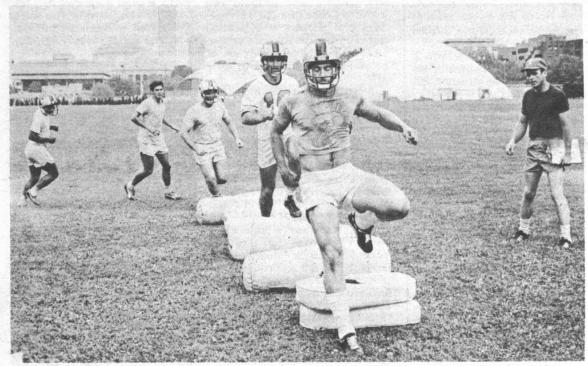
Welcome, Class of 1983

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Massachusetts Institute of Technology

August 29, 1979 Volume 24 Number 4



BEGINNING A NEW TRADITION were members of MIT's football club who reported for practice on Monday, August 27. Intercollegiate football returned

to MIT last year for the first time since 1902. Prospects for improvement over last year's 0-6 season look bright. See story on page 8.

Ready or Not, Here Comes

Some 1,070 members of MIT's class of 1983 are arriving in Cambridge this week in anticipation of Residence/Orientation (R/O) Week.

international students Forty checked in on Monday and Tuesday for a special three-day program of orientation to the Boston area, with trips planned to restaurants, stores, banks, museums and areas of historical interest in Boston and Cambridge. American students are expected on Thursday and Friday, August 30 and 31.

R/O Week actually lasts 10 days beginning with the Freshman Pic-

Photovoltaic

With the flick of a switch today (Wednesday, Aug. 19), the first commercial radio station powered by solar photovoltaic cells-cells that convert sunlight directly into electricity-will be put into operation in Bryan, Ohio, when daytime WBNO (AM) begins to draw its

nic at 4:30pm, Friday, August 31, in Killian Court. (In case of rain the picnic wil be held in duPont Gymnasium.) Immediately following the picnic, the fraternity rush marks the beginning of the first part of the program, when students will select their residences for the school year. On Monday evening, September 3, freshmen must turn their dormitory preference cards at the R/O center, and housing for the coming year will be assigned on the basis of their choices. The fraternity rush continues through Friday, Sept. 7.
This year the R/O committee

Radio Station

power from an 800-module solar array. The utility connection which previously filled its energy needs with provide backup service.

Under a Department of Energy contract, MIT's Lincoln Laboratory initiated and designed the experimental solar power system.

has introduced two innovations to the program, both planned to make the period more productive for the arriving freshmen.

The first is a change in assigning temporary housing. In years past, freshmen have requested their preferred R/O week dormitory space upon arrival. This has led to much delay in giving out rooms. This year, freshmen mailed in their temporary residence preference cards in advance and will pick up their room assignments on arrival. The system will take much

(Continued on page 4)

Airs in Ohio

At the heart of the system are 33,600 photovoltaic (PV) cells, for taking on a UROP project. which make up an array with a 15,000 watt peak power capacity.

Headed by Paul Maycock, the Department of Energy's Photovoltaic Systems Branch has a congetting involved in a research pro-

MIT Team Identifies First Double Quasar

By WILLIAM T. STRUBLE Staff Writer

A blurry double star image that some astronomers have thought could be a distortion caused by a massive cosmological "lens" has been scanned by MIT radio astronomers, who now believe the objects form the first double quasar ever

The conclusion of the MIT astrophysicists adds an intriguing new aspect to the study of quasars, or quasi-stellar objects, which are considered to be the most remote of the observable objects in the universe. Quasars look like stars when viewed through an optical telescope, but they emit more energy at radio frequencies than

the most powerful galaxies known. Scientists who had earlier used an optical telescope to study the twin images—which are designated 0957+561 A and B—had speculated that they might be seeing a single object split into a pair of images by a so-called "gravitational lens" between the quasar and the telescope. A massive galaxy could act as such a gravitational lens, refracting or bending the quasar's light in such a way that a single point of light would appear as two images. This is analagous to the bending of light as it passes the sun, a phenomenon predicted by Einstein and verified many times both by optical astronomers during solar eclipses and by

(Continued on page 8)

UROP Offers Entree To New Researchers

By KAREN RAY Staff Writer

Ask a few students to make up a "Why I came to MIT as an Undergraduate" list. Doubtless, the opportunity to do research will be near the top of most of those lists.

While students at other universities must often wait years before doing research, dozens of MIT freshmen dive right in and, in fact, almost 20 per cent of students participating in the Undergraduate Research Opportunities Program (UROP) are freshmen. At any one time nearly two-thirds of undergraduates are involved in UROP.

Freshmen get involved in UROP for the same reasons as other students-to do research and get to know faculty members-but for freshmen there are other reasons First, UROP is one of the easiest ways to overcome large impersonal classes and feel like you belong somewhere, and second,

ject may tell you quickly if a particular field is right for you.

First let's talk to someone who was sure of what he wanted.

"I knew I wanted to study the physical properties of biological polymers," said new sophomore Miguel Mitchell, "and this project was a perfect fit, although it was in the Department of Nutrition and Food Science, and I plan to major in chemistry and mathematics.

Miguel decided early on a career in science and spent his summers while going to Boston Latin doing research work at Wesleyan University and Tufts University Medical School. Last spring Miguel began working with Dr. ChoKyun Rha, associate professor of food process engineering, on a project studying the flow of concentrated protein solutions under high shear stress, work that could ultimately have applications for designing artificial food and artificial skin.

(Continued on page 3)

Chrysalis Takes To Air Via Human Power и узаиз

(Bryan Allen, who achieved fame earlier this summer when he piloted and powered the Gossamer Albatross across the English Channel, visited MIT two weeks ago to try out MIT's human-powered airplane Chrysalis. The following article, written by Professor E. Eugene Larrabee of aeronautics and astronautics, briefly chronicles the history of MIT's personpowered flight).

By E. EUGENE LARRABEE Special to Tech Talk

The Chrysalis biplane is the third-and successful-humanpowered airplane to be constructed by students at MIT. On August 17, Bryan Allen, who flew the Gossamer Albatross across the English Channel on June 12, flew MIT's Chrysalis airplane for the first time. He liked its stability and control and thought the power requirement to maintain flight (about one-third of a horsepower) comparable to that of the Gossamer Condor, predecessor of the Gossamer Albatross.

The student designers and constructors of the Chrysalis have enjoyed peer group relations with the designers and contructors of the Gossamer Albatross. Chrysalis uses airfoil sections developed by Dr. Peter Lissaman of the Albatross group while the Albatross uses a computer-designed propeller based on a program written by the Chrysalis group from principles developed by Professor E. Eugene Larrabee.

Bryan Allen's test flight of the Chrysalis is an aspect of the continuing interaction between the two groups that may one day lead to a new class of aeronautical recreation vehicles which would be to ordinary airplanes as racing sculls are to motorboats.

The Chrysalis human-powered airplane is a conventional biplane with a 72-foot wingspan, an aft tail, a tractor propeller and an empty weight of 93 pounds. The Gossamer Albatross, by comparison, is a canard monoplane with a 96-foot wingspan, a forward pitch control surface, a pusher propeller and an empty weight of less than 70 pounds.

The relatively small size of the Chrysalis is a concession to the size of the Lincoln Laboratory hangar at Hanscom Field in Bedford where Chrysalis is stored. Its relatively heavy weight reflects the limited time available for its construc-tion—the first week in March through the first week in June—which led to an alumi-(Continued on page 8)

Bryan Allen, who piloted the man-powered Gossamer Albatross across the English Channel in June, is at the controls--and the pedals--of MIT's man-powered craft, Chrysalis, in a flight at Hanscom Field in Bedford. Allen test-piloted the 95-pound biplane to help determine its maximum performance levels.

-Photo by Calvin Campbell

Whaling Career Lives On in Models

By CHARLES H. BALL Staff Writer

As a young man, Fernando A. Delima was a harpooner on a whaleboat out of the small port of Pice in the Azores.

Then he left the Azores for a new life in the United States and eventually came to MIT about eight years ago as a Physical Plant employee.

He works at the Institute as a floor polisher now, but his whaling experience lives on in the meticulously crafted ship and boat models he began building about two years ago.

His showpiece thus far is a 43-inch long replica of a threemasted whaling ship, which he keeps in a glass case in the living room of his Somerville home.

The model, which he created mostly from memory, is carved from white pine and took him a year and a half to complete. Mr. Delima fairly beams with enthusiasm as he tells how he took great pains to make the ship as authentic a reproduction as pos-

The rigging for the masts, a complex web, is accurately displayed. The small boats on deck -5½ inches long—contain the harpoons, lines and other gear they normally hold. Inch-high figures on deck, clothed authentically, are engaged in the work they would be doing.

The ship, naturally, flies the green, white and red Portugese flag, and is trimmed in those colors.

The actual whaling mother ship on which he served is about 95 feet long, Mr. Delima said. The smaller boats that go out to kill the whales are about 37 feet long, and Mr. Delima has built four models of these, each 16 inches

He is about to begin work, he added, on another mother ship



A MAN AND HIS SHIP--Fernando A. Delima spent a year and a half building this 43-inch model of a whaling ship he served on as a young

Mr. Delima, who is 48, went to sea when he was 15 on a ship commanded by his father and became a harpooner three years later. He was 28 years old when he gave up whaling to come to America in 1959.

In a fifth-floor corridor in Bldg. 39, standing next to his polishing machine, he demonstrated how he would hold his harpoon, position himself and then throw the weapon from the bow of the small boat into a whale, a distance of some five feet.

His actions had to be coordinated with the captain of the small boat, he said, so that the thrashing whale would not upset the craft.

This was not always successful. "We sometimes ended up swimming," he said, "and sometimes without a boat, too. It was very dangerous work."

Mr. Delima, a short, slightlybuilt man, has long been interested in woodworking. His house in Somerville, where he

lives with his wife, Maria, is filled with furniture he made himself.

And now he is using his skills in a way that obviously fills his leisure hours with pleasure and accomplishment.

A final question: What are his thoughts about the controversy over whaling and the feared depletion of some species of whales?

He turns serious. He believes, he said, that factory-ship whaling, such as the Soviet Union and Japan do, should be limited because of the large number of whales these fleets can kill. In Portugal, he said, whalers could go to jail for catching undersized whales, but he fears that today's whalers operate with few restraints.

The most whales his ship ever killed in a year was 14, he said, and many years the catch was much smaller.

He shrugged, a look of concern on his face. "The factory ships? How many can they kill? It is too much, I think, too much."

those looking for local housing.

The gasoline shortage isn't im-

proving matters either. As gas prices

go up and supplies dwindle it

becomes less practical to live in the

outer suburbs, so that just as the

number of rental units in the inner

suburbs and the city also dwindle and

rents climb upward, the number of

To prepare newcomers for the

situation, the housing office tries to

warn them that the search for shelter

will be long and expensive, that front

end expenses will be high, and that

adequate funds must be budgeted to

cover the rising cost of living in the

potential tenants is growing.

Casey Poster Exhibit To Open Hayden Season

An exhibition of works by Jacqueline S. Casey will open the fall season at the MIT's Hayden Corridor Gallery, August 27 through September 23.

The show, Jacqueline Casey: Hayden Gallery Posters, 1966-1979, will represent some 14 years of poster designs for exhibitions at MIT, where Ms. Casey is director of Design Services.

Ms. Casey has won numerous national awards and recognition. This past year the Art Directors Club of Boston included four of her Hayden Gallery posters with special awards in its annual exhibition, including one which received a silver award. Other awards during the past year for Hayden Gallery posters have included two from the Council for the Advancement and Support of Education and two from the Annual Communications Graphics Exhibition of the American Institute of Graphic

International recognition has most recently included being named one of the "Important US Graphic Designers of the Last Twenty-Five Years" in the Silver Anniversary Issue, 1978, of Idea Magazine (Japan). One of Ms. Casey's posters was published in Graphis Posters 79 (Switzerland), a collection of the "world's best posters of the year."

One of Ms. Casey's posters was recently acquired for the New York Museum of Modern Art's Graphic Design Collection. Her posters also are included in the collections of the Library of Congress, and the International Communications Agency (formerly the USIA). She has had extensive exhibitions of her work including shows at the Philadelphia College of Art, the Chelsea School of Art in London and in the Hayden Corridor Gallery (1972).

