

The Hamilton Street building is located between Brookline and Pearl Streets in Cambridgeport. The main entrance is on Erie Street and the garden entrance is on Hamilton Street.

A capsule, containing names of Cambridgeport residents who participated in planning the Hamilton Street building, will be implanted in the front entrance walk during an informal ceremony at the open house. The brief ceremony is scheduled for 5:30 pm,

so that those who work will be able to attend.

The open house caps a four-year, \$17.1 million program MIT percent of the development and percent is tied to computer hardware account for 80 to 90 percent 20 percent of the budget for considered to be the largest federal Turnkey program in the nation.

(Under Turnkey, a private developer independently acquires a site, plans and constructs the buildings, then conveys them, "ready to turn the key," to the local housing authority, with financing provided by the Department of Housing and Urban Development.)

September completion is expected for 199 apartments on Clarendon Avenue in North Cambridge, to be followed by 304 apartments on Gore Street in East Cambridge. Each of the complexes was designed specifically for its neighborhood after extensive consultation with area residents.

The Hamilton Street develop-

ment has 148 efficiency apartments, 32 one-bedroom apartments and one two-bedroom apartment. Each apartment has a private balcony. This mixture of apartments is determined by guidelines in the Turnkey program.

All of the apartments include special features helpful to elderly people, such as grab bars in bathrooms and an alarm system for each unit. Approximately ten percent of the apartments are specifically designed for handicapped persons, including those confined to wheelchairs.

Also included are a number of common facilities. There is a large multi-purpose room with a kitchen, several smaller rooms for crafts and activities, a laundry and drying area, and a clinic which is expected to have regular medical staffing.

The ell-shaped building, with one section rising five stories and the other twelve, is built around an enclosed, landscaped courtyard.

(Continued on page 2)



NEW HOMES—181 apartments for elderly and Cambridge, MIT's federal Turnkey project which handicapped persons will make their debut next week will provide 684 apartments when completed in the at an open house of A Housing Program in fall.

PEDAL-POWERED PLANE

BURD's Taxi Test 'Highly Successful'

The MIT man-powered airplane had "highly successful" taxi tests last week at Hanscom Field in Bedford in preparation for its first attempt at flight.

The fragile craft, which is powered by two men pumping bicycle-type pedals, reached a speed of 14 miles per hour in the tests, about four miles per hour below takeoff speed.

The taxi runs, which took place on Runway 5, tested the plane's braking, steering and controls. Altogether, the series of tests took up between 1,100 and 1,200 feet of runway.

The tests were held between 7

and 8 am. Because it is so fragile, the plane can only be operated in calm wind conditions, which usually exist in the early-morning hours.

MIT students, graduates and faculty members have been working on the plane for about 3 and ½ years. The project grew out

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Inside:

"Earthspots" are a new aid in weather prediction. Story on Page 2.

Study finds block-grant revenue sharing is potentially destructive for cities. Story on Page 2.

Interest in guitars unites two specialists for a seminar. Story on Page 7.

Small business seen as new computer market. Story on Page 8.

Study Finds Block-Grant System Potentially Harmful

Block-grant revenue sharing—under which state governments control how and where federal money is spent at the municipal level—is based on “myths” and could threaten city survival and inhibit community-oriented reform efforts, an MIT urban specialist contends.

Lawrence E. Susskind says a two-year study of how such grants were spent in Massachusetts has revealed the presence of “hidden incentives and controls embedded in the administrative culture of state government.”

Those incentives and controls, Professor Susskind contends, are likely to lead to spending decisions that not only threaten the survival of medium-sized cities (under 100,000) but also inhibit community efforts to reform unworkable service delivery systems.

What Professor Susskind calls “the prevailing myths associated

with President Nixon’s general and special revenue sharing proposals” include, he says:

—The myth that revenue sharing will help alleviate the fiscal crisis at the local level.

—The myth that block grant revenue sharing will help curb centralization of power in the national government.

—The myth that block grant revenue sharing will permit greater popular control over public spending because states and localities are closer to the people than a distant federal bureaucracy.

“Given a more complete understanding of resource allocation and decision making at the state level, it is not difficult to strike down the prevailing myths,” Pro-

fessor Susskind said.

In his 548-page study, Professor Susskind, 26, the director of MIT’s undergraduate urban studies program and an assistant professor of urban studies and planning, reports on his research into Massachusetts’ experience with money received under the Law Enforcement Assistance Act (LEAA) and the Partnership for Health Act.

“President Nixon’s special revenue sharing proposals (calling for consolidated block grants to the states) in areas such as urban community development, education, health, law enforcement, and manpower, are very similar to the (Partnership for Health Act) 314(d) and LEAA programs,” Professor Susskind said.

“Although it might seem that block grants would take account of the principle of diversity, such is not the case,” Professor Susskind

said.

“The Massachusetts experience suggests that state agencies are likely to internalize a rigid and rather narrow notion of the purposes to which block grants can be put. Ultimately, block grants are more likely to serve a rather limited set of state-defined needs at the expense of local options...”

“General revenue sharing allows most decisions regarding the use of shared funds to remain at the local level.

“Under block grants, however, decision-making power would be re-centralized in the hands of the state. The redistributive power of grants-in-aid seems to diminish when decision-making power and discretion reside at the state level,” Professor Susskind said.

In addressing himself to what he calls the “myths” of revenue sharing, Professor Susskind made these points:

—Although it is argued that block grants will ease the local fiscal crisis by minimizing the need for reliance on regressive tax sources such as the property tax, “the fiscal crisis at the local level is actually not on the revenue side, rather it is on the expenditure side of the ledger. Fiscal problems at the local level revolve mostly around the inadequacies of local fiscal planning and management...” Income from block grants, especially when the federal government doesn’t attach strings, will have little bearing on improvement of local-level fiscal management.

—The argument that block grants will promote decentralization of power ignores “the fact that block grants will still hinge on continual Congressional appropriations and approval.

“It seems very clear that state governments are more likely to interfere with local decisions than the national government. From a local (especially a neighborhood) perspective there is not much difference between centralizing authority in the hands of the federal government or in the hands of the states. Except, perhaps, that historically the national government has been more inclined to serve urban interests than the states.”

—The argument that requiring states to make decisions about the allocation of federal funds will increase citizen participation in those decisions “has not been borne out by LEAA and 314(d) experiences in Massachusetts.

“Without federal controls, which normally accompany categorical grants, states are likely to eat up large amounts of money creating bureaucracies analogous to federal agencies.”

Professor Susskind, in a summary of his findings regarding the LEAA program in Massachusetts, made these points:

Massachusetts has made a “serious effort” to promote institutional reform and “an honest and professional attempt” to distribute funds in accordance with federal regulations. Still, the program “has had no appreciable impact on the crime rate.” Distribution of funds has been uneven, with local planning and grant management capabilities often the deciding factor. The program has largely failed to involve local planners and criminal justice officials in the development of the

state plan.

As for the 314(d) program, Professor Susskind said:

“In Massachusetts, while the mental health department has on occasion managed to channel 314(d) funds into interesting community-oriented projects, the funds, for the most part, have been squandered.

“The public health department has used its block grant funds almost exclusively to underwrite expenditures that should have been covered by normal state appropriations...”

“The funds have not contributed in the least to the development of comprehensive health planning capabilities at the state, sub-state, or local levels.

“The hoped-for partnership (between the various levels of government as well as between public and private participants in the health care delivery system) has failed to materialize.

“Finally, the lessening of federal restrictions on public health grants has enabled the state to set up a ‘slush fund’ made up entirely of federal revenues and to hold down state allocation for health services.”

The Susskind report, entitled “Decision-Making and Resource Allocation in State Government: A New Perspective on Revenue Sharing and Urban Growth Strategies,” will be published soon by the MIT-Harvard Joint Center for Urban Studies.

Elderly Housing

(Continued from page 1)

All three complexes were designed by Benjamin Thompson & Associates of Cambridge and built by Peabody Construction Co. of Braintree.

Under the Turnkey agreement, MIT will sell the three completed apartment complexes to the Cambridge Housing Authority for \$17,100,000. To obtain the funds, the Cambridge Housing Authority will sell bonds to the public, and HUD will pay the principal and interest over the 40-year term of the bonds. Financing for the construction was obtained by MIT from the Massachusetts Housing Finance Agency.

‘Earthspots’—New Aid in Predicting the Weather

The movement of sunspots in the solar atmosphere has led two meteorologists to an intriguing discovery about “earthspots”—high and low pressure areas which bring clear and cloudy weather, respectively.

The researchers found that, like some sunspots, high- and low-pressure areas in our atmosphere mysteriously move faster in the direction in which they are elongated. The findings are useful for weather predictions.

Norman J. Macdonald and Hilda T. Storari began their study when they learned of a 1966 study by Fred Ward, 53, then of the US Air Force Cambridge Research Laboratories and now meteorologist for WNAC-TV. Macdonald is a staff meteorologist at MIT and weather forecaster for WBZ-TV and Dr. Storari, a former MIT meteorologist, is now living in England.

Macdonald and Storari decided to examine the shape and movement of high and low pressure systems over the northern hemisphere to see if a similar phenomenon existed in the terrestrial atmosphere.

They measured the shape and movements of some 10,000 high-pressure areas and 18,000 low-pressure areas occurring in the northern hemisphere from 1959 to 1962. Their results, published in the May 20 issue of the *Journal of Geophysical Research*, did show that certain elongated earthspots, like some sunspots, moved

most rapidly in the direction of their elongation.

“We found that the systems elongated in a west-east direction moved faster eastward than circular or north-south elongated systems. Similarly, the north-south elongated systems moved faster across the parallels direction,” said Macdonald.

“Our findings do not help predict the direction of movement of these weather systems, only their speed. In the U.S., lows tend to move in a northerly and easterly direction, and highs in a southerly and easterly direction, and the elongations affect only the speed of the component of movement in a particular direction.

Though the researchers are certain of their findings—there is less than a one-in-a-thousand chance that their results are due to chance—they are still puzzled as to the reason for the results. They say there is nothing in any theoretical studies that would indicate why the movements occur, or even whether the shape of the weather system causes the movement, or vice-versa. Nevertheless, the phenomenon is useful to weather forecasters in the prediction of the motion of high- and low-pressure areas.

The MIT findings may, in fact, boost the popularity of weather forecasters with their constituents, because the method works best for predicting high pressure areas, which bring “nothing but blue skies.”

2 Appointed to Arts Council Directorship

Peter Spackman and Ellen Burbank have been appointed director and associate director of the Council for the Arts at MIT.

The appointments, effective July 1, 1973, were announced by Professor Roy Lamson, Special Assistant to the President for the Arts.

“Now that the Council for the Arts is fully operational,” Professor Lamson said, “we have the need of increased staff work to make efficient and effective use of the council’s committee structure, and we are most fortunate in finding two people whose interest in the arts is matched by their experience.”

The Council for the Arts at MIT is a support and advisory body of about 60 alumni and friends of the Institute across the country who are concerned with the arts in general and with their application to a university based on science and engineering in particular. The council is organized into committees through which its active programs are put into effect.