Ms. Casey said of her work, "I see each assignment as a unique problem and try to come up with an appropriate graphic solution.

"Before I start designing," she continued, "I research the subject so that my work will be representative of it and make absolute sense. . . I always try to use colors and materials which relate to the subject, and the typeface must fit into the whole design."

In the catalogue of Directions 1968 at the Philadelphia College of Art, Kenneth Hiebert wrote, "Ms. Casey's work reflects great respect for the intrinsic nature of the information to be conveyed, genuine humor, unforced emotion, compact unity and precise craftsmanship. It is fed but unburdened by tradition."

tems Engineer; Jerry Kaplan Sales Engineer; Data Genera Corp.
WORKERS CONTROL IN THE

US: PAST, PRESENT, AND FUTURE-Prof. David Montgomery, University of Pittsburg.

Wednesday, September 5

RADIOACTIVE WASTE SYMPO-SIUM MIT THE INSTITUTION: PER-SPECTIVE AND STYLE

1-2:10pm 2-3pm

PAUL WINTER CONSORT-BOSTON REPERTORY BALLET AT KRESGE AUD.—Basement

LAST DAY OF THE DOLPHIN

Friday, September 7

1-3pm

CARNEGIE COMMISSION ON PUBLIC BROADCASTING RE-PORT-Prof. Wilbur Davenport, Dept. of Electrical Engineering and commission member; Stever K. Bailey, commission member, Harvard School of Education; Michael Rice, Aspen Institute and

WGBH-TV.
VIDEO DANCE—Basement Video

1-3pm

FUTURE OF LARGE SATELLITE COMMUNICATION NET-WORKS-Prof. David Staelin, Dept. of Electrical Engineering,

MIT THE INSTITUTION: NON-NARROWLY DEFINED

1-3pm

COMMUNICATIONS SATELLITES FOR THE PUBLIC—Russel Burke, Joint Council on Educa ser Burke, John Council of Budga-tional Telecommunications, Wash-ington, D.C., Bert Cowlan, Co-director, Public Interest Satellites Association, N.Y., N.Y.; Howard Hupe, US Dept. H.E.W.; Prof. Herbert Dordick, U.S.C.

INSTITUTE

national Biography.

Before coming to MIT in 1955 as

a graphic designer, Ms. Casey worked in fashion illustration,

advertising, interior decorating

and trade publication. She has

been a guest lecturer at the Massa-

chusetts College of Art, Yale Uni-

versity, Carnegie-Mellon Univer-

sity and Simmons College, and has

been a judge of several national

Ms. Casey is on the board of

directors of the American Institute

of Graphic Arts and is a panel

member reviewing government graphics for the Visual Communi-

cations Sections of the National

Endowment for the Arts, Washing-

Included in the 1978 edition of

Who's Who in American Art, Ms.

Casey is also listed in The World

Who's Who of Women, Fifth Edi-

tion, and the Dictionary of Inter-

exhibitions.

ton, D.C.

Announcements

Library Closing-Student Center Library will be open Saturday, Sept 1-Monday, Sept 3. All other libraries will be closed.

Physical Education Registration for first quarter, Tuesday, Sept. 11, 8:30am-11am, quarter, Tuesday, S DuPont Gymnasium.

MIT Furniture Exchange**—Open Tuesdays and Thursdays, 10am-2pm at 25 Windsor St. to buy or sell used furniture. Letters given for tax deductible donations. Info: x3-4293 during hours above.

(tmanship," done withou Club Notes "

MIT Community Plavers**-Auditions for October production. Arms and the Man, Sunday, Sept. 9, 2-5pm and Monday, Sept. 10, 7-10am, Rehearsal Rm A, Kresge: Tuesday, Sept. 11, 7-10pm W20-400, Monday night for MIT affiliates only. Info: Sue McCloud, 494-0112 or Carol Pokodner, 395-4765

MIT/DL Bridge Club**-ACBL Duplicate Bridge, Tuesdays 6pm, Rm W20-473.

MIT Duplicate Bridge Club*—Thursdays, 7pm, Rm 473 Student Center. All bridge players invited. Info: Adam Wildavsky, d15-7673.

Sailing**-Beginners' classes every Wednesday, 5:15pm, Sailing Pavilion. Summer Series Racing, Tuesdays and Thursdays, 5:15pm. Novice Racing, Mondays, 5:15pm.

Religious Activities

The Chapel is open for private meditation 7am-

Tech Catholic Community*-Sunday, Sept. 2, services at 9am and 12noon, MIT Chapel. Lutheran-Episcopal Ministry*—Interdenominational service of Holy Communion, Wednesdays, 5:10pm, MIT chapel. Supper follows in basement of 312 Memorial Dr.

Prayer Time and Bible Class*-1-2pm, Fridays, Rm 20E-207. Guest speakers, music, refreshments. Led by Miriam R. Eccles, founder and director, Alpha and Omega Missionary Society.

New Subjects

Disco Dance**-offered by Physical Education Department Mondays and Thursdays, noon-1pm, T-Club Lounge. Register at Physical Education Registration Tuesday, Sept. 11, 8:30am DuPont Gym.

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Of Rents Off-Campus Housing Warns degree of difficulty experienced by

Rental housing is scarce and the rents are rising.

Judy Douglis of the Off-Campus Housing Service wrote a form letter in April to warn people coming to MIT of the area's housing problems. Three months later she feels that the rents quoted in the letter are too low.

Ms. Douglis said that the number of listings that come into her office are off by 40 per cent from former years. The pinch was first felt last year by people trying to upgrade their housing. Willing to pay more, they found that more money did not buy better apartments. Controlled rents had risen from 10 to 17 per cent and uncontrolled rents had gone up as much as 50 per cent.

Much of the problem can be attributed to the increase in condominium conversions. Areas of high demand such as Brookline have already undergone a severe shift from apartment to condominium. Cambridge is

following suit with many of the larger apartment buildings along Broadway and Harvard Street converting to condos in the \$50,000 to \$70,000 price range.

Ms. Douglis explained that the national vacancy rate is now at about four per cent. A call to the Greater Boston Real Estate Board got unofficial confirmation of a rate of three to four per cent in the Boston area. In the past, the vacancy rate has averaged 10 per cent.

Asked if everyone was able to find housing under these circumstances, Ms. Douglis replied that they must. "The only way we can tell if they don't, is if they keep coming back.

People just don't let you know if they've found housing." Housing, said that more people than

Teresa O'Connor, of Off-Campus usual had been reporting it when they did find housing. This in itself is something of an indication of the

Cable TV

greater Boston area.

ent to me redmun August 29-September 11, 1979

Wednesday, August 29

Channel 8

COMPUTERS AND EDUCA-TION: WHEN WILL SCHOOLS BE OBSOLETE?—Prof. Seymour Papert, Dept. of Mathematics, and Director of LOGO: Prof. Michael Dertouzos, Director of the Labora-tory for Computer Science. John tory for Computer Science; John Holt, writer and educator; Alan Kay, Xerox Parc Learning Re-THE DISSECTION OF THE FROG

3:10-4pm

1-2:30pm

COMPETENCE TESTING: CATASTROPHE OR OPPORTU NITY?—Dr. Judah L. Schwartz, Educational Development Center. ANALYTICAL ISSUES IN DIVERSIFYING FOOD POLICY IN INDONESIA—Prof. C. Peter Timmer, Harvard School of Public Health.

Friday, August 31

1-2:30pm

IMPACT OF MODERNIZATION
ON WOMEN'S ROLES IN DEVELOPING COUNTRIES—Carolyn Eliot, Center for Research on
Women, Wellesley College.
THE ROLE OF TELECOMMUNICATIONS IN DEVELOPING
COUNTRIES—Robert J. Saunders. Chief Telecommunications

ders, Chief, Telecommunications Division, World Bank; Nino Ur-Division, world Bank, Nino Ur-sano, Director, Market Research and Business Planning, Western Electric International; John A. McCarthy, V.P. Engineering, American Bell International; Prof. Ithiel De Sola Pool, Dept. of Politi-cal Science. cal Science.

Monday, September 3 Institute Holiday, no programs

Tuesday, September 4 DATA ARRAY MICROPROCES SORS-James W. Herbert, Sys-

Two parties have been held this month to honor Paul B. Sebring, left, on his retirement as director of the Haystack Observatory operated by the Northeast Radio Observatory Corporation, a consortium of 13 universities and research agencies. Joel Orlen, center, executive officer in the Provost's office, presented Mr. Sebring with a picture of a model of Haystack, at a campus party held by MIT radio astronomers who use the facility. The model itself was given to Mr. Sebring at a later party held by

his friends and associates at Lincoln Laboratory. Mrs. Sebring is at right.

Page 2, Tech Talk, August 29, 1979 CONTROL OF MERCHANIST MARKETON

UROP Offers Research Entree (Continued from page 1)

"My sister went to MIT," said Miguel, "and it was from her that I first heard about doing undergraduate research. And when I was deciding what university to go to a prime factor in my decision was the opportunity to get actively involved in research right from the

Miguel spent this summer working with Professor Rha and will continue on the project during the fall term. In addition, this winter Miguel will begin his own research project isolating and studying magnetic micelles, colloidal or associative aggregates of certain detergents and water-insoluble particles isolatable with a magnetic field.

"I was particularly pleased with the lack of bureaucratic hassles, said Miguel. "And if I get tired of working here I can work in a totally different field, there are no rigid departmental boundaries for research." Miguel hopes to do graduate work in chemistry and then to do research in exobiology, the study of life beyond the earth. He is trying to gain broad knowledge in many areas of science since in exobiology research problems are

can learn 'on the job,'" said Miguel. "I haven't taken any courses in physical chemistry and yet from my work I feel I understand the basics. When I get a chance to take P-chem, I will be able to appreciate it more and understand how it relates to other sciences. "The chance to do research is

one of the things which has made me fit in and feel at home at MIT." Anne Serby entered MIT last

"It's incredible how much you

numerous and varied.

year planning to major in biology. "But after doing a little investigating I found that the biology here involves more chemistry and biochemistry," said Anne, "while I am more interested in physiology and learning how things work.

"That discovery, combined with a heavy load of large impersonal classes kind of got me down the first term. I'd heard about UROP but thought I wouldn't have enough time since I was also rowing crew. And I wasn't really sure if I could do it as a freshman, but during IAP I decided to try."

For her first UROP project Anne worked with Dr. Judith Wurtman, research associate in the Department of Nutrition and Food Science, on a study of estrogen in mice. She learned, quickly, how to give injections, operate on mice to remove their ovaries, and do the myriad of things involved in research with animals.

"The thing I really like," she said, "was being able to work with my hands. I was learning, but not just by doing homework sets.

"That was a short project and to coordinate the mice's schedule and my crew practice I often had to go to the lab at four in the morning!

Anne, from Woodmere, N.Y., had always been interested in science and spent one summer working at Sloan-Kettering Memorial Institute for Cancer Research and much of her free time in high school doing projects for the science club and entering science contests. For her project with Dr. Wurtman, which ended shortly after the spring term began, Anne opted to receive academic credit. For the project she has been working on during the summer, with Dr. Ann M. Graybiel, associate professor of psychology and brain science in the department of Psychology, she is being paid. But because UROP is not designed just to provide summer jobs Anne has promised to continue on during the fall term.

"Now I think I've found what I want," said Anne. "I've decided to major in psychology.

"I get to go to research seminars every Monday and the work that's being done here is very close to what I want to do." The project Anne is working on is a study of the role of acetylcholine, a neurotransmitter, in the visual system of the cat. Anne is assisting in a number of areas of her professor's neuroanatomical research. Part of her job is to prepare the brains for study

"Basically what we are doing is trying to learn how one part of the brain talks to another part of the brain. It's interesting and also important. What I particularly like is the individual learning and attention. Professor Graybiel knows how I'm doing and cares. And I know almost everyone in the building."

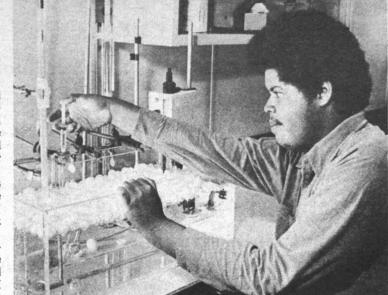
James A. Curme, from Le Sueur, Minn., used UROP as a way to learn about a particular depart-

"I knew I was interested in chemical engineering," said Jim, an entering sophomore, "but without UROP I would not have felt secure enough in that interest to designate it as my major. And now I will be better able to plan my course of study because of that designation.'

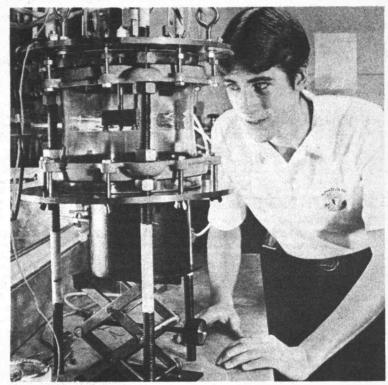
Jim began working in the spring

term with Dr. Jack B. Howard,

professor of chemical engineering, on a biomass pyrolysis program. tribution." The project is designed to determine what products remain after flash heating of cellulose material under oxygen-free conditions. This work could have applications in a fuels energy program.



Miguel Mitchell is using a capillary viscometer to measure the viscosity of a protein solution.



James Curme studies a batch reactor he helped construct for pyrolysis experiments connected with his UROP project.



Ann Serby is shown cutting a brain into very thin sections for study. Professor Margaret MacVicar, director of UROP, looks over Anne's shoulder.

"I was taking the introductory Jim plans to devote all of his time chemical engineering class," said Jim, "and attended a Course X social hour. One of the professors suggested UROP and I ended up working for Professor Howard. I didn't have a strong desire to work on any particular project, but I did

"When I began, it took me a little while to learn the ropes and at first got stuck with a lot of the chores. But as I've learned, I feel I've become very much a part of things and have been making a real con-

want to learn about the depart-

ment and what I was getting into.

Jim constructed an instrument table and cabinet for two new and larger batch reactors for the pyrolysis experiments. He knows the setup inside out and has been working full-time this summer.

to his studies this fall and resume

work here," said Jim, "is to get the references and experience I'll need to get other good summer jobs. During hgh school I worked in a cannery and did construction work. After my experience here I will better be able to convince a prospective employer of my talents and interest.

"I would say that the freshman year is the ideal time to do a UROP. Your classes are graded pass/fail and there is no better time to learn how things here work."

Materials Processing Center Formed in Engineering

Dr. Robert C. Seamans, Jr., Dean of the School of Engineering, has announced the formation of the Materials Processing Center within the School of Engineering, and the appointment of Dr. Merton C. Flemings, Ford Professor of Engineering, as first director of the Center.

In making the announcement, Dean Seamans emphasized the growing interest and involvement of the materials community at MIT in technological problems relating to improved ways of producing and shaping materials so that they can perform more effectively for society's use-and with acceptable economic and social costs.

For thousands of years, materials processing has been practised by skilled artisans such as those who made pottery, textiles and cast arts in Asia Minor 5,000 years ago, the beautiful and functional swords centuries ago in Japan, and who were the blacksmiths of early America. The materials processing of these workers was "materials craftmanship," done without the basic science and understanding that characterize modern processing.

Today, we understand that advances in properties and reliability of materials depend on a combination of modern scientific understanding, and the art of the traditional craftsman. An important new concept is that performance of materials can be controlled through control of internal structure, from the macroscopic to the atomic level. Without this concept the performance and reliability we have come to expect, for example, from modern aircraft and computers, could never be achieved.

We also understand today that economic and low energy production of materials in a competitive world depends on, first, rapid assimilation of many technologies into the materials processing industry, and, second, the modification and adaptation of processes to better utilize these technologies. Such new technologies include distributed intelligence, robots, and concepts of systems engineering.

'Segments of the American materials processing industry are lagging sadly behind those of other countries," said Professor Flemings, the Center's first director. "Innovative materials processing developments incorporating advanced technology, are essential if this country is to regain leadership in these areas.

"The Center will provide a way for the staff and faculty of the School of Engineering, and others, to contribute effectively to broad materials processing problems and to interact with industry and government in finding solutions to these problems. Through these programs and other activities, we will aim to develop and extend the broad scientific, technological, and educational base of materials processing. The Center will act cooperatively with other existing laboratories and centers at MIT working in related areas, including the Center for Materials Science and Engineering and the Laboratory for Manufacturing and Producti-

The Center will contribute to educational goals of the Institute through development of new curricula, seminars, and continuing education programs. It will also encourage the extended residence at MIT of industry and government personnel as visiting faculty, adjunct faculty, postdoctoral researchers, etc. Faculty and staff will participate in the Center from a number of departments at MIT, principally the Departments of Materials Science and Engineer-Mechanical Engineering, Electrical Engineering, and Chemical Engineering.

Several major research programs are underway, and others are planned. Of major importance is developing new processes for producing materials for energy-efficient automobiles, for lowering the economic and social costs of primary metal production (such as magnesium and steel), and projects on computer-aided and adaptive materials processing. Basic broad science programs are also being undertaken, including study of fluid flow in processing and processing by supercooling and ultrarapid solidification. In some cases, these programs will be carried out jointly with industry, and in all cases, with close industry and government interaction.



Alfred di Pietro of Medford and his son Stephen, who will be a graduate student at MIT this fall, don't really need a tour of the MIT campus. Mr. di Pietro, head custodian in Bldg 20, has worked at MIT for 14 years, and Stephen, who earned the BS degree in mechanical engineering from Worcester Polytechnic Institute in June 1979, worked in Bldg 44 in the summer of 1978 and in the Student Center this past summer. He will begin work toward the Engineer Degree in nuclear engineering at MIT in September.

his research work during IAP. "Another motivation for me to



August 29 through September 9

Highlights of Residence/Orientation Week 1979

Friday, August 31: 8am-11pm, R/O Center open; Airport Shuttle operates, 9am-3pm; Parent's tours of the Institute leave from Lobby 7, 1pm & 4pm; Parent's Hospitality Hour, Mezzanine Lounge, Student Center, 2:30pm-4pm; Pre-Picnic Discussion Groups, Killian Court, rain location, duPont Gymnasium, 3-4pm; Freshman Picnic, Killian Court, rain location, duPont Gymnasium 4:30-6:30pm; Fraternity Rush, 6:30pm.

Tuesday, September 4: Freshman ID pictures taken in R/O Center 9am-5pm; R/O Center open, 9am-11pm; First set of permanent dormitory assignments available in R/O Center, 11am; meetings with Freshman advisors, 2pm; Concourse Program orientation, 3:30-4:30pm.

Seminars and Lectures

Wednesday, August 29

Cascade Impactor Measurement of Sub-Micron Particles* - Prof Richard C. Flagan, environmental science, California Tech. Center for Health Effects of Fossil Fuels Utilizations Seminar, 3pm, Rm 66-360.

Community Meetings

General Meeting and Theatre Party* — Sponsored by the MIT Community Players. A general meeting for all members and those interested in joining the Players, to be immediately followed by attending MTG's production of A Funny Thing Happened on the Way to the Forum. Fri, Sept 14, 6:30pm, West Lounge, Student Center, \$3 tickets, refreshments served. Send reservations and check for tickets to: MIT Community Players, Box 236, MIT Station, Cambridge, Mass 02139. Deadline for reservations Sept 1.

Social Events

1pm, Exercise Room or on the field

Chinese Buffet *** - Complete with tea, pineapple and fortune cookies, \$7.75 incl tax. Wed, Sept 5, Faculty Club. For reservations call x3-4896.

Maggie Lettvin Self Designed Fitness** - Classes meet daily, Noon-

Lincoln Laboratory Authentic Food Club* - Our last banquet at Yenching Restaurant in Harvard Square was a great success, looking forward to our next gathering where Greek cusine will be featured. For information call Bill Macropoulos x5476 Lincoln Laboratory.

Faculty Club*** — Open Monday through Friday: Luncheon served Noon-2pm; Dinner served 5:30-8pm. Happy Hour: Monday through Friday, 4:30-6:30pm, wide variety of drinks \$1.05.

Exhibits

Jacqueline Casey: Hayden Gallery Posters, 1966-79* — Sponsored by the Committee on the Visual Arts. Display examples from her fifteen years of designs for MIT exhibitions, many of which have won national awards and recognition in leading design magazines. On view daily, 10-4; Wed evenings, 6-9, through Sept 23, Hayden Corridor Gallery, 160 Memorial Drive, Camb, Mass. Information call 253-4400.

Formal/Generative Studies Toward the New Harvard University Fogg Museum Expansion* — MA Thesis Drawings, Spring 1979 by Erika Franke, on view 9-5 daily, through Sept 13, Rotch Visual Collections, Rm 7-

List and Stratton Student Loan Collections** - Sponsored by the Committee on the Visual Arts. On view daily, 10-4pm; Wed evenings, 6-9pm, Sept 4-14, Hayden Gallery. Information call 253-4400. umates

> Gjon Mili* — Sponsored by the Compton Gallery Committee. A '27 graduate of MIT, he is a noted photographer whose work for Time-LIFE Magazine; his pioneer use of strobe lighting; and his documentation of MIT will be exhibited. On view daily, Mon-Fri, 10am-5pm; weekends, 1-5pm, Sept 4-Jan 1980, Margaret Hutchinson Compton Gallery, Alumni Center, Rm 10-150. Information call 253-5014.

> MIT Historical Collections* - Vannevar Bush, '16, Bldg 4 corridor. The New Technology Exhibit, 2nd floor balcony of Lobby 7. Energy Exhibit, Bldg E40, 1st floor. Solar Energy, Bldg 8, main corridor. Harvard-MIT Rehabilitation Engineering Center, main corridor, Bldg 4. Rogers Building Exhibit, Bldg 4. Meteorology, corridor, Bldg 8. Norbert Wiener, and Karl Taylor Compton, Bldg 4. Laboratory for Physical Chemistry,

MIT Historical Collections* — In-house exhibits include antique globes; the Ellsworth A. Wente Collection of motors and meters; rare instruments including compasses, sundials and other measuring devices from the 17th and 18th centuries; Early Alumni and several exhibits of memorabilia and photographs honoring prominent graduates of the Institute; The Compton Years, a photographic essay of the lives of Dr. & Mrs. Karl Taylor Compton. Recently installed exhibits: "Hello Central", traces the development of the telephone as well as the relationship between Alexander Graham Bell and MIT; "X-Ray Astronomy Sounding Rocket"; "L'ere de Despradelle", architectural renderings from the Beaux Art period of 1893-1912 as influenced by Prof Constant Desire Despradelle. On view daily, 9am-5pm, 265 Mass Ave, 2nd floor, Camb, Mass.

New Records* — Music Library, Rm 14E-109. Exhibit of record jackets of recent Library purchases.

The Outdoor Collection* — There are many fine pieces of contemporary sculpture displayed on the MIT campus, including works by Alexander Calder, Louise Nevelson, Pablo Picasso, Henry Moore, Tony Smith and Jac ques Lipschitz. For information and guides to the campus, call the Information Center, x3-4795.

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

MIT Science Fiction Society* - Come and visit the world's largest lending science fiction library. Hours posted on door, Rm W20-421.

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.

Theater

A Funny Thing Happened on the Way to the Forum* - Presented by the Musical Theatre Guild. Fridays & Saturdays, Aug 31 through Sept 15, 8pm; Sun matinee, Sept 9, 3pm, Kresge Auditorium, Little Theatre, Tickets \$4, group rates available, \$2 w/MIT ID, available in Lobby 10 or at the door. Information and reservations call 253-6294.

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

Open to the public

**Open to the MIT community only

***Open to members only

Send notices for Sept. 5 through Sept. 16 to Calendar Editor, Rm 5-113, x3-3270, before Noon, Friday, Aug. 31.

Theodore A. Mangelsdorf

Funeral services for Theodore A. Mangelsdorf, retired executive vice president of Texaco Inc., and a former member of the Corporation and benefactor of MIT, were held Tuesday, Aug. 28, at St. Peter's Episcopal Church, New Kent, Va. Mr. Mangelsdorf, 76, died Thursday, Aug. 23, after a brief illness.