Mr. Spackman, who joined the staff of the News Office in 1971, served the council as editor of its newsletter before taking his present full-time post. Prior to coming to MIT, he had worked for Associ-

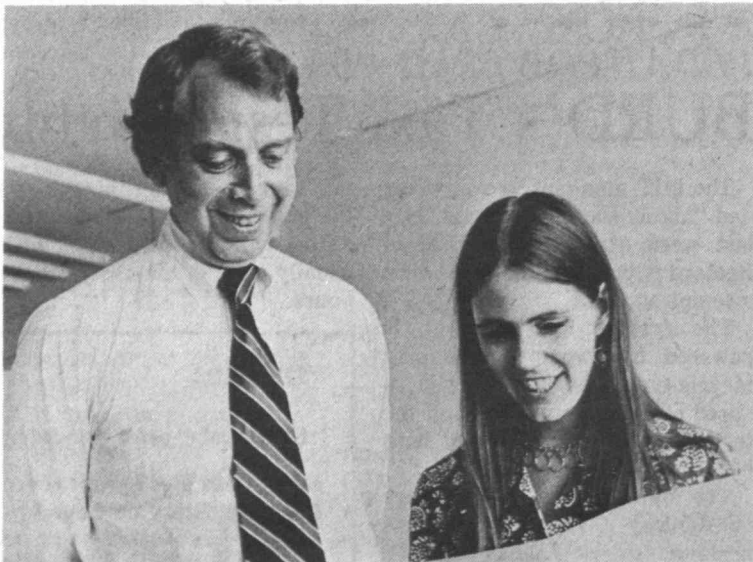
ated Councils of the Arts, a New York-based national organization composed of state and community arts councils, and as editor of *Cultural Affairs*, a quarterly magazine devoted to issues of public policy in the arts. Before that, he was editor of Columbia University Forum.

Mr. Spackman graduated from Princeton University in 1952 and from the Graduate School of Journalism at Columbia Univer-

sity in 1953.

Mrs. Burbank joined the council after several years in the MIT News Office, where she was in charge of publicity for art, music and cultural events at the Institute. During the tour last spring of the MIT Symphony Orchestra, she arranged advance publicity and press relations for the orchestra and served as tour manager.

Mrs. Burbank is a graduate of Finch College and resides with her husband at Boston, Mass.



Mr. Spackman and Mrs. Burbank.

TECH TALK

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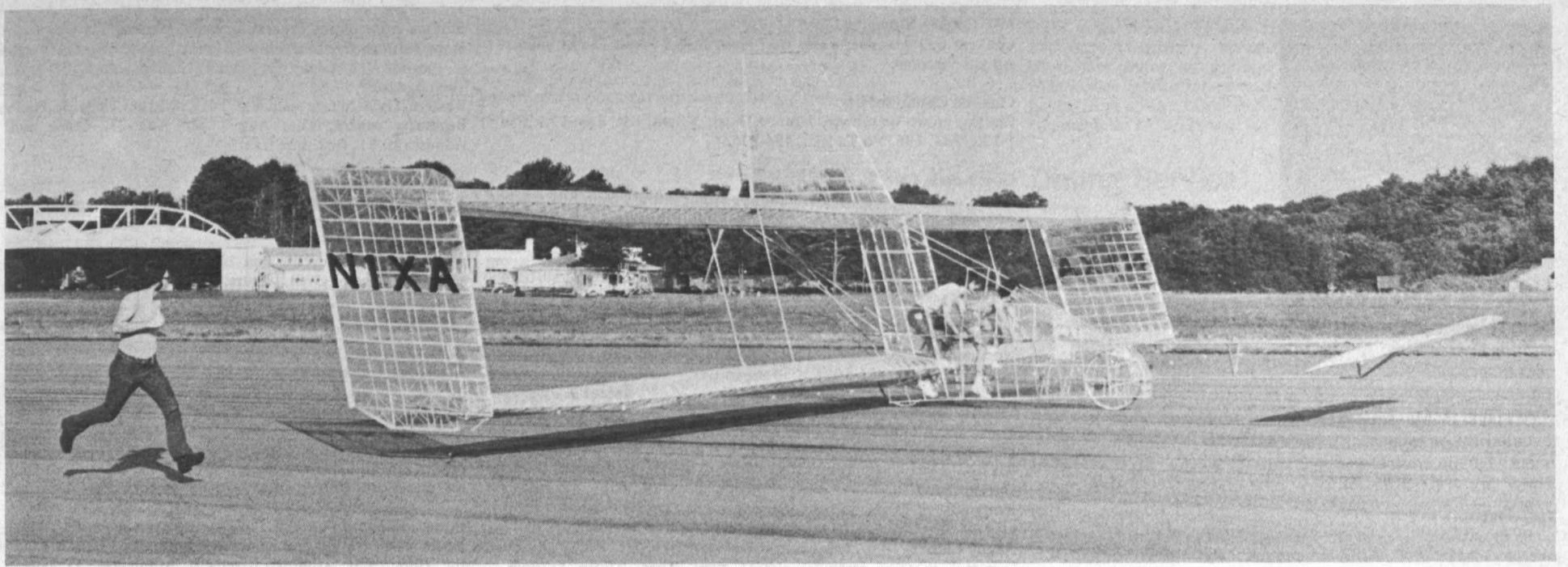
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Please address all news and comment to the editorial office, Room 5-111, Ext. 3-3277.



THE BURD TAXIS—MIT's man-powered airplane BURD (Bi-plane Ultra-light Research Device) is propelled along Hanscom Field runway during successful taxi test last week in Bedford. Working the pedals are project manager Robert M. Peterson, rear seat, and Stephen A. Chessin. Sprinting along side is Edward Uchno. All are MIT graduates.

BURD Passes Taxi Test, Next Will Try Its Wings

(Continued from page 1)

of a long-standing offer by a British industrialist, Henry Kremer, to pay a large cash prize for the first flight of a man-powered craft over a one mile, figure-eight course.

The prize has grown since 1959 to about \$128,000.

A number of man-powered planes have actually flown, although not well enough to win the prize. The longest flight, by a British-built craft, was 1,172 yards and the MIT group hopes to better that mark in the near future, according to Robert M. Peterson, of Somerville, project manager.

Peterson, who received both his bachelor's and master's degrees at MIT, was at the pedals for the taxi tests with another MIT graduate, Stephen A. Chessin, of Somerville.

No Rolls, Spins or Loops, Please

There'll be no deliberate rolls, spins or loops when MIT's man-powered airplane BURD makes its first flight. The Federal Aviation Administration won't permit it.

"This aircraft is prohibited from acrobatic flight," says paragraph seven in one of three official administration documents taped to BURD's transparent polypropylene hide.

"Regulations require that they be posted in a

clearly visible place," said Edward Uchno, one of the MIT graduates working on the project. "So we put them right to the left of the pilot. But, of course, on our plane, anyplace would be clearly visible."

The documents are a registration certificate, a flight-worthiness certificate and the experimental operating limitations. The latter, besides prohibiting acrobatic flight, also precludes carrying passengers for hire.

Two other persons—both cyclists and one a professional pilot—have been designated as the pilots for the planned official flights.

Peterson said that the "highly successful" taxi tests were the "prelude to an attempted straight-line flight, perhaps as early as next week, depending on wind con-

ditions." He said the first, unofficial flights were planned to be only 20 or 30 feet long about three or four feet off the ground.

If all goes well, he said, these will be followed by an official attempt to break the distance record and then a flight for the prize.

The group is aiming for an altitude of about 20 feet in the of-

icial flights and a top speed of about 18 miles per hour.

The MIT plane, called the BURD, (for Bi-plane Ultra-light Research Device) is an ungainly looking craft that somewhat resembles the planes of the Wright brothers era.

In order to keep its weight to a minimum, the BURD was con-

structed of balsa wood and aluminum tubing and covered with polypropylene, a clear material resembling household food wraps. The plane weighs 126 pounds, meaning that its total weight with pilots will be about 400 pounds.

Special aerodynamic features include the bi-plane design and 62-foot wings (for greater lift) controls at the front of the plane in a so-called canard arrangement, and spoilers on the wings (to facilitate making turns with a very shallow bank).

Their pedals and sprockets are connected by chain drive and gears to a 10-foot "pusher" propeller at their backs. The propeller, which can turn at 240 revolutions per minute, is made of laminated balsa sheets.

The pilots sit in a bicycle-for-two tandem arrangement at the rear of the plane, which is 27 feet long.

AT MIT CENTER

Kistiakowsky Named a Visiting Scholar

Dr. George B. Kistiakowsky, former science advisor to President Eisenhower and renowned for his research on the nature of chemical reactions, has been appointed a visiting scholar at the MIT Center for International Studies.

Dr. Kistiakowsky, a professor emeritus of chemistry at Harvard University, will work closely with Dr. Eugene B. Skolnikoff, director of the MIT center, on problems relating to the international policy implications of technological change, particularly arms control issues.

A native of Kiev, Russia, Dr. Kistiakowsky studied at the University of Berlin and Princeton

University. Because of his knowledge of the chemical reactions of explosives, he was chief of the explosives division of the Los Alamos Laboratory of the Manhattan Project during World War II, designing the explosive arrangement necessary to detonate the atomic bomb. For his work on the project, he received the President's Medal for Merit.

One of the original members of the President's Science Advisory Committee, from 1957-64, he was chairman and science advisor to President Eisenhower from 1959 to 1961, receiving from him the Medal of Freedom. From 1965 to 1973 he was Vice President of the National Academy of Sciences and

from 1961 to 1965 chairman of its Committee on Science and Public Policy.

Dr. Kistiakowsky is the fifth former presidential science advisor to be affiliated with MIT, out of a total of six who have held the post. Others are Dr. James R. Killian, Honorary Chairman of the MIT Corporation, President Jerome B. Wiesner, Dr. Lee A. DuBrudge, former director of MIT's Wartime Radiation Laboratory, and Dr. Edward E. David, who received master's and doctor's degrees from MIT in 1947 and 1952.

Dr. Kistiakowsky is the father of Professor Vera Kistiakowsky of physics.

GOES TO WILLIAM QUIVERS

MIT Receives IBM Minority Fellowship

MIT is among the first universities to receive a new graduate fellowship for minority students established by International Business Machines Corp.

First recipient of the IBM Fellowship is William W. Quivers, Jr., of Baltimore, Md., who received the SM degree in June and is beginning doctoral work in elementary particle physics.

The Fellowship includes full tuition and fees and an annual stipend of \$3,600 for single graduate students. Additional funds are provided for students with dependents. The fellowships are awarded

for one year, but may be renewed for up to four years.

Mr. Quivers, a native of McDonough, Ga., received the BS degree in physics from Morehouse College in 1969. During the summers of 1967 and 1968 he was a

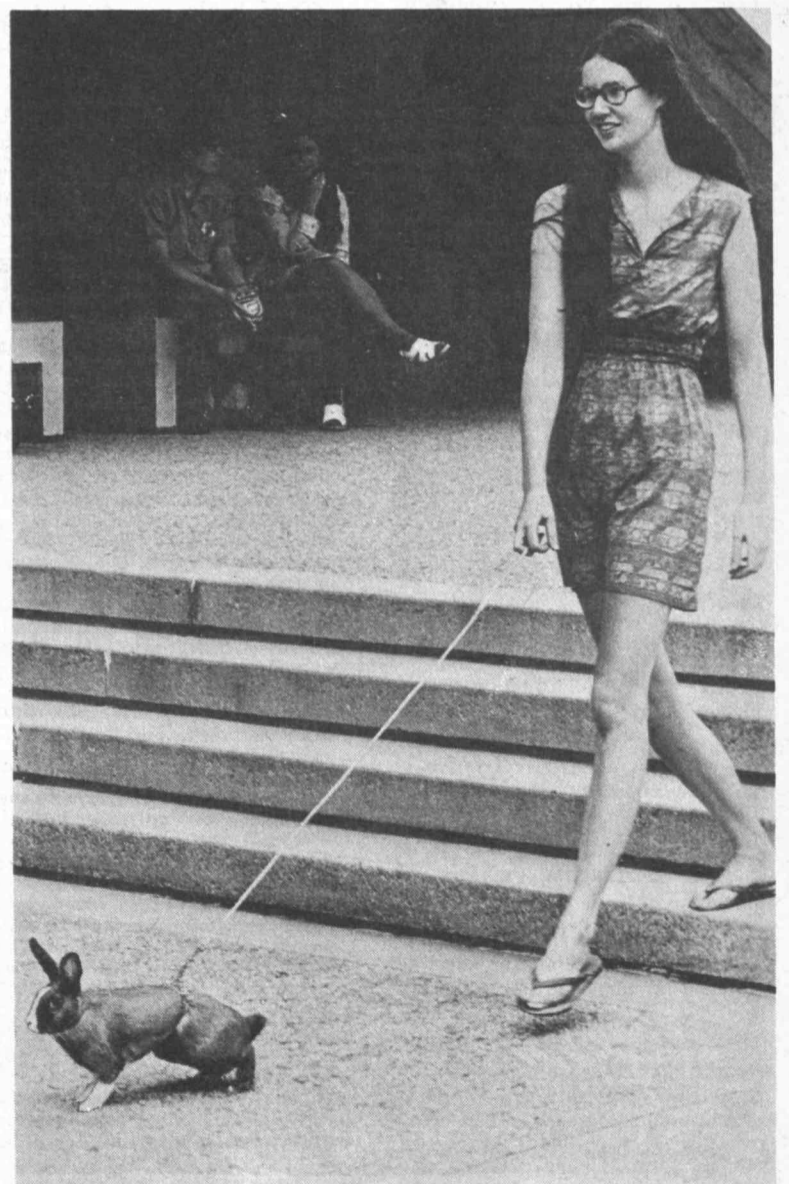
participant in the Harvard-Yale-Columbia Intensified Summer Studies Program.