Mr. Mangelsdorf was a 1926 graduate of MIT with the SB degree in chemical engineering, and the SM degree in 1929. He was associated with Texaco Inc. throughout his career.

Mr. Mangelsdorf was an active alumnus and was cited as the principal architect in the establishment of the New York Alumni Center. He served as president of the Alumni Association in 1966-67.

He was a member of the MIT Corporation from 1962-67 and of the Corporation Executive Committee from 1964-66. During his term on the Corporation he served on visiting committees for several

Mary E. Finn

Mary E. Kelley Finn, a telephone operator at MIT from 1952 until her retirement in 1967, died Wednesday, August 15, at the age of 79.

Mrs. Finn, who lived in Roslindale, is survived by three sons, Benjamin F. Finn of Chelsea, James M. Finn and Joseph P. Finn, and a daughter, Mrs. Majorie T. Gill, all of Roslindale, and 25 grandchildren.

Walter Parkinson

Walter Parkinson, a security guard at the Draper Laboratory from 1956 until his retirement in 1975, died July 12. He was 68 years

Mr. Parkinson is survived by a daughter, Joan Mooney of Scottsdale, Arizona,

John B. Nyren

Word has been received that John B. Nyren, of New Brunswick, a painter at the Physical Plant from 1943 until his retirement in 1963, died July 15. He was 79 years departments including chemistry, chemical engineering, mathematics, and economics, and on the Corporation Development Committee.

In 1962 the Brookdale Foundation, a private foundation established in New York City by a friend of Mr. Mangelsdorf, honored him by establishing the Theodore A. Mangelsdorf Fund at MIT to endow scholarships for undergraduate students.

Mr. Mangelsdorf is survived by two sons who are also MIT alumni, Theodore A. Mangelsdorf, Jr., '51, and Frederick E. Mangelsdorf, SM

WMBR to Air R/O Highlights

MIT's community radio station, WMBR (88.1 MHZ) will add the morning hours of 7am-noon to its usual broadcast day of noon-3am during R/O week.

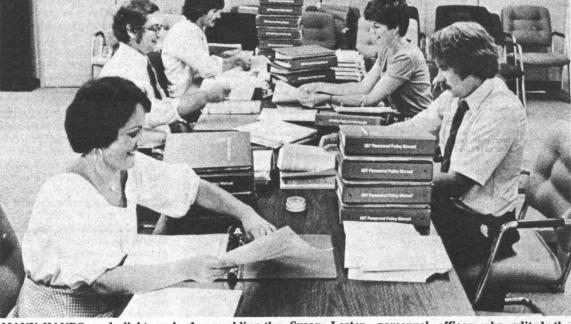
Plans for R/O week include remote broadcast from the activities midway on Thursday, Sept. 6, from Briggs Field on Saturday, Sept. 8, and from duPont Gymnasium on registration day. Interviews with freshmen, live and on tape will be featured throughout the week's programming of news and music.

Representatives of different student activities will also be given air time throughout the week to tell listeners about their clubs and groups. To get on the air, call Bob Brosseau, director of activities at x3-4000.

The station is going from 20 to 200 watts this year, and students who want to be involved will find it an exciting time to be a part of its operation. People are needed in all phases of the station's operation. from announcing to management and technical work. WMBR is located in the basement of the Walker Memorial, Rm. 50-030. Anyone interested in working for the station is welcome to visit the facility and talk with the staff.

Geschwind Article

Dr. Norman Geschwind, professor of psychology at MIT and professor of neurology at Harvard Medical School, is author of an article, "Specializations of the Human Brain," in the September, 1979, issue of Scientific American.



of Personnel Development (OPD) conference Room. One group of assemblers was (from left): Gail director of OPD; Paul Church, secretary in OPD; offices and laboratories throughout the campus.

MANY HANDS made light work of assembling the Susan Lester, personnel officer who edited the new MIT Personnel Policy Manual last week in Office Manual, and James Culliton, assistant to the vice president for administration and personnel. Altogether 17 people were involved in the two-day as-Cowgill, a temporary employee; Adam Yagodka, co- sembly of the books, which are now appearing in

(Continued from page 1) less time and cause less confusion and delay.

The second is a streamlining of the orientation program. Traditionally, a great deal of time has been given to a formal presentation of options for core courses, material that freshmen have already read in the freshman handbook, mailed to them in the summer. Many have skipped this part of the program, relying on the academic midway for specific information that they need.

This year, the program will be modelled on last year's Trailblazing seminar. Brief formal presentations will be made by MIT Provost Walter A. Rosenblith, followed by Dean Robert A. Alberty of the School of Science and Dean Harold J. Hanham of the School of Humanities and Social Sciences. After further five-minute discussions of the core subject options, the full group will break up into small groups for specific questions in the areas of biology and chemimathematics, physics, humanities and social sciences, and the general education program. The R/O committee hopes that this will enable the academic midway to fill its designed function friends in the general activities of informing freshmen of their

options in elective courses. The midways, academic, activities and athletic, bring the atmosphere of a fair to the orientation period. On Thursday, Sept. 6, the activities midway will be set up in duPont Gymnasium, introducing freshmen to the myriad of extracurricular activities at MIT. Model railroad buffs, frisbee, chess and tiddleywinks players will all find MIT.

area. Campus media—newspa-pers, radio and TV stations—musical and theatre groups, special interest and service groups, and campus religious groups will all be represented.

At the same time, the Athletics midway will be under way in Rockwell Cage, introducing freshmen to the intramural and varsity sports which will be part of their lives at

International Open House Planned

The seventh annual International Open House to greet newcomers from abroad is scheduled for Tuesday, Wednesday, and Thursday, September 4-6, from 9:30am to 5:00pm in the Bush Room (10-105).

All new internationals-undergraduates, graduate and postdoctoral students, visiting scientists, faculty, and their families-are invited to meet members of the MIT community and learn about campus programs and community resources that will make their stay easier. Representatives from a wide range of campus services and organizations will be on hand to talk informally with the new-

comers and share refreshments with them. A special children's corner will help keep youngsters

A highlight of the Open House will be the program, "An Evening with MIT Faculty" on Tuesday, September 4, 7:30-9:30pm. Dr. Louis Menand, special assistant to the provost and senior lecturer in political science, will chair the panel composed of Professors Margaret L.A. MacVicar of Physics; Philip Morrison of physics; Michael J. Piore of economics; and William M. Siebert of electrical engineering and computer science, who will talk about living and working at MIT.

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CLASSIFIED X3-3270

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. Persons who have no extensions or who wish to list only home telephones may submit ads by coming in person to the *Tech Talk* office, Rm 5-113, and presenting Institute identification. Ad-may be telephoned to x3-3270 or mailed to Rm 5-113. **Dead line is noon Friday before publication.**

For Sale, Etc.

Sankyo csste deck, STD 1410 w/dolby, gd cond, \$70. Call 868-3243.

A/C 9000 BTU, exc cond; 9x12 orange rug; baby stroller. Call x3-7212 or 73

Sngl bed, stu couch, \$80 ea, exc cond. Call Bernie x3-3106 or 926-3296.

Top of the line MA-Pro 1 spkrs, 1 Woofer & 5 Tweeters, 180 W, list \$500, ask \$280. Call Ardon x3-1923 or 625-8584.

Cakes! have one decorated and personally delivered to any office at MIT, great for birthday's, several flavors & sizes. Call Helen x5-6631 Dorm.

TI-59 orgnl bx, all 1st yr usrs lib & nxt yr forwarded to you! EE Pac; extra blnk cards, Leisure mod prgms & more, \$328 value, \$185; HP-67 org bx, reserve pwr pack incl. \$285, Call Sandy 8-4161 Draper days or x5-8397 Dorm eves.

Wilson T-2000 stl tennis racket. Call Steve x5588

Dinnerware for 4, 3 sauce & 2 fry pans, \$40 for lot, wd chr, \$10; AM/FM tble radio, \$10; Oscillating fan, \$15. Call x3-1869 or 492-0031.

Gillette Supermax 2 nvr usd, brnd nw, \$13; Heath guitar spkr, 90 watt, 2 10" & horn \$95; Braun L200 mini spkrs, one only, \$70; Puritron air purifier, \$10; rubber bike pedals, \$3; 27" bike tire, \$5; 27" bike tube, \$1; upright 10 spd handlebars European sty, \$5. Call Gerald 536-0823 pm.

Hvy duty bench vise w/4½" jaw, best reasonable offer. Call x3-5012.

Couch, 2 corner tbles, coffee tble, arm chr, \$150. Call Michael x3-3017.

2 bureaus, 1 maple, \$20; 1 dk wd, \$25. Call Carol

Brooks bike seat, lk nw, \$10. Call 926-5784

Baseball bat, hockey stick, M hockey skates, downhll skis, old canvas tent, 4 person, usd paperbk books & K clock. Call Arlene x3-7045.

Bed, nw matt on unique platform frme, access avail. Call x3-7192.

Admiral refrig, exc cond, 14cf, gr, 2 yrs old, \$200. Call Agnes x3-7236 or 923-9044.

Dynamax 6 telescope w/carry case, eye pieces, solar filter, \$650, nw hardly used, \$500. Call Joe x3-5494.

36" gas range 4 brnr, oven, boiler storage cab, gd cond, \$25. Call Mac x444 Lincl.

Refrig w/lg frzr area, \$120; sofabed, \$25; K tble, \$25. Call 254-8982 aft 5:30pm.

Sofa, 84"L, br uphlstry, mod design, vy gd cond,

\$150. Call Tom or Gus 547-5642 aft 6pm

GE auto washer; Magee 30" gas range, \$100; free RCA gas dryer; antique pineapple solid mah BR set, \$600; humidifier, lk nw, \$700. Call Bob x8-1418

Fl sz matt, box sprng, & frme, \$60 or best; wd desk 2 drawer, \$45 or best. Call 864-4222 or x3-4173 kp try.

Moving Kenmore dishwash, nw pump, \$60; gr rug 9x12 \$45; formica K set 6 chrs, gd cond, \$55; humidifier free, AM clock/radio, \$5; arm chr, \$5; curtains, best. Call Sam x3-6735 or 738-1350.

Brother port elect typwrtr w/tble stand, \$120 exc cond. Call Juan x3-3494 or 494-9185.

Panasonic RF2800 mod precision recvr, AM/FM, digital readout on sw showrm cond, \$150 firm. Call Wayne x304 Lincl.

M 10 spd Raleigh Gran Prix bikes, \$90: 2 Optimus III Radio Shack stereo spkrs, 8 OHM beaut cab, \$80. Call x3-6155.

4 14" Mustang, mag sty whl covers, exc cond, \$50. Call 729-4413 or x8-4951 Draper

DR set, Colonial sty, thick legs, 48" round, opens to 48-72 w/pads & 4 captains chrs, vy gd cond, \$300. Call x339 Lincl.

IBM Select, about 5 yrs old, gd cond, ask \$200. Call Lee Gilbert 776-6234.

Refrig, Sears, 6 cf counterheight 1 yr old, avail 9/1, \$150 or best offer. Call Fran x3-7446 or Dan 864-\$150 3710,

Desk, brnd nw, 22" deep, 54" long, 4 file drawers walnut finish top. Call 367-8949 before 9am or aft

Lg Carrier A/C, exc cond, best, Call x3-7612 betw 2

Sansui 8 AM/FM recvr, 200 watt, nw \$500, ask, \$275. Call Jim x7661 Lincl.

Sofa bed, sturdy but homely, nw foam matt, \$30 Call Kathy x3-8257.

Stereo csstt tape deck, top loading, Technics Panasonic, mod RS-640 US, \$150. Call Molly or David x3-5728 or 261-2442 eves.

Fll sz Simmons box sprng, brnd nw, stll in wrap-per, \$40. Call 868-5098.

Whis w/bald tires; 2 13" Valiant/Dart, 15" Ford/Mercury, disc brks, \$5 ea. Call Richardson x7674 Linel.

4 bikes, 1 F 3 spd, \$40; 2 childrens, \$23; 1 childs, \$30; all fily recond, exc cond. Call Emily x3-3600.

Kenmore hvy duty fl polisher-rug shampoo, 3 set of brushes, vy gd cond, \$25; slim master exercise bike w/time, collapsable for easy storage \$12; K Magi-cian, nvr usd, nw \$12, sacrifice \$8; sm white K tble, forming to no use struck. formica top, vy sturdy, \$10; wd end tble vy sturdy, \$5. Call Joanne 483-0391.

Rotobroil broiler oven Rotisserie, \$25; Westingheroaster over, \$25. Call Gerald 536-0823 pm.

Knife set, elect appl; K set; Boston rocker; tble; Armoire digital clock & more. Call x3-6345.

Sony csst deck mod TC134, nds work, \$40. Call Arraham x3-4360 or 494-0345.

Sofa w/match chr, \$60 or best; dble bed, \$40 or best. Call Joan 492-6512 eves. Stereo 8 track auto type player, gd cond, \$20. Call

Singer Futura in cab, \$150; M 10 spd bike, \$75; W 3 spd bike, \$50; flu sun lamp w/stand; 6 qt stainlss steel pressure cooker, \$15; assorted blank cssts tapes wi sell sep or \$15 a dozen. Call Jeannine x7584 Lincl or x3-2163 aft Sept 1.

HP bttry charger, brnd nw, nvr usd, nw \$18.95 ask \$13.95. Call x3-7154 or 494-8176

Koss Pro 4/AA stereo headphones, \$25; Sears C78 13 Dynaglas belted tires w/rims, pr for \$25. Call Joel x3-7611.

Qu sz matt, box sprng & frme, \$75 or best. Call

K chrs, \$5 ea; occasional chrs, \$10 ea; K tble, \$15; tw bed frmes, \$15; baby crib, \$15; youth bed, \$15; accordian, \$45; refrig, \$25. Call x3-4335.

Solid walnt BR set bkcase headboard; triple dresser; night tble, Beauty Rest box sprng & matt, \$450; blck leather hida-bed couch & recliner chr, \$275; cherry uphlstry love seat, \$40; contemp couch, \$20; other misc items. Call 648-7757 aft

Sofa; love seat; 2 end tble, gd cond; sngl bed; box sprng & matt. Call x3-2554 days & eves.

Bic 940 man trntble, Panasonic STR E80 stereo recvr, \$150 for both or best. Call 262-7809 aft 7p Thomas organ, Calif mod w/rhythm section, exc cond, ask \$800. Call x8-4164 Draper.

Upright piano, Estay, NY, gd cond, best. Call x8-1811 Draper.

Old man typwrtr, fr cond. \$5. Call Michael x5-7216 Dorm or x3-1541 lv msg.

Pr of nw lg Advent spkrs, exc cond, \$190; pr of Triaxial spkrs for car, gd cond, \$60. Call Steve x5 9294 Dorm.

G Huffy 3 spd bike, gd cond, 19", \$40 or best. Call

Stereo sys, AM/FM stereo; Glenburn trntble, track play & record, two way stereo spkrs, all exc cond, \$100. Call 494-8942 aft 7pm.

Cello, 3/4 sz, exc tone, gd cond, bow & cover incl \$200. Call Len x3-4971.

Lg refrig, \$400 if I move it, \$325 if you move it; Omega B22 XL enlarger w/EI Nikkor t/2.8 50mm lens, \$1.75; Eico 3070 amp, 20 watt rms & Lafayette tuner, \$100 for both, \$60 ea; Markel elect htr, 1400 watts \$45; and more all nego. Call Lin x3-5442.

Ladder, 40' hvy duty aluminum, \$100. Call Bannister x3-6138 or 235-8167

Pentax camera sys 35mm SLR, blck bdy w/split image focus thru the len meter, 1/1000 sec; 50mm Takumar f/1.4 lens; 200mm Takumar f/2.5 lens w/-case; Accura 2X extender w/case, cls up lens 1,2 & 3, all w/screw in mount, \$250. Call x3-7802.

Lg oak desk 5x3' top, vy gd cond, \$85. Call x5858 Lincl.

Pats-Jets football tickets, Sept 9. Call x8-2001

Vehicles

'66 Volvo 120 runs well, some rust, but solid, snows incl, \$300 or best. Call x3-4946.

'67 Chevy 3/4 ton 4 wd for sale, transfer case nds work, otherwise gd shape w/nw brks & gd tires, ask \$450; also pr 7.50-16 chains, \$40. Call Izzy x3-2460 or 322-7777

'67 Chevy Caprice, 283 eng, runs gd but smokes, \$160. Call Dan x3-3772 or 864-4527.

Collectors item, '67 Chrysler New Yorker, 4 dr, hd-top, blck, exc bdy, immac interior, PS & PB, A/C, pw seat, AM/FM, 93K, exc mech cond, wl consider highest bid. Call x5792 Lincl.

'67 Ford Galaxie, sm V8, runs gd, 1 owner, radio, stdd snows on rims incl, \$350. Call Tom x3-5162 or 389-0991 eves.

67Ford Galaxie, V8, 890 ci, PS, brks & windows 115K, runs vy smooth, 2 dr, dk blue, gd cond, vy gd stl rads, \$350. Call Paul x3-1835 or 494-9084.

'69 AMC Rable, nw elect sys, nw tires, mny nw parts, gd bdy, gd run cond, \$350 or best. Call Mike x3-5840.

'69 Buick Electra, only \$600, fantastic cond. PS. PB, PW, snows, come see. Call Dina, 236-1589

'69 Cougar, PS & PB, A/C, auto, snows, gd cond, best. Call Peter x3-7872 or 547-2454

'69 Ford Fairlane, a bit rusty but everything in gd work order, exc eng, burns no oil, gd tires, 2 spare whls. \$295. Call Marcia x3-4802.

'70 Chevy, Kings Wood wg, 88K, PS & PB, auto, AM, no rust, runs perfect, mny nw parts, snows, \$530 or best. Call Ehrigue x3-5021 or 494-8731.

'70 Dodge Polara, gd mech cond, nw tires, snows, PS & PB, AM/FM, htr, \$450 or best. Call Gai x8-

'70 Dodge Polara, gd cond, 2 nw tires, snows AM/FM, \$500; '68 Ply Satellite, \$100 runs well Call x3-2150.

$^{\prime}70$ VW Bug, exc cond, 25mpg city, \$800; $^{\prime}72$ Fiat 128, exc cond, 28 mpg city, 38 hgwy, \$850. Call 876-6863 eves.

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253 - 4895

'71 A/C Cutlass, 1 owner, uses reg gas, ask \$800.

'71 Ply Cricket, 4 dr, 45K, decent cheap trans ids some work, \$675. Call 762-4913 exc Fri

'72 Chevy Impala, gd cond, sm V8 cyl eng w/mny nw parts on it, 73K, \$800 or best. Call 354-9128 3pm to 7pm days or 776-5203 wk nights 7pm to 11pm & Sat & Sun.

'72 Chevy Impala, 64K, 1 owner, \$1000. Call x8-

'72 Pontiac Catalina, reblt eng, 4000mi, exc mech cond, nw tires bttry, coil mffler, nds minor bdy work, \$1300 or best. Call x3-5494.

'72 Subaru 4 dr sedan, 4 spd. 4 cyl. Mich. no dents frnt whl frv, no problems & get 30-40 mpg, \$1150. Call x3-8214 days or 387-9047 eves.

'73 Buick Regal A/C, AM/FM, PS & PB, vnyl top, rads, 1500 mi; '73 AMC Ambassador, 4 dr, AM, PS & PB, A/C, 60-40 split bench vnyl top, 1300 mi. Call x5834 Lincl aft 6pm 662-8117.

'73 Honda CB-350G hi mlg but gd cond, \$450 firm. Call x182 Lincl.

'73 142S Volvo, 2 dr, AM/FM, 4 spd + overdrv, fuel inj, rads, gd mlg, \$2200 or best. Call x3-4582.

'74 Bultaco Alpina 350cc lots of low end torque, \$500 or best. Call Lorenzo x7139 Lincl or 259-0141 aft 7pm.

'74 Chevy Vega, 2 dr hatchbck, 4 spd, AM/FM, gd cond, reliable trans, \$700. Call Steve x3-2807 or '74 Datsun 710, 4 dr wg, 4 spd, exc cond, gd gas

mlg, 35 mpg hghwy, \$2000 or best. Call Barb x3-5041.

'74 Honda CL360, 4300 mi, \$550. Call Jeff x3-1539.

'74 Mazda RX 2 sedan, A/C, nw eng, wrrnty or 10K mi, nr brks, nw mffler sys, best. Call 449-0386. '74 Mustang Fastbck, gold, vy clean, auto trans, 51K, reg gas, 20 mpg, \$2995 or best. Call 924-4262.

'74 Olds Cutlass Supreme, 60K, gd tires, snows, brnd nw spare tires & whl, A/C, etc, \$2700. Call Miyazaki 894-4237 7-9pm or x3-3764 10am-5. '74 Ply Valiant, slant 6, 80K, man, rads incl snows, r/window defog. Call Paul x5323 Lincl or 481-5138.

74 TR6, blue w/blck inter, 31K, recently painted AM/FM 8 track, \$4200; '74 Ply Val, 6 cyl, A/C, vnyl top, all tires, exc gas mlg, \$2500. Call 861-0581.

'74 VW Dasher 27 mpg, reg gas, undercoated, exc bdy & eng, MU Tempo rads, hugh truck red seats, trailer hitch, \$2600. Call Greg 275-8847. '75 Chrysler Newport deluxe, 4 dr hdtp, exc mech

cond, no rust, vy clean int, PS & PB, A/C, AM/FM, stereo, radio, \$1700. Call x5792 Lincl. '76 Capri, 72K, gd cond, \$2400. Call Bill x8-1206 Draper or 899-6131 aft.

'76 Rabbit 2 dr, A/C, 23K, mint cond, exc mpg, best. Call x3-1968. 78 Dodge Aspen, stat wg, 225 slant six, low mlg,

14K, super cond, ask \$4000. Call 491-2220. '78 Dodge Diplomat, 225 slant six, A/C, vnyl top, AM/FM PS & PB, 20K, super cond, well maintained, ask \$4150. Call x3-2772.

'78 Buick Century wg, 6 cyl, 21K, extras, moving, mst sell, \$4500 or best. Call 861-9027.

'79 Honda 110 ATC all terrain vehicle, exc cond. Call William x8-1241 Draper. 17' Thompson, gd sea boat, wl maintained outfit-

ted for fishing now in use, Lady Bee gal tilt trainer, 35hp, Evenrude w/gas tank, \$750. Call x263 Bates. Dirt bike, exc run cond, hardly usd, bike & misc nw parts, worth over \$2100 for \$750 or best. Call Chuck x8-3705 Draper or 774-2045.

Honda CS400F super sport motorcycle, showrm cond; Dyna III electronic ign; Boge-Mulholland shocks; Conti-twin tires; K&G backrest & lugage rack, mst see, ask \$1250. Call Sue or Elliot 443-

Housing

Back Bay, lg mod 1Br, twnhse, A/C, D&D, ww, frpl, deck, park avail, avail Oct 1, approx \$425/mo. Call x3-4076.

Belmnt attractive rm in beautiful hme, park, K prv, pool & tennis nr by, non-smoker, \$38/wk. Call

Bkline cln 2 BR apt prv hme prv entrance nr T, lg LR, breakfast rm, nw B, K dw, no pets, furn incl K utensils, some linens & all util, park ideal for visit fæc w/sm child, avail Sept 15, \$425/mo. Call 734-

To rent 9/78 to 5/80 31/2 BR 2 story Colonial all brick hse, Brkline, nr Baker Sch w/elect dr gar, lg LR w/work frplc, formal DR, eat in K, panel fam rm also w/frplcs, 2½ \$750/mo, Call 731-0154. 21/2 B, prof w/fam prefer,

E Falmouth, winter rental, 3-4 BR, gas ht, furn, \$220, sec dep. Call 924-7124 eves.

Lex split level, 4 BR, 2 car gar, 3 fll B, 3/4 acre. Call

Nora x3-1714 or 861-9408 eves. Beautiflly furn cape in Lex for rent, yr for Sept.79; 4BR, 2B, study w/2 lg desks, playrm, frpl LR, gar, vy energy efficient w/ample frwd supply, lg backyard w/babbling brook, \$790 per mo. Call 861-

N Conway Eidelweiss, 4 BR chalet, slps 8, ww, frpl, prv pool, tennis crts, min from rec areas, \$200/wk \$100/wkend, \$125/hol wkends, avail for ski season at \$3000 + util or \$200/wk, gd foliage viewing. Call x3-5251

VT ski hse, slps 9, avail Nov 1 - May, \$3100 for season, nr Killington, Call 894-0022 eves.