At MIT Mr. Quivers was a tutor in Project Interphase during the summer of 1970. He has been a National Science Foundation trainee since 1971.

The IBM Fellowships are limited to the fields of physics, chemistry, electrical engineering, mathematics, computer or information science, mechanical engineering and materials science. Candidates for the fellowships are nominated by the dean of the Graduate School.

Pool Hours

Because of a change in the Day Camp schedule, Alumni Pool is now open for general swimming daily from 11:45-1:45pm.



One of the multitude of pets on the campus this summer is Bonzo, a seven-month-old rabbit who belongs to Marcia Hannon of the Radiation Protection Office. Marcia, who is employed through the Cambridge Youth Resources Program, said that Bonzo wears his collar around his middle because it is too big for his neck.

THE INSTITUTE CALENDAR

August 1
through
August 10

Community Meetings

Woman's Forum

Meetings and discussions. Mondays, 12n, Great Court, if raining - Bush Rm, 10-105.

Course Evaluation**

Sponsored by TCA & SCEP. Come and help out. For info, call Robert, 494-8889 evgs, or lve mesg at TCA, W20-450, x3-4885.

SCEP

Summer meetings cancelled. First meeting in fall: Wed, Sept 19, 7:30pm, W20-400.

MIT Club Notes and Meetings

Bridge Club

ACBL Duplicate Bridge. Thurs, 6pm, Stu Ctr Rm 473. IMP-scored team games, (similar to rubber bridge scoring). Call Jeff, x3-5285 or 864-5571.

Chinese Choral Society***

Singing, every Sun, 3-6pm, W20-473.

MIT Chinese Student's Club*

CSC softball practice, every Sat, 2pm, Briggs Field. Refreshments. All are welcome.

Classical Guitar Society

Classes, group or private. Mon & Thurs, 5-8pm; Sat, 8am-12n; Rm 1-132, 134, 136. Vo Ta Han, 494-8353.

Goju Karate Club*

Open to the Cambridge Community. Mon, Thurs, 7-9pm St Ctr Rm 407. Call 253-2018.

Hobby Shop

Mon-Thurs, summer term, 12n-5pm, Rm W31-031. Fees: \$10/term for students; \$15/term for community. Call x3-4343.

Kung Fu Club**

Northern Praying Mantis. Tues, Thurs, 7-9pm, T-Club Lounge. For info, H.C. Wong, 876-5071.

MIT/DL Duplicate Bridge Club**

Tues, 6pm, Student Center Rm 473. Call Jeff, x3-5285 or 864-5571.

Outing Club*

Every Mon & Thurs, 5-6pm, W20-461.

Rugby Club**

Informal practice sessions: almost every Tues, Thurs, 5:30pm, Briggs Field.

Science Fiction Society*

Fri, 6pm, Rm W20-421

Scuba Club**

Compressor hours, Mon & Fri, 4-6pm, Alumni Pool.

Strategic Games Society

Come try some of our new games: Star Lord, Emperor of China, Feudal, & Acquire. Sat, 1pm-1am, Walker 50-318.

Student Homophile League

No summer meetings. MIT gay phone, 492-7871, is active. Sun-Thurs, 8-11pm, (most nights aft 12m), for counseling, social activity info, help in "coming out", rapping.

Student Information Processing Board Meeting*

Mon, 7:30pm, Rm 39-200.

Tech Squares*

Western style square dancing. Tues, 8-11pm, Sala de Puerto Rico. Beginners dances, Tues Aug 7 and Aug 21. Come and try it. Admission: \$1; first time free.

Tiddlywinks Association*

Tues, 7-11pm, Student Center Rm 407.

MIT Wheelman**

All aspects of bicycles and bicycling discussed, events planned, advice and help given. Thurs, 7:30pm, Rm 1-203. Call Harry, x3-2384.

Social Events

Summer Coffee House*

The MIT 24-Hour Coffee House has re-opened as a 12-Hour Coffee House for the summer. Inexpensive food, candy, and non-alcoholic drinks are sold. Relax, games, read. Open: daily, 3pm-3am, center lge, 2nd fl, Stu Cntr.

Friday Afternoon Club**

Music, conversation and all the cold draft you can drink. Fri, 6pm, the Thirsty Ear, Ashdown basement. Admission: \$1 men, 50 cents women. Must be over 18.

Muddy Charles Pub**

Join your friends for music, beer, wine, snacks, conversation at the Muddy Charles Pub, 110 Walker. Hours: Mon-Fri, 11:30am-2pm and 4-8pm. Call GSC, X3-2195.

Movies

The Trip

LSC. Fri, Aug 3, 7:30pm, Rm 10-250. Admission 50cents. No IDs.

The Monitors

LSC. Fri, Aug 10, Rm 10-250. Admission 50 cents. No IDs.

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, Aug 3.

For Sale, Etc.

Men's 5 spd bike, \$50. Jack, x3-1419.

Rya rug, 9x6, rd, org, gold, \$125; K cupboard, 4x1 1/2 x 1 1/2, \$20; Bedroom suite, all items and accessories, \$275; pr Fedders ACs: 1800BTU, \$140; 6000BTU, \$85. x3-4868 or 495-2262.

Used Mercedes Benz brake parts, fit many MB '62-'69, also generators. Bill, Beebee, x8-3661 Draper.

Rug, 9x12, gd twee, 10 mos old, \$25. Elaine, x3-1590.

Bedroom suite, \$270; bunk beds, pr, \$150; upright dresser chest, \$50; Vicky, 426-3340.

Double bed, \$25; 2 dressers, \$10, \$7; red rug, 9'x12', \$20; bkcase, \$10; mod easy chr, \$12; sm tbl, \$12; fl lamp, \$5. Carl, x3-1708.

"Super Tiger" solid st stereo pw amp, 80 watts rms per channel, may be modified to 100 watts/channel. assembled kit, 3 yr. old. \$35. David, x3-7275.

Oscilloscope, Tektronix 310 port DC-4mhz, exc cond, \$300; Heathkit, ag 10, sin-square generator, best offer; resistance & capacitance boxes, pw supplies, Larnie, x8-3367 Draper.

GE 12 cu ft refng, \$25; bl studio couch w/gold cover, \$35; port shower, \$5. Linda, x3-5831.

Enlarging lenses, 50mm f/3.5, 75mm f/3.5, \$15ea; Wanted: 9x12 or larger rug, file cab, photo print dryer. Herb, x3-7707.

Maple rocker, \$20; Motorola coffee tbl, console stereo, \$25; Emerson BW 23" TV console, \$30; not new but grt condition. Paula, x3-6728.

Jeunet, 10spd men's bike, new, green, 23" w/simplex gears, center pull Mafok racer brk, Hutch tires, air pump, w/warr, \$115. Das, x3-7873.

Frigidair, approx 10 cu ft, gd for sm budget, \$20. Jim, x3-6631.

Leaving country, selling, refrig, beds, all kinds of furniture, K utensils, bk cases, etc. Call any time. 782-7076.

Necchi sewing machine, port, zig zag, v gd cond, asking \$75, x5778 Linc.

Harpichord, 1'x8', exc cond, \$500. Bo Finlay, x3-5743.

Lester baby gr piano. George, x3-7855.

AC, 12 amp 8,000BTU, lk new, used 3 mos. \$150. Carl, x9633Dorm.

Singer sewing mach, w/cut tbl, exc cond, \$75 or best. Lucy, x3-4271.

Tandem bike, fair cond, \$40 or best. Paul, x5872 Linc.

Folding K tbl, \$10; 4 folding chrs, \$5 ea; stereo GE rec player, nds amp & ldsprks, \$20. Hasan, x3-7535.

Delta mark 10B electronic ignition, new fac assembled, \$31. Harold, x5845 Linc.

Philco, AC, yr old, 9,000BTU, \$150 or best. Marilyn, 387-4287.

Kay Tenor banjo, w/case, gd cond, \$25. 494-8876.

Kodak super 8 movie film, 1/2 price. John, x3-1588.

Comm & inst flight instruction, well equipped aircraft, reasonable rates. Bill, x3-2297.

Blk Angus broiler-oven, petite, \$12. Peter Kurnik, x180-8361 aft 6pm.

Victorian sofa, red velvet, gd cond, best offer over \$100. Call, x8-1440 Draper.

Bottles, 5-gal, suitable for terrariums or beer brewing, \$3 ea. Jeff, x3-5900.

Pr Gdtyr tires, polyglass, F60-15 wide design, lk new, \$80 ea new, \$35/pr. Pappas, x7287 Linc.

Pr water skis for beginners, 68", \$15. Nichols, x7035Linc.

Tent camper, Trade Wind Catalina, full equip, hard top, skps 6=7, hardly used, plastic cover, still on cushions, in Bedford, \$995. x7451 Linc.

Back issues of Phys. Revl Letters for '64-'70, \$20. George, x3-5827.

K tbl w/4 chrs, \$60; 2 K cabinets, \$9 ea; custom Queen sz hide-a-bed, \$175; Queen sz bed, \$125; Norge wash mach, yr old, \$150; walnut chr, \$20; bassinet, \$6; toaster, \$4; 3 lamps, \$15 ea. Rosenberg, 494-8479, Thurs or Fri.

Shop service manual for '68 Dodge passenger cars, \$4. Mike, x3-6762.

Sm wood desk, shelf on side, w/drwr. Bruce, x3-2380.

Pr B.F. Gdrich TA's Fr-60, used 3 K, \$40. Carol, x3-5804.

Sofa bed, brw, gd cond, \$35. Sanai, x3-4597.

Hotpoint dish washer, w/butcher block top, 8 cycles including Sani-cycle 2 mos old, must give up moving to home with built in dishwasher. new \$245, now \$175. Nak-Ho-Sung, x3-5364.

Women's blk 3 spd bike w/basket, \$27; also kryptonite lock, 2 mos old, \$10. Heather, 247-8355.

Radio, \$15; crib, \$20; car seat, \$7; stroller, \$8; infant, \$1.50; playtex nurser set, \$3; bassinet, \$10; bath tub, \$1.50; training seat, \$1.50; diaper pail, \$2; baby, child, and maternity clothes, x3-3757.

Collier convertible carriage, orig \$60, now \$30; jonhny jump-up baby exerciser; cosco infant seat, all in v gd cond. Stephen, 899-6797.

Merc, out/board motor, 4 hp, long shaft, used few times as sailboat aux, \$175; GE 12 cup electric coffee maker, orig carton, \$15; antique pine chest, 4 drw partially stripped, \$20. X3-3933.