Waltham sublet Sept 8-Sept 29, furn townhse, 2 BR, 1^4 2B, 2 wk, \$240; 3 wks, \$350 incl util. Call Miyazaki 894-4237 7-9pm or x3-3764 10am-5. Belmnt hse, architect designed LR, vy lg 36'L &

DR, 4 BR, screened porch, corner lot, nice sect 2 blcks for Harv Sq bus, \$80's. Call 484-7681 am or

Animals

2 free kittens, wd like gd home. Call Dick x3-4278. Lkng for hme for pretty Persian cat till 6/80, wl pay board. Call 861-0532.

Free kittens adorable & cute, 6 wks, calico & B&W. Call x3-2710.

Intelligent, affectionate, 7 yrs old spayed G Shepherd, nds gd home, she's quiet & gentle but a gd watch dog, ideal for single or older person. Call Bruce x3-5570.

AKC Laborador Retriever, blck F, 8 wks, champ line, vy healthy. Call Mark Freedman 732-1370 or 668-5062 Walpole eves.

Free yng B&W M cat, affec, likes out drs; also 2 sm catfish. Call Tony x3-5717.

Wanted

Mass or disc memory & a printer for my TRS-80. Call Martha x3-1564.

Sm apt sz frzr; drawing tble. Call Brenda x3-3109

sg or 864-4222 Usd camera tripod in gd cond. Call Beth x3-6434.

Fam day care/babysitter, Malden, Everett area for old, M. W. 8-4:30. Call 321-1154 eves Floral refrig. Call Earl x5882 Lincl.

Toaster oven & hot plate. Call Bobby x8-1516 Draper before 4:30 or x5-6273 Dorm aft 4:30.

Visiting scientist is lking for apt sublet, Sept 15-Dec 15. Call x3-2412 or 868-4425 eves.

Dr wishes to sublet furn apt or hie for 6 mos, any consecutive 6 mos betw Oct & June. Call 776-5546 eves & wkends.

Kayak, usd but in gd cond. Call Susie x3-2260. M grad student wishes to move in to apt as rmmate. Call Brenda x3-6116 or x3-3189.

Recent grad student desires rm, board & meager salary in exchange for cooking & light hsekeeping in order to further studies wl babysit & tutor children in art/history, prefer fam w/art/history in-terests. Call Jane x5-9617 Dorm.

Child care/hsekeeping, 20 hrs approx, Newton, nd own trans. Call 969-6868.

MIT grad Italian F student sks clean, safe place to live, up to \$300 for 1 BR apt, up to \$200 rmmate Pls lv msg, YWCA 491-6050 Rm 423.

MIT post-doc needs sleeping quarters for himself & 9 yr old child for 3 mid week days TWTh, can supply a trunk load of dry, seasoned firewd every wk apprx 10 cf in exchange for lodging. Call Bob Lawler Logo Project x3-6214.

Rm wanted w/family in Bos area, MIT employee. Call 864-8684.

Roommates

rmmate to shr 5 BR apt w/1 F & 3 M, grad udent only, \$150/mo, Arl on T, avail Sept 1. Call Eileen 266-4796.

F rmmate wntd 9/1 to shr 2 BR mod apt on Ellery St, Camb w/1 F, 2 B, 2 A/C, ww, D&D, park, \$250 incl ht. Call Cathy 864-5400 days or 648-1245 eves.

M or F 26+ non-smoker, to shr w/married couple, 1st fl of 2 fam hse, Belmnt, DR, frpl LR, sunrm, porch, lg yard, dw, wash & dryr, conv to T, independent, quiet neat person, \$170 + ht & util. Call Karen or Eliot 484-6869 eves. Watertown, rmmate nds for vy mod 2 BR apt nr Mt. Auburn Star Mkt, ww, mod K, ht & gas incl, exc bus service, off st park, \$225. Call Chris x3-4524 or 926-1695.

Miscellaneous

Wl do gen tech & thesis typing, IBM Correct Select. Call x3-5041.

Typing fast accurate typist, wl do all types of work reasonbl rates. Call Donna x3-6870. Thesis typing, 10 yrs exp, quick, reasonbl rates, IBM Correct. Call x3-1566.

Expert tech typing & illustration, fast, reasonbl rates. Call 661-3986. Typing, tech or general, IBM Correct Selectric, pick up & delivery. Call Aisha 547-8695.

WI type thesis, ms, tech, fast & accur, IBM Correct Select. Call Debbie x3-1848. Learn to sing or play the piano, learn the basics or brush up on your techn, conservatory grad offers instructions on all levels, free introductory lesson,

for info call 643-5791. Volunteer translators needed, help to translate German article into English; I would appreciate if you can help w/a page; could correspond w/Spanish-English trans if needed. Call Arturo

Surplus Property

The following MIT Surplus Property is available for transfer through the Office of Facilities Management Systems. Please contact W.A. Derry, Property Officer, extension 3-2776, citing property case number:

48 Steel storage bins, Wilson Metal Products, 6 shelves each, size 32"x18"x6'4" Case 154.

Shaw-Walker-Safe, lock broken, fireproof, 3 shelves, size 5'6"Hx4'W Case 153.

POSITIONS AVAILABL

available on the MIT campus. Duplicate lists are posted on the Women's Kiosk in Building 7, outial Assistant for Wo and Work (10-215) and Minority Affair and in the Personnel Office, (E19-239).

Information on openings at Lincoln Laboratory (Lexington, MA.) is available in the Personnel ersons who are NOT MIT employees should call

Employees at the Institute should continue to con tact their Personnel Officers to apply for positions for which they feel they qualify.

the Personnel Office on extension 3-4251.

Dick Higham 3-4278 Pat Williams 3-1594 Susan Lester Appointments: Tertia Perkins

Virginia Bishop 3-1591 Richard Cerrato 3-4266 Ken Hewitt Appointments: Marsha Gens 3-4267 Sally Hansen 3-4275 Lawrence Milan Kathleen Rick 3 - 29283-4269 Appointments: Jenni Leibman - - - -

2 drawer file cab, suspension prefer. Call Mike x3-3680.

Administrative Staff, Industrial Liaison Officer, for the Industrial Liaison Program to interface between member companies and MIT; solicit new member companies. Bachelor's and Master's degrees required. One degree should be in electrical engineering and computer science or materials science and engineering, three years applicable experience, excellent interpersonal and communication skills, in depth knowledge of Institute also required. MIT degree preferred. A79-58 (8/29)

Admin. Staff, Asst. to Manager of Central Utilities Admin. Staff, Assa. to Manager of central criminal prepare planning and feasibility studies for utilities expansion; provide engineering support for steam boiler plant and chilled water plant operation, maintenance and expansion; prepare engineering design, design specifications and cost estimate for capital expansion projects, equipment nd distribution lines. May also manage and coordinate construction projects. Bachelor's degree in Mechanical Engineering and 5 years' experience in engineering design including steam power plant facility necessary. Registration as Professional Engineer or in program for registration also neces sary. A79-55 (8/15)

Academic Staff, Assistant Director, in the Sloan School, Center for Information Systems Research, to handle financial and general administration for a Center performing state-of-the-art research for industrial sponsors. Responsibility will include budget development and management; supervi-sion of accounting processes; general office management and supervision; conference ad ministration including preparation of promotional and other materials, and facilities arrangements; and other materials, and facilities aritalgements, liaison with sponsors. A Bachelor's degree in business administration, or equivalent experience in office and financial management required. Supervisory experience is also necessary. C79-20 (8/15)

Admin. Staff, Assistant Editor, for Technology Review, Alumni Association, to be responsible for evaluating potential articles; general editing and preparation; writing and editing shorter news items on technology and its implications. Must have ability to write and report on developments in science technology and policy for sophisticated audience. Professional level journalism experience is required. Science or engineering background is required. Science or engineering background highly desirable. A79-53 (8/15)

Admin. Staff, Director of Alumni Fund, to act as Executive Officer and Secretary of the Alumni Board with specific responsibility for: development of long term goals and strategies; execution of maor annual giving program; coordination of ac-tivites with other Institute funding efforts. Signifi-cant fund-raising experience, demonstrated managerial competence, university administration experience, and personal experience in alumni relations required. Bachelor's degree, or equivalent education/experience also necessary. MIT degree is desirable. A79-54 (8/15)

Admin. Staff. Executive Officer of the Undergraduate Academic Support section in the Office of the Dean for Student Affairs. New positive of the Dean for Student Affairs. New positive of the Dean so Office. Administrative responsibility for coordination of Freshman and Undesignated Sophomore Advising Programs, Undergraduate Seminars, planning for Residence/Orientation Week, publication of for residence/orientation week, pointation for Freshman Handbook, and other support services to advisors and students. Responsibility for maintenance of close working relations with academic departments. The UAS Office will operate as an academic information center for un-dergraduates. Excellent organizational and com-munication skills, supervisory skills, and demonstrated ability to work well under pressure required. Familiarity with undergraduate academic program and previous administrative ex-perience at MIT would be very helpful. A79-56 (8/15)

Sponsored Research Staff in the Center for Transportation Studies to do research related to transportation Studies to do research related to transportation in developing countries. Position requires strong academic background in travel demand analysis, including course work in supply analysis of transportation systems. Professional practice or study in other culture (preferably that of developing country), Master's Degree in transportation related field also necessary. Position is for approximately 18 months. R79-223 (8/29)

Sponsored Research Staff, Technical Writer, in the Energy Laboratory to research and write monographs on energy-related topics, edit technical reports and proposals, index documents for publication; format papers; assist in developing resource material for prospective sponsors. Extensions for individual technical control of the control of t sive familiarity with a wide range of energy technologies. A Bachelor's Degree in English and at least 2 years' professional editorial experience

required. R79-222 (8/29) Sponsored Research Staff, Research Associate, in Materials Science and Engineering will perform research in alloy development and characterization, including glassy and microcrystalline materials, produced by various rapid quenching techniques. Ph.D. required. Melting, heat treating and mechanical testing experience and scanning electron microscopy, SAM, transmission electron electron microscopy, SAM, transmission electron microscopy, STEM, differential scanning calorimetry, x-ray diffraction experience also re-quired. R79-225 (8/29)

Sponsored Research Staff, Physicist, temporary, in the Laboratory for Nuclear Science to participate in ongoing program of studies in nuclear structure means of electronic scattering using high-resolution spectrometer; assist in develophigh-resolution spectrometer; assist in develop-ment of the facility in the area of focal plane in-strumentation and precision beam monitoring; help plan, develop and perform other related ex-perimental programs. A recent Ph.D. in ex-perimental nuclear or high energy physics re-quired. Temporary 2 years, may possibly be ex-tended. R78-105 (8/29)

Sponsored Research Staff, Research Associate, in the Energy Laboratory will help design, specify and estimate a large multi-equation energy de-mand model to analyze at a disaggregated level the following: energy capital utilization, appliance choice, decisions to purchase and/or retire energy using capital, and consumer demand for more using capital, and consumer demand for more energy efficient appliances and housing. Ph.D. in economics with strong background in econometric techniques and in theoretical and applied microeconomics. Familiarity with standard computer language, with some on line system and working knowledge of batch processing and JCL. also required, as well as ability to use statistical packages. R79-215 (8/29)

Sponsored Research Staff, Technical Assistant, in the Department of Nutrition and Food Science to develop a method for stain for bladder cancer cells from cell culture and from human sources based on a specific reaction of cells with agglutinin. Master's degree in Biochemistry, Cell Biology or Imnunology and laboratory experience required. R79-216 (8/29)

Sponsored Research Staff, Electrical Engineer, in the National Magnet Laboratory to design, prepare specifications for, and supervise construc-tion and installation of multimegawatt high voltage dc power supplies to be used in plasma fu-sion research. A Bachelor's degree in electrical engineering and 5 years' experience in design of large dc power supplies required. R79-219 (8/29)

trace elements in sediments and sea water. also administer day to day laboratory activities. Bachelor's degree in Chemistry or Biology, good laboratory technique and laboratory experience re-quired. R79-221 (8/29) (Continued on page 6)

Sponsored Research Staff, Research Specialist, in Earth and Planetary Sciences, chemical oceanography laboratory, to do basic analysis of

(Continued from page 5)

Sponsored Research Staff, Editor, to assist communications officer of the Sea Grant Program in writing and editing quarterly report describing marine science and engineering research projects. Will prepare displays, news releases, brochures, slide-tape shows and radio public service spots. Bachelor's degree, or equivalent experience in sciences, journalism, required. Familiarity with publication production, including scheduling, editing, proofreading and abstracting also required. Experience in audio visual and photography preferred. R79-217 (8/29)

Sponsored Research Staff, Plasma Physics Experimentalist, to conduct research in a variety of plasma physics areas in the Plasma Fusion Center. Specific areas are problems relating to toroidal confinement systems, including equilibrium and stability investigations, RF heating and wave experiments and basic diagnostic development. Ph.D. in Plasma Physics and at least 5 years experience in experimental plasma physics areas essential. R79-213 (8/29)

Sponsored Research Staff, Staff Scientist, in the National Magnet Laboratory will participate in research on the human being using magnetic field measuring techniques: measure magnetic dust in lungs in a shielded room using cryogenic detection and low frequency electronics. Will also arrange appointments for measurement and maintain relevant data and records. Bachelor's or Master's degree in Physics, Bio-engineering, Electrical Engineering or related field required. Good organizational skill and experience maintaining records also required. R79-212 (8/29)

Sponsored Research Staff, Postdoctoral Associate, in the Laboratory for Nuclear Science, Bate Linear Accelerator, Middleton, MA to work on project involving high resolution electron scattering and photo reactions. Will participate in the design, construction, data acquisition and analysis of an experiment to detect parity violation in polarized electron scattering .Ph.D. in experimental nuclear or high energy physics required as well as experience with computer based data acquisition systems and particle detectors. Strong interest and capability in instrumentation also necessary. R79-210 (8/15)

Sponsored Research Staff, in the Center for Space Research to analyze scientific data from x-ray experiments on the SAS-3 satellite and from hard x-ray experiments on the HEAO A-4 (10-150 Kev). Ph.D. in Physics or Astrophysics and 2 years applicable experience necessary. Programming skills and demonstrated ability to publish scientific results also necessary. R79-209 (8/15)

Sponsored Research Staff, Research Scientist, in Nuclear Engineering to act as coordinator for research project dealing with baron neutron capture therapy at the MIT reactor. In addition to administrative management, will prepare tissues for histology and antoradiography; gamma ray and neutron dosimetry; use of multichannel analyzers and other nuclear instrumentation. A Master's Degree in physics, chemistry, nuclear engineering or other appropriate field, and 2 years experience in indicated activities required. R79-211 (8/15)

Sponsored Research Staff, Technical Assistant, in the Biology Dept. to assist in research in biochemistry or microbiology. Responsibilities include biochemical operations such as preparation and assay of enzymes, chromatography and enzyme purification. Some knowledge of microbiological procedures is also necessary. Bachelor's or Master's degree in Chemistry, Biology or Biochemistry required. R79-201 (8/15)

Sponsored Research Staff, Technical Assistant, to do research in a Biology Dept. laboratory of molecular genetics. Research involves synthesis of an enzyme of E. Coli, in vivo and in vitro. Techniques include media preparation, selection of mutants, genetic recombination, sterile techniques, cell fractionation and purification. Work also involves use of radioactively labeled material. Bachelor's or Master's degree in Microbiology or Biochemistry required. R79-200 (8/15)

Sponsored Research Staff, Research Associate, in Earth and Planetary Sciences to do research in quantitative seismology and tectonophysics. Applicants must be proficient in techniques for qualitiative analysis and synthesis of both body and surface waves, as well as in programming and debugging of routines for this analysis. Familiarity with other geophysical data (gravity, magnetics of heat flow) and with geological constraints, as well as a Ph.D. in geophysics, or a related field, also necessary. R79-186 (8/15)

Sponsored Research Staff, Technical Assistant, in the Nutrition and Food Science Dept. to assist in research on the metabolism and functions of vitamin A in the formation of glycophospholids. Work involves tissue culture of rat cornea and biochemical enzymatic assays on culture medium. Bachelor's degree, or equivalent, in life sciences required. R79-189 (8/15)

Sponsored Research Staff, Electronics Engineer, in the Lab for Nuclear Science to design, test, install and maintain electronics hardware used for data acquisition in nuclear experiements. Bachelor's degree in Electrical Engineering required. At least 5 years' experience in the design of analog and digital instrumentation and controls, experience in troubleshooting complex systems, and familiarity with minicomputers, architecture, hardware models and interfacing circuit also required. Knowledge of NIM/CAMAC systems, nuclear instrumentation and experience designing microprocessors desirable. R79-192 (8/15)

Sponsored Research Staff, Postdoctoral Associate, temporary, in the Labortory for Nuclear Science will collaborate in a research program involving experiments in hadron interactions at FERMILAB. Ph.D. in high energy experimental physics required. At least 2 years' experience in experimental physics required. (Thesis research can be counted in the two years.) Temporary up to 2 years. R79-193, R79-194. (8/15)

Sponsored Research Staff, Research Specialist, part-time, in the Cell Culture Center will grow cells from primary culture and produce cell lines in suspension and monolayers. Techniques include preparation and quality control of cell culture media and propagation of animal cells and viruses. A Bachelor's degree, preferably in Biology or Chemistry, required. Experience in animal cell culture is desrable. R79-182 (8/15)

Sponsored Research Staff, Mechanical Design Engineer, in the National Magnet Laboratory will design and supervise fabrication, installation and operation of electro-mechanical systems related to cyclotron resonance heating of tokomak plasmas, which include high power VHF transmission lines, impedance matching networks and compact antennas. Bachelor's degreee, or equivalent, in mechanical engineering or a related field and 10 years of experience required. R79-183 (8/15)

Sponsored Research Staff, Research Dietician, part-time, in the Clinical Research Center to calculate dietary ingredients for metabolic studies; coordinate and supervise work schedules of diet aides; supervise meal preparation and service; control inventory and order supplies; teach patients. Bachelor's degree in Nutrition or related field required. Registration in American Dietitic Association or eligibility for A.D.A. registration also required. 20 hrs./wk. R79-187 (8/15)

Admin. Staff, Technical Supervisor, in Information Processing Services, Operations to direct and supervise technical and operational activities of unit involved in programming and analytical support to users of centralized computer facilities. Responsibilities include scheduling and supervising work of analysts and programmers; developing and modifying user services; participating in design, writing, modifying, debugging and documenting of programs; planning and cordinating user and staff training. Position requires 3-5 years' experience in administrative applications programming evnironment and 1 to 2 years' supervisory experience. A79-60 (8/29)

Admin. Staff, Systems Analyst, in Information Processing Services to analyze user information systems problems and develop solutions. Will be responsible for external design and implementation of computer systems in assigned areas; test new or modified programs and release documentation; interpret systems for users. May act as applications programmer. A Bachelor's degree, or equivalent education or experience, and experience in systems analysis or computer related activities required. A79-59 (8/29)

Admin. Staff. Systems Programmer, in Information Processing Services to work in Multics RDMS Support Group: design and implement enhancements to system; convert applications from old to new system. Proficiency in PL/I use for system programming, experience in data base systems and in developing applications required. A79-51 (8/15)

Sponsored Research Staff, Computer Systems Engineer, for a Meteorology Department Weather Radar project to run a TI/980 minicomputer system: hardware maintenance assembly language systems programming and applications programming. Computer Science degree, experience with digital hardware and programming desired. R79-206 (8/15)

Sponsored Research Staff in the Laboratory for Computer Science to participate in office automation research: participate in design and implementation of text processors, electronic mail and other office systems; conduct case studies of office procedures and develop language mechanisms; assist in project management, report writing and sponsor relations. Experience in large-scale software systems, good organizational and interpersonal skills required. Ph.D. in Computer Science or Management and familiarity with office systems technology highly desirable. R79-196 (8/15)

Sponsored Research Staff, Systems Programmer, in the Laboratory for Computer Science to design and implement new text processing systems and other office automation tools. Will also assume responsibility for leading software development effort. Master's degree in Computer Science and experience building large-scale software systems in a high level language required. Familiarity with text editing and formatting systems and electronic mail systems highly desirable. R79-197 (8/15)

Sponsored Research Staff, Research Specialist, Programmer, temporary, in Earth and Planetary Science to work with research group in analysis of laser ranging and radio interferometric data for astronomical and geodetic applications. A Master's Degree in a closely related field, previous experience in analysis of astronomical and geodetic data required. Extensive knowledge of Fortran IV and IBM systems, including JCL, also necessary. Temporary for approximately 1 year. R79-220 (8/29)

Sponsored Research Staff, Programmer, in the Center for Space Research to maintain a medium size data base and data reduction system for the solar wind experiments of the IMP and Voyager spacecraft; write new Fortran programs for graphic (mostly Cal Comp) and applications; maintain the existing system. Three years' Fortran experience and a science or engineering degree required. Experience in graphics and near real time data reduction preferred as well as ability to read assembly code and/or IBM 360 system experience. R79-224 (8/29).

Exempt, Area Supervisor, in Food Service will maintain food supplies and flow; check food items, portions and handle any discrepancies; assist with deliveries and preparation work; insure compliance wh sanitation regulations assist customers. A degree in the food field, or equivalent, required. Good interpersonal skills and knowledge of menu planning and quality control also required. 10:30-7:30pm, including weekend shifts. E79-26 (8/29)

Exempt, Asst. Auditor, in the Audit Division will perform operational and financial audits; develop audit programs; perform audits; direct junior staff; write and present reports. At least 2 years' experience in public accounting or internal audit necessary. College degree preferred. E79-28 (8/29)

Exempt, Engineering Asst., in the National Magnet Laboratory to supervise and participate in assembly and testing of high power water cooled Bitter magnets and hybrid water cooled and superconducting magnets. Position requires a background in mechanical design and 5 years' experience in magnet design and assembly. E79-25 (8/15)

Librarian, to maintain rapidly expanding Information Center collection in the Energy Laboratory. Will be responsible for collection development, cataloguing, reference service and coordination of all Center activities. Excellent organizational and interpersonal skills, ability to handle several projects simultaneously and to set priorities necescary. Master's degree in Library Science also necessary. Related experience and knowledge of energy reference materials and literature helpful. R79-214 (8/29)

Academic Staff, Librarian Documentation Specialist, in Rotch Library, Aga Kham Program for Islamic Architecture, to design cooldinated systems and computerized services for bibliographic control, literature search and retrieval, document delivery and dissemination of visual and textual materials in Islamic architecture at Harvard and MIT. Will also coordinate documentation project with ongoing acquisitions and reference activities of both universities libraries. A Master's degree in library/information science, and 3-5 years professional experience which includes computer applications to bibliographic control and information retrieval required. C79-21 (8/29)

Library Assistant in Barker Engineering Library will file; perform circulation duties; search for missing journals; send overdue notices and bills; inspect bags and briefeases; provide change; collect visitor permits. High school graduation, or equivalent, and 1 year of applicable experience required. Typing and interpersonal skills and attention to detail also required. Tues.-Sat. 9-5. B79-487 (879a)

Library Assistant in Dewey Library's Industrial Relations collection will assist users: order, review and process materials; index journal articles; prepare and file catalog cards; maintain statistical activity records; prepare materials for binding; train and supervise student assistants; prepare Library Accessions Bulletin. Excellent typing and interpersonal skills and ability to handle diverse and complex tasks necessary. At least 2.5 years applicable experience also necessary. College study preferred. B79-495 (8/29)

Library Asst. will assume responsibility for processing United States, United Nations and state government documents in collections in Dewey Library: receive and process documents; prepare and file bibliographic records; oversee shelving and maintenance: maintain statistics; provide reference service; assist in other areas as necessary. Typing and interpersonal skills required. At least 2.5 years applicable experience, or equivalent combination of education and experience, also required. College study in social sciences preferred. Occasional evening and weekend shifts may be required on a prescheduled basis. B79-513 (8/29)