Maple K tbl w/4 chrs, \$20; fan, \$5; lamps, \$5; electric broom \$5; nite stand, \$5; shopping cart, \$5. Jon, x3-3559.

Propane camping stove, 2 burner port, \$10. Norm Tibbetts, x8-4430 Draper.

Hand painted greeting cards fr India, 50 cts, 25 cts. Ashok, x3-5095.

Phonograph, \$12. Zvi Body, x3-1476.

Draftsman instruments, never used. Miss A. P. Guyton, 536-7674.

Sears Kenmore wash mach, 2 sp, 3 cycle, gd cond, \$25. x3-2721.

Whirlpool washer, 2 sp, 4 cy; brick & board bkcases; 2 tbl lamps; desk w/4 lg drws; dresser & mirror, blk vinyl chr; lg w carpet w/pad; wll nego. Jerry, x3-5133.

Free 2 VW rims, 5 hole, gd for planters, anchors or orig purpose, Kester, x3-2280.

Bike, 3 spd english mens, 2 mos old, cheap. Sam, 494-8993.

Vehicles

'61 International crew cab pickup truck, 4 dr cab, 6' box, 250cid, 6cyc eng, 4 spd tr, \$650 or best. Mike, x3-6762.

'62 Chevy II, blue, 4 dr, running, gd eng, nds some work, 77K. \$50 or best. 354-4441.

'62 Ford Galaxie, dented body, gd run order, \$45. Gary, x3-2300.

'63 Chevy Impala, 4dr, p. br & st, radio, \$175. Bill Sartzowicz, 258-1241.

'65 Mustang, gd ocnd, 4 spd tr, V8 eng, nw batt, \$250. Carlos, x3-6221.

'65 Dodge Monaco, all pw, gd cond, best offer. 484-3641 evgs.

'65 VW, 47K, \$250. Charlotte, x3-1632.

'66 Dodge Dart 270, auto, pw st, radio, new muffler, new cooling sys, & snows, burns oil, some dents, \$120. Eli, x3-7520.

'66 Peugeot 404, sunroof, radial tires, 58K, \$495; clock radio, \$10; Harvard bed frames, \$10; 10 gal humidifier, \$20; 26" 3 spd men's bike, \$15. Thomas, 494-8322.

'66 Merc wgn, exc run cond, gd tires, load level shocks, gd brks, new exh, nds paint, \$350. Ed, x8-4444 Draper.

'67 blue Chrysler Newport, 4 dr sedan, ac, auto tr, pw blk, tinted glass, snos, best offer. Alice, 253-2376.

'68 Fiat 124 Sport Coupe, 4 disks, new clutch, valve job, radial wheels, 4 spkr radio, exc shape, \$995; '68 Triumph spitfire, new brk & gen, exc eng, \$795. 261-5577.

'68 VW ble sedan, v gd cond, new valves & tires, am/fm, \$675. Tony, x5780 Linc.

'68 Camaro 327-V8, ps, pt, exc cond, best offer. 273-0559 aft 6pm.

'69 Chrysler Imperial, 2 dr, ht, blk, 42K, 4 new steel belt radials, \$1,500. Ken, x3-2237.

'69 Citroen st wgn, 70K, new Mich X tires, am/fm, gd cond, lving country, \$1000 or best. X3-6809 or 1-584-2917.

'70 4dr Merc, exc cond, no body damage, auto pw st-pw br, am/fm, ac, convert, below 40K, \$1,500. Kimil, x3-2256.

'70 Opel Rallye Kadett, 30K, 4 new rad tires, (2 steel 1K miles), new brakes, all instr, am, trunk bashed - still runs great, 30 mpg, \$200 or best, needs repair freak. Robin, x3-4710, 969-9148 evgs.

'71 Raleigh sport Camaro, 350cc 4 sp, 24K, \$2400. Rosemary, x3-6101.

'71 Saab, 99 E, 4 dr, w/sunroof, am/fm, best offer. Mark, x7856 Linc.

'71 Peugeot 304, 4 dr, lo K, Mich X tires, exc cond, \$1,400. Peter, x3-5831.

'72 Plym Fury III, fact a c, auto, pw st & brk, vinyl roof, lux inter, \$2,400 or best. Robert, x5745 Linc.

'72 VW bug, radio, exc cond, still w/warr, \$1,750 or best. George, x8-3369 Draper.

Catalina sailboat, 22ft, fully equip w/trailer, can be seen any time. Anne, x3-7477.

Housing

Arl, lg furnished rm, gas stove and refrig, pking for compact, n T. x3-5915.

Belmont, 3 1/2 BR, brk / fr center ent, colonial, lg LR w/frplc, 1 1/2 B, fam rm, 2 car gar, dw, lg secluded patio w/scr, res zoning, n shops & T, avail 9/1, \$50,000. Owner 484-4331.

Brkline, lg sunny 2 BR apt, avail 9/1, quiet st, yd, n Comm Av & T, \$250. Michelle, x3-7753.

Camb, 5 rm apt, exc cond & locations, 2nd fl, 5min fr MIT, \$250/mo, avail now, Tasos, x8-4980 Draper.

Hummerock, Sept-June rental, 6 rms, furn, no util, \$200 mo. x8-1425 Draper.

Newton Watertown line, 2 BR apt, n T, avail Sept 1, \$240 unheated. Doug, x8-3987 Draper.

Bridgton, Me, secluded chalet for rent Aug 18-25 and Sept. 4 BRs, slps 12 in comfort, full equip, lg sun deck, 2 Bs nr all activities, canoe, \$175 wkly. Hoenig, x3-5503.

N.H., lk front cottage, priv beach, boat, secluded, last two wks in Aug. 5869 Linc.

Animals

Alaskan malamute, lg blk & white, full mask, will stud. 628-3348 evgs.

Pr. m tiger kittens, abandoned, gd cond, pretty markings, free. Janet, 235-5443.

Free pr blue pt siamese, m & f, fixed, nd new home, gr pets, affect, intelligent. Dotty, x3-7729.

M/Apt cat, 16mos old, v affectionate, fixed, trained, desperately needs loving home, blk w/white ascot, right-angled tail, all shots, owners lv country. Gary, x3-7458.

Lost and Found

Lost: Block & tackle/pulley set from Draper 5-172, please return, no questions asked. W. Little, x8-3969 Draper.

Wanted

Rmmtes, 2, m or fem, MIT affil only, to shr 5 BR apt w/3 males, n Cent Sq, approx \$90 ea, furn, avail 9/1 or sooner. Sam, x3-4182 aft n.

Camb, 2 BR apt, betw Harvard Sq and Porter Sq, n T, for 2 fem, quiet, considerate and gd neighbors. Michelle, x3-7753.

Triple Mandarin Movie Feature
CSC presents: The Blade Spares None, Call of the Mountains, Magic Bowl. Sat, Aug 18, 6pm, Kresge. Tickets: \$2 adults; \$1 children; members free with membership card.

Music

Madrigal Singing**
Every Mon, 7:30pm, Rm 4-260. For info, call John Chandler, 3-1909.

Theater and Shows

L'Histoire du Soldat
The MIT Community Players presents Igor Stravinsky's "The Soldier's Tale," directed by Jeffrey Meldman, conducted by Chris Blair and choreographed by Judy Williams. Also, "Facade" with poetry by Edith Sitwell spoken to music by William Walton. Fri, Aug 10, 8:30pm, Sat, Aug 11, 7pm and 9:30pm, Kresge Little Theatre. Tickets \$2.50, at door or reservations, 253-4720 or 253-2311.

Dance

Folk Dance Club*
International, Sun, 7:30-11pm, Sala. Balkan, Tues, 7:30-11pm, Student Center Rm 491. Israeli, Thurs, 7:30-11pm, Sala. Afternoon dance break, Fri, 12:30-1:30pm, Kresge Oval.

Exhibitions

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.

Music Library Exhibit
Pictorial Exhibition, Mozart's Opera the Magic Flute. Daily, Rm 4E-109.

Subjects for psychological test, med approved and superfised, \$1.60 for 1/2hr session. Judy, x3-5764 lv mesg.

Young woman to live w/doctor's family in Newton; own rm & B, plus salary, part/time, ample free time for studies or other interests. Shukla, x3-5935.

Ride morns 8:30am & some evgs, 5:30pm, Pleasant St. Lexington to/fr MIT. Jody, x3-5542.

Israeli wife with wide secretarial experience in own country seeks p/time or full time job, in order to develop english proficiency. x3-7031.

Sublet, n T or MIT, Sept (plus lt aug), Gwynne, x3-3312.

Set of used bunk beds for 2 young boys. 628-1518.

Useable copy of Hildebrand's "Advanced Calculus for Applications" - 18.075, 19.076 text. Don, x3-3876.

Men's bike, cheap, no frills, Phil, x3-2023.

F seeks f rmmate for 2 BR apt, in Camb, 9/1. Pat, x3-7582.

To buy used m bike, 3, 5, or 10 spd. Mike or Amy, 492-5851 evngs.

Tent for VW camper. Bob, x8-1425 Draper.

Person to drive Plym st wgn, on or around Aug 24, to lve fr Boston or NY, to Santa Barbara, Calif by Sept 15. Eliz or Gerard, x3-4724.

Apt for long term rent, in Camb enfirons, to professional woman, reas rent, start mid Aug. Sally, x3-3277.

Occasional ride wanted or car pool arrangements, daily, MIT-Concord. Jim, x3-1430.

German Grundig radio w/record player console on bottom, 25 yrs old, personally imported nds an aficionado repairman, wl pay. Erika Babcock, x3-2728.

Ride fr Kendall Sq to Riverside Ave in Medford, daily, 11pm, x3-7163.

Fem rmmate to shr w/2 girls, Beacon H apt, 3 BR, 2 B, LR, ww carp, avail 9/1. \$100/mo. Ursula, x3-5954.

Driving instructor, car's my own, pay nego. Parker, 494-8494.

Miscellaneous

Typing, thesis or general. Mary, x3-4294.

Professional thesis typing, reas rates. Mauree, x3-4461.

Lost: Post Versalog slide rule, in Bldg 39, 7/18, \$30 for return. Frank, x3-2183 lv mesg.

Religious Services and Activities

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

Christian Bible Discussion Group*
Thurs, 1pm, Rm 20B-031. Call Prof. Schimmel, x3-6739, or Ralph Burgess, x3-2415.

Islamic Society*
Prayers, Fri, 12:15pm, Kresge Rehearsal Rm B. Discussions on the Qur'anic interpretations of various aspects of life, Sun 10am-1pm, W20-473 & W Lge.

Roman Catholic Masses
Sun, 10am, Chapel.

United Christian Fellowship*
Summer meeting. Fellowship, singing, sharing, praying. Newcomers welcome. Thurs, 8pm, Westgate I, Rm 708.

Westgate I & II Bible Study
Wed, 8pm, Westgate I, apt 1202. For information, 494-8405 or 494-8778.

Announcements

Change: Group Tennis Lessons
The following time changes for group tennis lessons have been made: Fri, Aug 3: beginning, 12n & 5:15pm; intermed 4:15 & 6:15pm. Sat, Aug 4, 11: beg, 10am, intermed, 11am. Mon thru Fri, Aug 6-10: beg 12n & 5:15pm; intermed 4:15 & 6:15pm.

Maggie's Exercise Classes
Summer schedule: daily, 1-2pm, 5:15-6:15pm; east end small track, good weather, or DuPont Athletic Center. Must have athletic card.

MIT Chinese Student's Club*
CSC Cape Cod trip - Provincetown - beach party, bike riding, horse back riding, sight-seeing. Sat, Aug 4. Bus leaves at 7:30am from Kresge Parking lot, returns at 6pm. Reservations necessary, call Leslie Tung x9854 Dorm line. Prices: advance sale \$2; \$3 at bus; non-members \$4; \$5 at bus.

Dining Service

Wed, August 1
Lunch: Old Fashioned Veal Stew
Dinner: Chicken in a Basket
Thurs, August 2
Lunch: Baked Ham Loaf with mustard sauce
Dinner: Hot Roast Beef sandwich with gravy
Fri, August 3
Lunch: Beef Burgundy over buttered rice
Dinner: Broiled Whole Flounder with lemon butter
Mon, August 6
Lunch: Hot Turkey sandwich with cranberry sauce
Dinner: Braised Swiss Steak
Tues, August 7
Lunch: Ravioli with meat sauce
Dinner: London Broil with mushroom gravy
Wed, August 8
Lunch: Shrimp Foo Yong over rice with oriental sauce
Dinner: Summer Picnic: Super special steamship rounds cut to order.

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

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

Send notices for Aug. 8 through Aug. 17 to the Calendar Editor, Room 5-111, Ext. 3-3279, before noon Friday, Aug. 3.

Positions Available

The following positions are on Hold pending final decisions:

73-645-A Admin. Staff
73-639-R Asst. Loan Officer - Admin. Staff
73-673-A Admin. Asst. / Exempt P.T. Admin. Asst. V
73-579-R Secretary IV
73-648-R Secretary III
73-659-R Secretary III-IV
73-705-R Secretary III-IV

The following positions have been filled since the last Tech Talk and are no longer available:

73-518-R Secretary III
73-633-R Secretary III
73-676-R Secretary III
73-649-R Sr. Clerk / Receptionist
73-565-R Statistical Typist III - cancelled
73-641-R Sr. Clerk III
73-703-R 3rd Class Engineer
73-603-R Technician A (EM)
73-236-R Clinical Research Nurse
73-616-R Grounds Crew
73-668-R Pot Washer
73-396-R Architectural Draftsman
73-679-R Library Asst. III

Employees at the Institute should call their Personnel Officer for further information.

Virginia Bishop 3-1591
Mike Parr 3-4266
Phil Knight 3-4267
(secretary - Priscilla Mah)

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.

Special Assistant for Minority Affairs - Admin. Staff - The Special Assistant will advise the President and the Chancellor on minority matters and concerns. He or she will act as advocate for minority interests, with a particular concern for the well-being of minority members of the community - students, faculty, and employees. The Assistant will be expected to speak for the Institute on minority affairs and will be the principal official representative of the Institute to minority communities. Within the Institute the Assistant will be a member ex-officio of the Equal Opportunity Committee, the Administrative Council, and such other MIT groups as may be deemed desirable in order to carry out his or her responsibilities effectively. The Assistant will be a point of appeal for complaints of discrimination because of minority status, with a principal responsibility for the handling of charges of discrimination filed with MCAD, EEOC, HEW or other agency.

Qualifications must include an advanced degree or appropriate equivalent experience and concern with minority problems and interests, and interpersonal skills. It is expected that the Assistant will be familiar with university life and procedures, and will have demonstrated the qualities of judgment and communications skills required by the position. 73-646-R (7/11).

Administrative Staff member in Personnel Development Training Section will instruct employees in the areas of general typing, dictaphone transcription, basic education, and general office practices. Background and experience in tutoring and/or teaching adults helpful. Ability to prepare course plans, and to work independently important. Please submit resume. 73-611-R. (7/11)

Staff Recruiter (Admin. Staff) will report to the Employment Officer will be responsible for coordination of search for well-qualified persons to fill non-academic 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. (7/18).

Executive Officer - DSR Staff for Mid-Ocean Dynamics group will manage multi-institutional and international oceanographic deep sea program; supervise, under responsibility for all project funding, logistics of the field program, scheduling of ships and projects; publication of results, and planning future field work projects. PhD physical oceanographer required; experience as Chief Scientist, having conducted research at sea. Ability to write and negotiate proposals, experience with relevant Washington agencies, good theoretical knowledge of geophysical fluid dynamics. Fluent English; Russian language useful. 73-325-R.

Administrative Staff - Assistant Director in an administrative office dealing in resource development will handle specific tasks of educational fund-raising; extensive writing of letters, memoranda, statements on priorities, some proposals and informational studies. Must have a minimum of three years active, consecutive experience in fund-raising, preferably in a university environment. Effective writing skills, ability to communicate verbally, professionalism and career motivation important. Exposure to data processing systems useful, BA required; advanced degrees are welcome. 73-479-R.

Administrative Staff member will work in the area of resource development dealing with individual contributors. Develop strategies and programs, prepare reports, provide advice and counsel of a legal nature for resource

development activity. Some travel required to represent MIT. Must have legal training and preferably some experience as a counselor in practice or a job situation utilizing legal training. Writing and organizational ability, motivation, enthusiasm required. 73-480-R.

Administrative Staff Writer in Resource Planning will provide substantial writing support for resource development activities. Tasks will include preparation of proposals for major private donors, pamphlets supporting planned giving programs and correspondence. The position is sensitive and demanding. College graduate with previous writing experience and a sense of humor required. 73-452-A (7/11).

Director for Alumni Data Resources in the Alumni Association to provide analytical and planning support for the Association. Develop and implement improved systems for researching, codifying, storing, recalling and maintaining information on alumni re: their areas of MIT interest. Coordinate with the Corporation, Development office, other Institute offices and data processing group. Coordinate, develop, maintain performance and cost measurements, and statistical support data. Must relate easily to individuals in leadership positions; MIT degree recipient preferred. 73-670-R (7/18).

orientation. Familiarity and experience with low-speed flight and wind tunnel testing methods and advanced piloting qualification for particularly general aviation type aircraft; Ph.D in Aerodynamics and five years applicable research and development experience required. 73-488-A.

Biochemist - DSR Staff member will participate in lipoprotein studies, and will supervise the activities of several technicians in a clinical research setting. PhD or MD in Biochemistry required, as well as experience with lipoprotein and supervising. 73-515-R.

Administrative Staff Project Officer will be principal staff administrator for major funding programs. May support very large campaign such as a building or two, or more smaller projects which are determined by Institute's priorities. Individual will work with Resource Development Office. Will arrange for solicitation visits, provide follow-up and coordinate all activities leading to completion of campaign. Person must have capacity for hard work, often under considerable pressure. Must be well organized and able to work easily with institutional and industrial leaders. Familiarity with MIT desirable. 73-600-A.

Micro Automation Systems Programmer - DSR Staff member will develop a PDP-10/PDP-11 operating system for the project; design and implement a computer operating system. Experience on the PDP-10 and PDP-11; as well as a background in automata theory is required. 73-512.

Administrative Staff member will work with corporations to increase membership in Industrial Liaison Program and related areas. Identify prospective

member companies, evolve solicitation strategy travel extensively and establish continuing relations with senior management of member companies. MIT graduate desirable with several years experience in marketing-related fields. Technical background helpful. Must relate easily to senior corporate management. 73-569-A.

Administrative Staff - includes participation in the activities of the Group which provides staff support to the senior officers and to the Academic Council in the conduct of studies of academic and administrative programs, plans, and organization. The ASPG is a part of the Office of the President and the Chancellor and reports to the Vice President C.B.Simonides. Candidates for this position should have an educational background equivalent to graduate study, and/or working experience in such areas as management, program planning, analysis and evaluation. Systems analysis and computational background and skills would be especially helpful. Superior communication and writing skills are essential. This position offers very useful career preparation for senior responsibility in universities and other complex organizations. 73-461-R.

Administrative Staff Accountant for the Comptroller's Accounting area will perform internal cost audits of research contracts and grants; prepare contract cost reimbursement billings and a variety of grant fiscal reports and fund accounting reports. Coordinate accounting and audit functions with Office of Sponsored Programs and various MIT schools and departments. College graduate with major in accounting or general business is desired. 73-619-R. (7/11)

Editorial Director - Administrative Staff opening requires wide, diversified publishing experience, and an ability to define and create innovative publishing programs as well as administer existing ones. Acquaintance with international publishing and a distinguished record in a variety of areas such as environmental studies, linguistics or the public interpretation of science required. Appreciation of science and technology, a developed sense of publishing process and practice, a desire for challenging interaction with scholars and the staff essential. 73-326-R.

Administrative Staff Planner will direct long-range physical planning for the Institute; monitor and coordinate the various efforts of the planning team; develop budgets and schedule of events. Will act as liaison between government agencies and community groups. Must have a Masters degree in Planning and a minimum of 5 years experience. 73-535-R.

Application Programmers - Admin. Staff the office of Administrative Information Systems is seeking two Application Programmers to take program specifications and translate them into an efficient computer program. The process includes the evaluation of specifications, flow-charting, coding, testing, debugging

(Continued on page 6)

(Continued from page 5)

and final program documentation. Knowledge of IBM DOS ANS COBOL and/or PL/1. Knowledge of 360 Assembler Language desirable; experience with university accounting or teleprocessing applications helpful. 73-340-R/73-341-R.

Systems Analyst - Admin. Staff for the office of Administrative Information Systems will design financial and/or administrative applications to be run on a medium-sized computer. Duties include making feasibility studies, system flowcharting, defining programming specifications, conducting system tests, implementation, documentation and client education. Experience in designing financial applications, teleprocessing applications, data base management systems and a working knowledge of ANS, COBOL and/or PL/1 is desired. 73-330.

Administrative Staff Programmer for the MIT Information Processing Center must have experience and thorough knowledge of large-scale, time-sharing computer system. PL/1 language, documentation and communication skills are necessary qualifications. The Users Services Group requires an individual who understands and is responsive to the needs of the Center's users. This person will be challenged in entering a new area of time-sharing operation for this group which includes the following:

User Assistance - assisting users by providing programming information and debugging help and tracking down special problems.

User information - instructional documentation and conducting seminars, workshops, and other courses. 73-640-A (7/11).

DSR Staff member will perform chemical assays for enzyme and neurotransmitters. SM or MS degree in Chemistry required. 73-590-R.

DSR Staff member in Civil Engineering will be administrator for active research group: responsible for fiscal management for research accounts, budgets, payrolls; will compile, edit, compose reports for lay audiences; prepare reports for sponsors; will manage production of all reports; maintain liaison with staff, faculty, students. Much international correspondence. Assist in policy administration. Coordinate a variety of activities; will arrange administrative aspects of workshop and conferences held at MIT. Must have mature, independent judgment; tact; ability to organize. 73-667-A (7/18).

Industrial Hygienist - (Academic Staff) will work in the Environmental Medical Service to study and control occupational disease and other environmental factors such as noise, heat, pressure and toxic materials that may be physically or chemically hazardous to employee health. Will work closely with physicians, depts., supervisors. BS. in Chemical Engineering is required. 73-336-A.

EDP Coordinator - (DSR Staff) will maintain the software systems and expand the operating systems for a computer facility; assist users; determine loads and aid in scheduling. Will work with students and faculty in developing and maintain systems for academic computer usage. Individual must have experience in machine language programming and operating systems; detailed knowledge about compilers, interpreters, schedulers, priority processors, and basic knowledge of computer hardware. Degree in computer science required. 73-537-R.

Administrative Staff - Assistant Director for a program which provides member industrial firms direct and convenient access to Institute's educational and research programs, while at the same time providing the Institute with unrestricted financial assistance and professional relationships. Primary responsibility would be liaison function between MIT faculty and research staff and representative 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). 73-508-A.

Computer Systems Analyst - DSR Staff - in Electrical Engineering/Electronic Systems Laboratory will work on research and development projects in information retrieval including networking of I-R systems. Develop systems, research computer interfaces for interconnecting heterogeneous I-R systems, develop information centers by which individuals can access all sources of information. Broad experience with hardware and software computer systems; experience with PL/1, 360/370, MULTICS, or ARPANET systems; programmer supervisory experience and an advanced degree required. 73-691-R (7/25).

Systems Programmer - DOS - Admin. Staff will provide technical expertise; develop and implement methods of

improving computer performance. Minimum of two years S/360 or S/370 BAL (ALP) Assembler Language Programming experience. Knowledge of teleprocessing, and COBOL or PL/1. 73-265-R.

Systems Programmer DSR Staff will work in the Program Development Office as a full-time Multics System Programmer. Two or three years experience with the Multics system and PL/1 is required. Other experience in system design and programming desirable. 73-466-R.

Advertising Assistant (Exempt) at the *Technology Review* requires skill in all phases of advertising sales including actual advertising space sales, creating promotion material, advertising production, billing, and correspondence. Some typing skills needed. 73-642-R (7/11).

Accounting Asst. (Exempt) will prepare monthly dining operating statements and supporting workpapers for the MIT Dining Services. Will reconcile accounting statements; prepare monthly operating statements for the Faculty Club. Education, experience in accounting field. 73-675-R (7/18)

Dental Hygienist - Exempt staff in the Medical Department will diagnose and treat dental emergencies, perform dental prophylaxis, assist dentists with treatment procedures, take x-rays, record patients' case histories, supervise dental assistants. Candidate must be a Registered Dental Hygienist. Previous work experience in periodontal treatment required. M-F 8:30-5pm. 73-709-R (8/1)

Administrative Assistant V will work part-time (15 hrs) in the DSR - Patent Administration section. Prepare marketing abstracts and marketing plans based on MIT inventions. Engineering background, combined with marketing research or business background is required. 73-708-R (7/25)

Admin Asst. V for the Director of the Operations Research Center, an active interdisciplinary research center. Will have responsibility for interdepartmental academic program procedures such as admissions, correspondence and records. Substantial interaction with students, faculty, visitors. Schedule appointments for Directory; non-technical editorial work; supervision of report reproduction; maintain reading room. Able to make independent judgments; establish priorities; deal well with many people. College background preferred. 73-662-R. (7/18)

Computer Technical Assistant V will be responsible for all input into the computer system for the book order process: categorize orders, generate invoices, process foreign orders, process special coding and entries, generate new codes and records on new books and accounts, update all computer input. Individual must have ability and interest in Electronic Data Processing. Maturity, a good memory, ability to handle details with precision most important. 73-467-R.

Computer Operator IV will operate IBM Model 135 and all peripheral equipment associated with it, including disk drives, tape units, card reader/punch, printers. Must have a good knowledge of DOS job control, multi-programming experience and be capable of understanding operating instructions. 4pm-12:30am shift. 73-443-R.

Senior Keypunch Operator III will operate the IBM 029 keypunch machine. Will punch into computer input cards formatted and unformatted documents. Minimum of two years experience operating IBM 029 or comparable equipment; familiarity with the creation of program drum cards desired. 73-574-R.

Senior Secretary V will be responsible for smooth operation of an academic dept. headquarters office. Type correspondence from dictation or shorthand, maintain busy schedules, handle travel arrangements, coordinate office workloads, supervise support personnel, maintain complicated files. Ability to recognize priorities, to work under pressure, to organize important. Excellent typing; knowledge of MIT valuable. 73-519-R.

Sec./Admin. Asst. IV-V in Sloan School to work for visiting professor in Industrial Relations who will direct a project on equal employment opportunity, funded for one year. Assist in organization and implementation of plans for three workshops. Type correspondence and reports; schedule and coordinate activities regarding conference held at MIT. Maintain account records. Some administrative experience valuable; MIT familiarity preferable; good typing skills ability to work independently important. 73-672-A (7/18).

Senior Secretary V to Civil Engineering Department Head will have contact with a variety of faculty, administrators, and students. Screen phone calls; schedule appointments and meetings; maintain department records of tech-

nical reports and research papers, and arrange for their publication and distribution; prepare correspondence for signature. Excellent typing and shorthand; ability to organize and establish priorities; initiative and tact essential. Knowledge of MIT helpful. 73-700-R (7/25).

Secretary IV or Senior Secretary V will be Economics Department Headquarters secretary. Perform general secretarial duties necessary to the smooth operation of the office; provide assistance to the Administrative Officer; handle graduate registration procedures for the department. Maturity; ability to work with details and recognize priorities; good typing skills required. Knowledge of MIT procedures helpful. There is a lot of contact with students, faculty and visitors in this busy office. 73-263-R (8/1)

Secretary IV in Personnel will work for the Employment Officer and 2 Personnel Assistants. Good typing skills needed for correspondence, memos, form letters; answer busy phones; assist with maintenance of specialized files; handle employee cases and applications. May also assist with special projects, statistics, and extra typing. Ability to work independently and to keep track of a variety of schedules and procedures important. Flexibility, experience, and interest in being an active part of a group is necessary. 73-729-A (8/1)

Secretary IV in Nuclear Engineering will handle general secretarial duties for four professors. Type technical reports and journal articles from handwritten drafts, dictaphone, and shorthand; maintain student records; schedule appointments. Knowledge of general office procedures, ability to work important. Good typing and shorthand skills required, as is technical typing and dictaphone experience. 73-718-R (8/2).

Secretary IV in the Dean for Student Affairs Office will make appointments, answer routine correspondence, maintain students' files. Opening for one person in 3-secretary team to work for four full-time and one part-time counselling dean. Will have contact with students, faculty, and staff. Good typing skills; ability to write letters, to recognize priorities required. Knowledge of Institute procedures helpful. 73-716-R (8/1).

Secretary IV in the Office of the Council of the Arts will maintain files, do routine typing, assist with accounting and billing procedures. Will also assist with a variety of special projects, on papers, and on the Council Newsletter. Knowledge of MIT helpful; shorthand and interest in the arts are desirable; ability to work with a variety of individuals important. 73-646-R (8/1).

Secretary IV in academic department will type correspondence, proposals, DSR reports, manuscripts, theses (much of it technical). Keep DSR account records; compose routine letters; assist professor with details of registration. Ability to work independently and to write letters important; accurate typing essential; knowledge of shorthand, technical typing and book-keeping preferred. 73-578-R.

Secretary IV in academic department will type manuscripts and correspondence for life science lab; handle operation and renewal of grants; perform all functions of one-secretary office. Excellent typing and dictaphone skills required; ability to organize important. 73-591-R.

Secretary IV or Senior Secretary V to the Director and Assist. Director of an Interdepartmental Laboratory will type technical reports and journal articles. Occasionally coordinate office workload; handle all general secretarial procedures. Excellent shorthand and typing skills, 3-5 years experience and ability to learn technical typing required. 73-342-R.

Secretary IV to three psychiatrists will handle all secretarial duties; transcribe patient case histories; maintain accurate records. Excellent typing skill, maturity, ability to deal with patients important. 73-525-R.

Secretary IV will perform secretarial duties for the administrative officer of an academic department. Maintain department contract and personnel records. Excellent shorthand, dictaphone, typing skills needed. Organizational ability, familiarity with keypunch or computers desirable. 73-390-R.

Secretary IV in the Clinical Research Arteriosclerosis Center, will perform secretarial duties for the clinical director. Transcribe from dictaphone, patient records; type manuscripts, speeches, proposals; schedule appointments, maintain bookkeeping records. Knowledge of medical terminology is preferred. Previous medical secretarial experience is desired. 73-698-R (7/25).

Secretary IV in Urban Studies and Planning will handle registration for a

special program in regional studies, set up special meetings, type correspondence, act as liaison between the Program Fellows and the Program Director. Compose letters by instruction, answers questions related to the program. Good typing skills, ability to take on additional responsibilities; Institute background desirable. 73-699-R. (7/25).

Secretary IV to the Office of the Director in the Urban Systems Laboratory. General secretary for the Headquarters Office. Will type general correspondence, file, reconcile accounts, handle purchasing, payrolls, travel arrangements, and maintain a small library. Will work closely with the Administrative Officer and is expected to help prepare financial reports, as well as compiling information for the Directory of Research Projects published once a year. This position requires good judgment, excellent secretarial skills and ability to communicate well. MIT experience preferred; able to organize priorities. 73-665-R (7/18).

Secretary IV in Psychology will type articles and papers, schedule appointments, handle travel, maintain files, take dictation for one professor. Secretarial training or previous experience important. Maturity and good general skills required. 73-704-R (7/25)

Secretary IV to Associate Director of an Administrative group will type bulletins, correspondence, minutes of meetings; maintain committee records and files; arrange travel; monitor and process solicitation materials returned by alumni. Will also independently answer routine inquiries. Excellent typing, shorthand and a flair for details required. Overtime sometimes necessary. 73-585-R (7/25)

Secretary IV in academic department will handle general secretarial duties for a Biology professor including correspondence and manuscript typing, account maintenance and assistance in operation of training grants. This demanding and interesting position requires excellent skills for an extremely productive laboratory. Will do some correspondence for other laboratory members. Excellent MIT benefits and competitive salary. 73-591-R.

Secretary IV in Laboratory for Nuclear Science will work for group of professors and staff; schedule appointments; type technical reports, correspondence; handle all other general secretarial duties, good secretarial skills (typing and dictaphone); ability to work independently required. Experience typing technical reports very helpful. 73-609-R. (7/11).

Secretary IV to busy professor in Earth and Planetary Sciences will compose correspondence; manage heavy typing load; do some editing and library research; handle general administrative chores necessary in the operation of the office. Excellent typing, (shorthand preferred); ability to edit; tact, good judgment and sense for priorities important. 73-613-R (7/11).

Secretary IV to two professors at the Sloan School of Management will type correspondence from dictaphone; schedule appointments, maintain files; type course material. Will also handle some administrative duties including maintenance of information system for group; arrange seminars; coordinate information about class schedules, teaching assignments and description changes for catalogue. Strong secretarial and administrative skills and experience in both required. 73-615-R (7/11).

Secretary IV in Administrative Office of Mechanical Engineering will work for three administrators, handling correspondence, calendars, composing letters, departmental records, general accounts. Will order supplies, set up and maintain files, schedule meetings and rooms. Deal frequently with people, answer variety of questions. Shorthand, good typing; knowledge of office procedures. Accurate; cooperative; poised to work with many interruptions. 73-652-R (7/11).

Secretary IV will work in Center for Theoretical Physics for three-four professors. Must be able to work well in busy, pressured office; establish work priorities; type technical manuscripts, correspondence, class notes, papers. Some telephone work. Typing and shorthand skills must be excellent. 73-630-R (7/11).

Secretary IV in Physics Department to head of the Optical Maser group will assume wide responsibilities for output of large volume of work for a very active group. Ability to work under heavy pressure; will coordinate the workload of another secretary. Experience and good shorthand and typing skills are a must. 73-632-R (7/11).

Secretary IV at Project MAC to two professors will handle the preparation of course materials, type technical papers; maintain schedules. Will help coordinate major interdisciplinary research project involving computer

scientists, physicians, and graduate students. Ability, motivation to appreciate and master differences between medicine and computer science, and to interface effectively with workers from both areas. Organizational and secretarial skills must be excellent; interest to serve as a valuable assistant to the project. 73-681-A (7/18).

Secretary III-IV in Meteorology will assist with administrative duties and perform secretarial functions for the Executive Officer of a large research program in physical oceanography. Handle routine office duties, type correspondence, arrange meetings for program participants from all over the world. Ability to organize office and to communicate with 60 scientists on a regular basis. Good office skills important; interest in physical oceanography desirable. 73-701-R (7/25).

Secretary III or IV to a Professor of computer science and his graduate staff will type quizzes, reports and technical manuscripts. Excellent secretarial skills and technical typing ability a must. Ability to deal with faculty and students important. 73-545-R.

Secretary III-IV two openings in an academic department working for 2-3 professors. Good skills of shorthand and typing, organizational ability and experience required. 73-323-R.

Acct. Clk./Secretary III-IV will work for the Administrative Officer in Nuclear Engineering, and his assistant in the Reactor Business Office. Perform all typing, filing; compile data and prepare various records and reports; maintain various departmental budget records; prepare vouchers; process reactor use charge information. Must work with little supervision; accurate typing; dictaphone; must like figures, complex clerical work. 73-653-R (7/18).

Acct. Clk./Secretary IV in Nuclear Engineering for the Administrative Officer will maintain budget records for various departmental accounts including processing statements; maintain various administrative and financial files; originating or answering correspondence and questions concerning monthly statements. Previous experience in secretarial and accounting work required. Dictaphone typing. 73-654-R (7/18).

Secretary IV for Institute Secretary for Corporations will organize and run the office. Very accurate typing needed for some letter-perfect copy; other typing duties require speed. Preliminary research on corporate prospects; gather backup information for visits; draft not-too-technical correspondence. Work closely with other Institute offices in obtaining pertinent data; receive visitors. Flexible, adaptable, good telephone presence. 73-674-R (7/18).

Secretary III in Earth and Planetary Science headquarters office will assist the secretary to the Department Head. Good typing needed for correspondence and manuscripts; handle monthly billing records for Xerox machine, maintain petty cash, purchase office supplies; answer general questions. Ability to deal with all types of people, willingness to work in a busy office with many interruptions. 73-706-R (7/25).

Secretary III-IV in Personnel Benefits Office will answer phones and explain benefits to employees and faculty. Excellent typing skills and shorthand or speedwriting are needed. Knowledge of insurance, pensions or medical plans would be helpful. Initiative, poise and the ability to clearly explain benefits important. 73-687-R (7/25).

Secretary III in the Industrial Liaison Office will take and transcribe dictation, handle travel arrangements, perform secretarial duties for one staff member dealing with major industrial corporations. Secretarial or business school background, 1-2 years experience preferred. Shorthand, good typing, spelling and ability to master office procedures essential. 73-683-R (7/25)

Secretary III will handle reception duties for busy student-oriented administrative office; maintain files and complex schedules. Good typing and dictaphone skills required, as well as previous office experience. 73-429-R.

Secretary III to a faculty member in the labor relations/law area will handle general secretarial duties. Type correspondence, course material, manuscripts; arrange meetings and maintain calendar. Good typing skills; speedwriting or shorthand would be helpful; secretarial school training preferred. 73-599-R (8/1).

Secretary III will handle reception duties for busy student-oriented administrative office; maintain files and complex schedules. Good typing and dictaphone skills required, as well as previous office experience. 73-429-R.

Secretary III - (temporary for 6-8 months) in Urban Systems Lab will type correspondence from handwritten

material, maintain accounts, handle travel arrangements and schedule appointments for project staff. Knowledge of medical terminology helpful; familiarity with MIT preferred. Previous secretarial experience desirable. 73-720-A. (8/1)

Secretary III to one staff member will take and transcribe dictation; type correspondence; handle travel arrangements; handle other general office duties. Ability to organize and work independently; good secretarial skills required. Previous working experience and secretarial training preferred. 73-581-R/73-580.

Secretary III in the Office of the President and Chancellor will handle heavy typing of tapes and handwritten material; preparation of speeches; filing; screening phone calls; incoming mail. Will eventually handle complicated travel arrangements. Excellent typing and command of English spelling required; Norelco dictating machine; poise, tact, good telephone presence. Will be second secretary in office. No smoking, due to allergy of other staff member. 73-647-R (7/11).

Secretary III in Metallurgy Department will assist a professor with the coordination and administration of a large undergraduate "service" course; will type all class material, lecture notes, and material for publications. Maintain records of research project expenditures. Shorthand or speedwriting desirable, organizational and administrative skills required. Previous secretarial experience or training essential. Lots of student contact in this job. 73-520-R (7/11).

Secretary III in Physics Department Theoretical Center to 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 preferred, experience necessary. 73-629-R (7/11).

Secretary III to work closely with support staff of Physics Optical Maser group. Second secretary in two-person office will handle heavy volume of correspondence, type proposals and manuscripts; shorthand; experience helpful. 73-631-R (7/11)

Secretary III to the Manager and members of Technical Service Section of the Information Processing Center (about 20 people) will handle correspondence, occasional technical typing; travel arrangements some registration procedures, preparation of course material. Good skills required; shorthand helpful. Must enjoy variety of duties; and interaction with many people. 73-624-R (7/18).

Secretary III in the Sloan School of Management will work for three professors in management science, management information and control, and information systems. Correspondence, typing of class materials, distribution of them; some manuscript typing (occasionally technical); handle secretarial details of a one-secretary office. Shorthand or speedwriting required; able to organize a variety of tasks. 73-664-R (7/18).

Secretary III in the Treasurer's Office will use dictaphone and magna card for security transactions, acknowledgement letters, and general correspondence; type gift records on all security gifts; keep log of MIT Community Service Fund gifts; file. Accuracy with figures and details; good typing and spelling; familiar with corporation names. August 1 opening. 73-671-R. (7/18)

Secretary III to a Contract Administrator in the Office of Sponsored Programs will type letters, keep records on contracts and grants; coordinate routing them for approval; keep accounting statements, government regulation books updated; set up meetings, write letters, arrange travel. Previous secretarial experience; shorthand helpful; careful worker, able to work without close supervision. 73-680-R (7/18)

Senior Clerk III or IV in the Personnel Records Section will process personnel actions; act as liaison with employment sections; answer phone inquiries and follow-up on department problems; generate required statistics or reports. Good typing skills; ability to work with details; minimum of three office/clerical experience required. 73-612-R (7/11).

Sr. Clerk/Media Asst. III-IV at the MIT Press will set up and maintain budgets fiscal records and inventories, process invoices. Will process all reprints and rebinds; deal with printers; handle scheduling and follow-up. Highly organized individual required interested in analyzing and solving problems. Bookkeeping experience helpful; productive manner in an extremely busy atmosphere. Interested in learning about book production. 73-663-R (7/18).

Senior Clerk IV will work in the Business Office of the Medical Department. Prepare, process and distribute

all clerical and accounting projects for the office. Maintain payroll, vacation, sick leave records; process clinic Infirmary, office supply orders. Previous business office experience (preferably with payroll and accounting procedures) required. Ability to handle a variety of assignments, and to work with detail important. Typing skills will be needed. 73-721-R (8/1)

Technical Typist III in the Research Lab of Electronics will type manuscripts and reports from rough data. Responsible for punctuation and paragraphing, may involve some editing for preparation for publishing. skills, minimum of one years experience. 73-397-R.

Technical Typist III in the Office of Administrative Information Systems will type technical memoranda, data processing control documents and manuals. Maintain documentation library, including filing, organization and maintenance of programmer reference library. Good typing skills, experience in a data processing environment desirable. 73-684-R (7/25). **Senior Clerk III** in Student Accounts Office in Comptroller's Accounting will help prepare Degree list: typing, filing, work with Registrar. Handle variety of check requests, distribution of funds; inventory of supplies. Will help analyze student accounts and computer reports. Some secretarial duties included: schedule appts., travel, handle mail, type correspondence for a supervisor. Bookkeeping familiarity helpful. 73-650-R (7/11).

Jr. Accounting Clerk II-III in the Comptroller's Accounting Office will process invoices and patch processed invoices. Apply discounts to invoices, determine vendor distribution, audit vendor invoices, complete batch control record for keytape entry. Ability to work with figures and proficiency on the adding machine required. 73-707-R (8/1).

Senior Library Assistant IV-V will maintain a library of systems documentation and technical information for the Office of Administrative Information Systems. Circulate professional publications; type write-ups developed by technical support group. Knowledge of basic data processing concepts and terminology; good typing and clerical skills with emphasis in filing and library techniques required. 73-714-A. (8/1)

Sr. Library Assistant IV in the Engineering Library will be responsible for library operation on nights and weekends. Train student employees and coordinate the work of night and weekend personnel. Perform routine circulation desk duties, provide catalogue information service, assist with processing the reserve collection, stack and shelf books. Previous library circulation experience desirable; college background and study in library science helpful. Mature, responsible individual needed to work Sun. - Thurs. evenings. 73-711-R (8/1)

Library General Assistant III will handle circulation of library materials from the Science and Humanities Libraries; tabulate statistics; interpret loan and other policies; train and coordinate the work of student assistants. Responsible individual with the ability to perceive routine needs of the department, and capacity for detail is needed. Accurate typing skills are required. 8am-4pm. 73-725-R (8/1).

Electronic Technician A will operate, maintain, and repair commercial electronic instruments. Will assist in laboratory, research, or analytical work under direction of scientific personnel. Graduate from a two year day technical school or its equivalent and a minimum of two years experience in trouble shooting and repairing instruments, especially oscilloscopes and digital measuring equipment. 73-391-R.

2nd Class Engineer must have a Mass. second class Engineer's license or higher. Individual must be willing to work on any shift. 73-182-R.

Electronic Technician B in Center for Space Research will assist in laboratory or research work under the supervision of scientific personnel. Operate highly technical experimental apparatus; Should have considerable skill and good performance in aerospace, computer or related fields. Requires some supervision. Breadboard and test linear and digital circuit systems for satellite-type experiments. Does flight quality soldering and cabling. Will be required to perform function tests on subsystem and make indicated adjustments and corrections. Graduate from a two-year day technical school. 73-602-A.

Custodians - We are seeking qualified applicants for our waiting list. Openings will be on the second and third shifts. Candidates must have a steady, reliable work record and good references. The waiting list will be used to fill openings as they occur over the next several months. Interested applicants should fill out an application at the Personnel Office and leave it for consideration.

Guitar Unites Specialists for New Seminar

Two members of the MIT teaching staff, brought together by a guitar, will collaborate this fall as instructors in a two-term undergraduate seminar on the theory, design and construction of musical instruments.

One is Adrianus J. M. Houtsma, a lecturer in the Department of Electrical Engineering and the Music Division of the Department of Humanities, who recently designed and built an acoustically innovative classical guitar.

His teaching partner will be Ignacio H. Garabieta-Orueta, a technical instructor in the Department of Architecture who has been a designer and builder of stringed instruments for more than 20 years.

He was once commissioned to build a guitar for Andres Segovia, the famed guitarist.

Mr. Garabieta sought out Dr. Houtsma after reading an article in the May 23 Tech Talk about the guitar he had built.

Mr. Garabieta, a native of the Basque country, came to the United States in 1964 from Venezuela with the intention of finding an acoustical engineer who would be interested in applying a more scientific approach to the building of classical guitars.

Now almost ten years later he has found a qualified partner for his project and they will share their investigations in an educational workshop-seminar.

The seminar will be broken into a study unit followed by a work unit.

The fall semester will be devoted to a lecture series on basic acoustical problems of instruments. During this term the stu-

dents will choose an instrument (preferably stringed) which they wish to build.

When the students begin the second semester, they will have the necessary materials and tools to spend the following months building and testing their instruments.

Dr. Houtsma said in an interview last week, "Our approach in the seminar will be to stress the need to integrate fully the scientific and acoustical theories of instrument design with the exacting craft of construction. Both sides are of equal importance."

By setting up experimental procedures to investigate the sound variables of the classical guitar, they said, they hope to derive the ideal structures and dimensions for the guitar as well as the proper materials and best bonding techniques.



The subject is guitar—Adrianus J.M. Houtsma, (right) holding the classical guitar he designed and built, talks shops backstage with Vo Ta Han, (far left) guitar soloist, and Ignacio H. Garabieta-Orueta, (center) after the debut of the guitar at a recent MIT

concert. Mr. Garabieta, a professional builder of concert string instruments, and Dr. Houtsma, will teach together this fall in a new undergraduate seminar on the theory, design and construction of musical instruments.

Obituaries

Professor Lan Jen Chu, 59

Dr. Lan Jen Chu, of Lexington, Mass., Webster Professor of Electrical Engineering at MIT, died Wednesday, July 25, after a brief illness. He was 59.

Professor Chu was internationally known for his pioneering work in electromagnetic theory and its application to engineering problems, such as the design of antennas. He was the founder of Chu Associates, a firm specializing in the design and manufacture of microwave and high frequency radio antennas.

A native of Kiangsu, China, Professor Chu received the BA degree from Chiao Tung University, Shanghai, in 1934, and the SM and PhD degrees from MIT in 1935 and 1938 respectively.

During World War II, Professor Chu was associated with the MIT Radiation Laboratory, later the Research Laboratory of Electronics. In 1947 he was appointed associate professor of electrical engineering. He became a full professor in 1952 and was appointed the Edwin Sibley Webster Professor of Electrical Engineering in 1963.

Professor Chu and his associates at MIT made new contributions to the theory of interaction between waves and moving, polarizable matter, and he was a leader also in the formulation of the theory of microwave tubes.

A gifted teacher, Professor Chu played a leading role in modern-

izing the curriculum of the MIT Department of Electrical Engineering in the late 1950s.

Most recently he has spent the spring semester each year at Chiao Tung University, now located in Taiwan, Republic of China, where he was instrumental in the development of its graduate school. This work was carried out under a National Science Foundation grant as part of the Sino-American Cooperative Sciences Program.

Professor Chu was a fellow of the Institute of Electrical and Electronics Engineers, the American Physical Society, the American Academy of Arts and Sciences and the Academia Sinica, and a member of Eta Kappa Nu and Sigma Xi.

He is survived by his wife, Grace Feng Chu, two sons, Yuan Bo Chu and Yuan Ho Chu, all of Lexington, and a daughter, Mrs. Carl B. Durlay of Columbus, Ohio.

Funeral services were held Saturday, July 28, at Grace Chapel, Lexington.

Charles Wareham, Professor Emeritus

Private funeral services were held Thursday, July 26, for Charles M. Wareham, Class of 1916 and MIT emeritus associate professor, who died on Tuesday, July 24.

Professor Wareham, 81, was a member of the MIT teaching staff and faculty for 41 years.

He joined the staff in 1917 as a teaching assistant in drawing and design geometry. Two years later, he became an instructor in the chemistry department. He was promoted to associate professor in 1941. He retired from the Institute in 1957.

Professor Wareham was born in Lakewood, N.J., and had lived in Marblehead for the last 20 years.

Survivors include a son, Richard R., and a daughter, Mrs. Jane DeWolfe, both of Marblehead; a brother, four grandchildren, and two great grandchildren.

Eleanor O'Connor, 89, An Early Graduate

Eleanor Manning O'Connor, of Boston and New York, one of the first women to graduate from MIT's architecture department, died Thursday, July 12, in Mexico City at the age of 89.

Mrs. O'Connor, who was born in Lynn, Mass., graduated from MIT in 1906 and was an architect and teacher as well as a specialist in the restoration of old homes.

Mrs. O'Connor was the widow of Johnson O'Connor, who died in Mexico City earlier this month.

Mrs. O'Connor leaves a son, Chadwell O'Connor, of Newport Beach, Calif., and four sisters.

Small Business Foreseen As Next Computer Market

The computer industry's largest untapped market--small businesses that don't use computers--will remain largely a profitless wasteland unless systems are developed that can be used by unsophisticated firms, an MIT professor says in the July issue of *Technology Review*, the Institute's national magazine.

Stuart E. Madnick, assistant professor of management science at the Alfred P. Sloan School of Management, believes there is "enormous potential market growth" for computerized processing and information

systems, but he warns of three "bottlenecks."

One bottleneck--systems that can't be understood or used by those uneducated in computer technology--could choke off that untapped market which, Professor Madnick says, is even larger than that composed of current, relatively mature computer users.

Other bottlenecks to market growth, Professor Madnick said, flow from the percentage imbalance between salaries and hardware on the one hand and between maintenance and development on the other.

"It is estimated that close to 70 percent of the development and operation costs of new application areas is tied to people (including their salaries, office space, fringe benefits, etc.) and only about 30 percent is tied to computer hardware. If the hardware costs were to drop to zero, there would still be relatively little increased incentive to develop applications at a faster pace," he said.

Operation and maintenance account for 80 to 90 percent of the personnel costs in most mature data processing in-

stallations, Professor Madnick points out, leaving only from 10 to 20 percent of the budget for development of new application areas.

"If the prices of hardware drop as anticipated," writes Professor Madnick, "it will be possible to do next year's processing at less cost than this year's. One estimator claims that the current world-wide inventory of processors and memories could be replaced at a cost of less than \$1 billion by 1975. Thus, if there is not continual and massive growth of the market, the

industry will stagnate--and its dollar revenues will shrink tremendously."

Although confident that the potential exists for market growth, Professor Madnick concludes that realizing growth "depends on making dramatic changes in information system usage and structure."

"In many cases, these changes are more under the control of information system users than manufacturers. An informed user community is an important requirement for future progress."

International Journal Features MIT Graphic Design

Novum Gebrauchsgrafik, the internationally distributed journal for visual communication and graphic design, has devoted 12 pages of its July issue to the work of the MIT Design Services office.

Thirty-five examples of what the magazine calls the "MIT style" accompany the article. The work illustrated includes posters, brochures and bulletins executed by Jacqueline S. Casey, who heads Design Services, by Ralph Coburn, and by Dietmar Winkler, formerly with the office.

In the text accompanying the illustrations the magazine praises the "visual and textural excellence" of the MIT design work, of which it says: "They are intended as professional vehicles of

contemporary communication in the field of education, but they are surely more than that: their design, their visual and textual excellence makes them an educational success."

The *Novum* article grew out of an exhibit of MIT's work collected and mounted by the New York Art Directors Club. Originally shown in New York City, the collection later was seen in London, Bath, Ravensbourne, Leicester and Hornsey in England.

Another collection of the work of MIT's graphic artists is being prepared now for showing in September as part of an exhibition planned by the Frederick L. Ryder Co. and Container Corporation of America. The exhibition will be in the Ryder Gallery in Chicago.

11 Receive Faculty Appointments

One associate professor and ten assistant professors have been appointed to the MIT faculty, effective July 1.

Dieter J. Sigmar, a lecturer in the Department of Aeronautics and Astronautics since September 1972, has been promoted to associate professor in the Department of Aeronautics and Astronautics and Nuclear Engineering for two years. Dr. Sigmar received the MS degree in 1960 and the PhD in 1965, both from the Technical University of Vienna.

Moshe E. Ben-Akiva has been appointed assistant professor in the Department of Civil Engineering for one year. Dr. Ben-Akiva received the BS degree from the Israel Institute of Technology in 1968. He received the SM degree in 1971 and the PhD last month from MIT. He has worked at MIT since 1968 as a research assistant.

Richard M. Britain has been promoted to assistant professor in the Department of Architecture for one year. Mr. Britain is a 1967 graduate of Cambridge University, England. He received the MA from the University of Oregon in 1970. He began teaching at MIT in 1971.

James L. Gole has been appointed assistant professor in the

chemistry department for three years. Dr. Gole is a 1967 graduate of the University of California at Santa Barbara. He received the PhD from Rice University in 1971. Since 1971, he has done post-doctoral research at Columbia University.

Judith T. Kildow, who has worked as a research associate in the Department of Ocean Engineering since 1972, has been promoted to assistant professor for three years. Dr. Kildow is a 1964 graduate of Grinnell College in Iowa. She received the MA in 1965 and a doctorate in 1972, both from Tufts University.

William P. Thurston has been appointed assistant professor in the Department of Mathematics for three years. Dr. Thurston received a BA from New College in 1967 and a PhD from the University of California at Berkeley in 1972. Last year he was on the teaching staff of the Institute for Advanced Study, Princeton, N.J.

Six assistant professors were appointed to the Sloan School of Management. They are:

Ralph Katz, a former teaching assistant at the Graduate School of Arts and Sciences at the University of Pennsylvania, has been ap-

pointed assistant professor of organizational psychology and management for three years. Dr. Katz is a 1966 graduate of Carnegie-Mellon University. He received the MBA in 1968 and the PhD this year, both from Wharton School.

Peter G.W. Keen has been appointed assistant professor of organizational psychology and management for three years. He is a 1963 graduate of Balliol College at Oxford University. He received the MBA from Harvard Business School in 1969 and the doctorate degree in 1973 from the Harvard Graduate School of Business Administration. Dr. Keen is a former member of the faculty of the Harvard Graduate School of Business.

Peter Lorange has been appointed assistant professor for three years. Dr. Lorange graduated from the Norwegian School of Economics and Business Administration in 1966 and received the MA from Yale University in 1968. He received the PhD from Harvard University in 1972. Dr. Lorange is a former assistant professor at IMEDE Management Institute in Switzerland.

Kenneth S. Mericle has been appointed assistant professor of industrial relations for three years. Dr. Mericle received the BS degree in 1967 and the MS in 1969, both from Iowa State University. He is completing the PhD at the University of Wisconsin this year. Dr. Mericle is a former research and teaching assistant at the University of Wisconsin.

Eric Arthur von Hippel has been appointed assistant professor of management for three years. Dr. von Hippel graduated from Harvard College in 1964 and received the SM from MIT in 1968. He completed the doctorate this year at Carnegie-Mellon University. He is a former management consultant for McKinsey & Co. in New York. He is the son of Institute Professor Emeritus Arthur von Hippel.



IT'S A NATURAL--Jean-Luc Janninik, foreground, and his friends Sydney Sorenson, left, and Christy Stickney discovered that twigs and leaves make fine mobiles, and they decorated the Great Court with several of their art works last week. The children are Benjamin Janninik, a graduate student in chemical engineering, of West Newton; Richard A. Sorenson, assistant to the vice president in charge of operations, of Winchester; and Robert E. Stickney, professor of mechanical engineering, also of Winchester. The children were on the MIT campus to participate in a study of the digestibility of milk, being conducted by Cuthberto Garza, a graduate student in nutrition.

Meters Proposed To Curb Traffic

(Continued from page 1)

Roads would be posted with signs indicating the current parking charges, he said, and cars left at the side of the road would have their meters advanced by appropriately-timed pulses.

Allocating Other Costs

Other external costs also could be allocated by these means, he said, explaining:

"Quarterly inspections could determine certain performance, pollution and noise characteristics of each vehicle and could thereby adjust a conversion factor relating the meter reading to the road-use tax. A large vehicle would pay more per mile than a small one, other things being equal, and noise or polluting emissions would also produce an increased rate."

Professor Wilson said that the effects of using a road-use-meter system nationwide would be "dramatic."

"Strained urban budgets would suddenly become more manageable. There would no longer be an unfair subsidy on people living in the suburbs and in country areas because such people would have to pay all their true costs of transportation."

Coach Frailey On Leave To Steer Olympic Rowing

Jack H. Frailey has taken leave as varsity lightweight rowing coach in order to devote more time as the new chairman of the US Olympic Rowing Committee.

Mr. Frailey, who is director of student financial aid, has been associated with MIT crews since 1954. That year his first lightweight crew won the Thames Cup at the Henley Royal Regatta.

In January, 1973, Mr. Frailey was elected vice president of the National Association of Amateur Oarsmen, the governing body of rowing in the United States. In this capacity he is one of three US delegates to the Federation Internationale des Societes

d'Aviron, the governing association in international rowing, including the Olympics.

In announcing Mr. Frailey's leave, Professor Ross H. Smith, director of athletics said, "Jack's extensive coaching background in rowing at collegiate and Olympic levels, together with his proven skills in management and administration, will enable him to make significant contributions to the development of a national program. We are very grateful for his many years of dedication to the students of MIT."

Professor Smith said a successor to Mr. Frailey as lightweight crew coach is being sought.