Library Assistant in the Libraries Catalogue Dept. to compare entries in catalogue documents to identify holdings and entry conflicts; participate in processing OCLC card shipments; type new subject authority records and subdivision cards, as well as references and subject corrections. At least 1 year applicable experience required as well as

typing skill and high school graduation, or equivalent. B79-511 (8/29) Library Assistant, part-time, in the Student

Library Assistant, part-time, in the Student Center Library to process reserve book lists; request reprints and arrange for photocopying; file shelf lists; assist at bookchecking desk; perform other clerical duties as necessary. High school graduation, or equivalent, at least 1 year's applicable experience required. Typing skill desirable. 20 hrs./wk., M.F 1-5pm. B79-510 (8/29)

Library Assistant in the Libraries/Cataloguing Section will catalogue monographs in all languages of subject fields using Library of Congress record on OCLA data base by means of OCLC 100 terminal or from NUC. Will also implement cataloguing practices and procedures; establish name and series authority records; catalogue material additions; file; assist in file and record maintenance. Good typing skill and attention to detail necessary. High school graduation, or equivalent, and 2.5 years applicable experience also necessary. B79-485 (8/29)

Library Assistant, part-time, in the Rotch Library to share circulation desk functions: charge, discharge and renew books; search for missing items; record statistics; prepare overdue notices, fine slips and bills; inspect briefcases and bags; direct assistants; occasionally open and close library. Will also identify, retrieve and process reserve materials; type lists and charge cards; file. High school graduation and one year of applicable experience, or equivalent necessary. Good interpersonal and typing skills also necessary. Permanent 11 months/year, 30 hrs./wk. position. Most hours will be scheduled for weekends and evenings. B79-474 (8/29)

Library Assistant, in the Laboratory for Computer Science to handle entire operation of Lab's Reading Room: coordinate, schedule and direct work of support staff and student assistants; assist library users in locating materials; supervise processing of library materials, circulation activities and collection section. Will also be responsible for report management. At least 4.5 years' applicable experience required. Willingness to learn computer systems also required. College background, including courses in library science, and experience in a library or computer setting desired. 40 hrs./wk. B79-443 (8/15)

Library Asst., part-time, in the Center for Policy Alternatives to process incoming materials; catalogue from LC cards; file catalog cards; type correspondence; invoice and mail publications; update publication list on word processor. Good tyng skill, flexibility, interest in special libraries and willingness to accept responsibility required. At least 1 year direct/related education and/or experience required. 20 hrs./wk. B79-391 (7/25)

Admin. Secretary to Department Head of the Earth & Planetary Sciences Department who is active in research and administration; will also provide assistance to Administrative Officer. Type correspondence from dictaphone tapes, manuscripts, reports; organize faculty and Visiting Committee meetings; handle general secretarial work for several research staff members. Compose correspondence, provide information in Dept. Head's absence. Must coordinate details of financial management, office coverage, etc., with other headquarters staff members. Excellent secretarial skills required; fast, accurate typing, ability to proofread essential. Previous experience essential (4.5 years minimum), and ability to work under pressure with a busy staff. B79-526 (8/29)

Administrative Secretary in Aeronautics and Astronautics to Dept. Head, Will collect and compile information to be included in reports and correspondence, and in materials related to the faculty appointment and promotion process; arrange complex travel and arrange for payment of related expenses with various agencies; maintain calendar; act as liaison with other Dept. members and with other Institute offices. Excellent typing, ability to type technical material required as well as 4.5 years' applicable experience or equivalent. B79-504 (8/29)

Administrative Secretary to Director, Sloan Automotive Laboratory, Mechanical Engineering will provide secretarial and administrative support to a large research group: arrange appointments and travel; type proposals and technical manuscripts; handle editorial tasks related to Laboratory publications; manage research accounts; maintain files. Excellent typing and at least four and a half years applicable experience required. Writing/editing background preferred. B79-524 (8/29)

Administrative Secretary to two staff members of the Division of Laboratory Animal Medician Medicial Dept. to coordinate meetings, and seminars; arrange travel; type proposals, medical reports and technical manuscripts; establish and maintain a complex filing system; handle editorial tasks related to publications and reports. Four and a half years' experience including medical secretarial experience required. Secretarial school training desirable. B79-514 (8/29)

Administrative Secretary in the Nuclear Engineering Dept. will perform complex secretarial duties for Dept. Head. Establish work schedules; organize data and provide editorial assistance in support of tenure and promotion review, faculty search efforts, visiting committee meetings, etc. Functionally supervise support staff and operate department headquarters office with minimum supervision. Ability to organize and prioritize work is very important. considerable responsibility and independent judgement required. At least 4.5 years secretarial experience also required. B79-409 (8/15)

Administrative Secretary in the Alumni Association will assist in coordinating promotional mailings; act as liaison between printer and reunion chairmen; maintain records, files and statistics; assist staff with logistical support for housing, food and beverages, transportation, etc.; arrange committee meetings and travel; type correspondence. Will be trained on word processor, and use of data base management system. Interpersonal skill, excellent typing and command of English required. Secretarial experience also required. B79-445 (8/15)

Administrative Secretary to Head of the Architecture Dept. to answer and screen calls and visitors; schedule appointments and meetings; arrange travel; open, sort and route mail; reply to routine correspondence; occasionally compose correspondence; type correspondence, reports, mailings; assist in compiling tenure, promotion and reappointment cases; maintain files; order lunch and dinner for meetings when necessary. Excellent typing skill, good organizational, filing and editing skills and ability to set priorities required. Good educational background and 5 years secretarial experience also required. B79-207 (8/15)

Sr. Secretary to the Regional Director of the Alumni Association will assist with western, New England, or southeastern region alumni activities: transcribe dictation; type correspondence and general materials (utilizing word processing system); research records; prepare and coordinate printing and mailing pieces; file; coordinate meeting and travel arrangements; assist in special projects asnecessary. Excellent secretarial (including shorthand), organizational and interpersonal skills, ability to set priorities and to handle several duties simultaneously required. Secretarial experience also required. Formal secretarial training and knowledge of MIT desired. B79-396, B79-397, B79-480 (8/29)

Sr. Secretary in the Admissions Office to act as receptionist for Office, and as secretary to 2 Admissions Officers: maintain calendars; open and distribute mail; arrange travel; perform other secretarial duties as necessary. Excellent typing and organization skills, ability to transcribe machine dictation required. Ability to work effectively in a service oriented setting also necessary. B79-508 (8/29)

Sr. Secretary to a number of faculty members in the Mechanical Engineering Dept. to handle correspondence; schedule appointments; arrange travel and coffee seminars. Applicants should have at least 2.5 years applicable experience or equivalent, plus high school graduation and secretarial skills including shorthand/machine transcription and technical typing required. Excellent typing and basic bookkeeping skills also required. B79-505 (8/29)

Sr. Secretary, Technical, in the Mathematics Dept. will coordinate academic activities of faculty and teaching staff: type correspondence; answer phones; arrange travel; maintain recrods and files; schedule appointments. Excellent typing skill and ability to set priorities necessary. At least 2.5 years applicable experience also necessary. Technical typing skill desired. B79-501 (8/29)

Sr. Secretary to the Director of Physical Education in the Athletic Dept.: assist with student registration; maintain records and grades; type correspondence and reports. Excellent typing and interpersonal skills required. At least 2.5 years applicable experience also required. B79-502 (8/29)

Sr. Secretary, Editorial, in the manuscript acquisition section, MIT Press to type correspondence related to publishing projects; arrange for manuscript review and notification of authors; assist in arranging Editorial Board meetings; prepare and administer contracts; handle a variety of other duties as necessary. Excellent typing and facility with detail required, as well as organization skill and command of English grammar. Applicants should have two and a half years' applicable experience. B79-519 (8/29)

Sr. Secretary in the Admissions Office, Educational Council, to maintain member lists; answer correspondence independently; arrange appointments and travel for Director; coordinate and arrange prospective student/Counselor meetings, handle a variety of general office procedures. Typing and strong interpersonal skills required as well as at least 2.5 years' applicable experience. B79-518 (8/29)

Sr. Secretary in Humanities Dept./Center for Materials Research in Archaeology and Ethnology to type correspondence, papers, course materials and proposals including some machine transcription; file; maintain accounts; organize meetings for the Center's staff; coordinate Director's activities; handle mailings; xerox. Excellent typing, filing and organizational skills, initiative and attention to detail required. Adaptability to a changing work content also necessary. At least 2 years secretarial experience preferred. B79-306 (8/29)

Sr. Secretary in the Office of Minority Education will type from handwritten drafts; answer phones; arrange meetings; file; provide information to callers and visitors. Excellent interpersonal and good typing skills required. At least 2.5 years experience also necessary. Knowledge of Institute procedures highly desired. B79-496 (8/29)

Sr. Secretary, Technical, in the Energy Lab/Energy Model Assessment Program will type reports (some technical), manuscripts and correspondence; answer and screen calls; arrange travel; maintain files; schedule appointments, meetings and seminars. Excellent typing, including technical, and interpersonal skis, command of English language and ability to set priorities necessary. At least 2.5 years applicable experience also necessary. B79-498, B79-499 (8/29)

Sr. Secretary to the Director of Engineering Internship Program will type and proofread correspondence, reports and manuscripts; initiate and compose routine correspondence; answer phones receive visitors; maintain budgets and account charges; arrange and maintain records and files; order supplies; handle petty cash; arrange travel; provide information and answer inquiries related to Program; schedule appointments, meetings, etc. Excellent interpersonal and organizational skills necessary, as well as good typing and proofreading skills. At least 2.5 years of applicable experience also necessary. B79-523 (8/29)

Sr. Secretary to 4 staff members in Resource Planning, Development Office, will process incoming mail; type correspondence; draft routine correspondence; perform reception duties; arrange travel; prepare Institute forms; maintain supply inventory; operate office machines and equipment; maintain files; assist in payroll adjustment sheet preparation. Excellent typing and organizational skills, ability to set priorities and handle several assignments simultaneously necessary. At least 2.5 years applicable experience also necessary. B79-527 (8/29)

Sr. Staff Assistant in Headquarters Office of Economics Department. Will assist graduate Placement Officer and Graduate Registration Office (2 faculty members) with administrative and academic details-of a headquarters office: type class materials, correspondence, and reports; arrange schedules for on-campus recruiters. Provide information regarding job placement. Good typing, interpersonal skills very important; shorthand helpful; good potential for advancement. B79-527 (8/29)

Sr. Secretary in the Medical Dept.'s Social Work Service will schedule appointments; arrange conferences; provide reception support; type handwritten drafts and from machine dictation; prepare statistics; maintain files. Will also assist in matters related to development of special program and provide relief coverage support for other secretaries. Excellent interpersonal, good organizational and typing skills, and attention to detail necessary. Secretarial experience also necessary. B79-456 (8/15)

Sr. Staff Assistant in the Career Planning and Placement Office will respond to inquiries and provide procedural and resource information; edit and publish a biweekly job newsletter; prepare job descriptions from telephone conversations; receive and maintain records of all job openings; route job information as necessary; provide reception duties; process incoming mail; schedule appointments. Excellent interpersonal and organizational skills, 2.5 years experience, and good command of English language required as well as good typing and editing skills. B79-454 (8/15)

Sr. Secretary, part-time, in the Humanities Dept. to maintain schedules and calendar for orchestra; order music; handle financial accounts; arrange logistics for recordings, concerts, tours, etc.; act as liaison between Dept. and graphics; maintain instrument room. Shorthand/speedwriting and typing required, as well as at least 2.5 year's experience. Permanent 9 month position Sept.-May. 17.5 hrs./wk. B79-462 (8/15)

Sr. Secretary in the Sloan School of Management-/System Dynamics Group will type correspondence, manuscripts, proposals and class materials from draft and/or dictation equipment (typing on word processing equipment); edit same as necessary; answer phones; arrange travel, printing, etc.; collaborate with other staff on project deadlines. Good organizational and typing skills, good command of English grammar and syntax and willingness to work occasional overtime required. 2.5 years applicable experience also required. Will train for word processing equipment. B79-463 (8/15)

Sr. Secretary in the School of Humanities and Social Science, Program in Science, Technology and Society will assist 2 faculty members with general secretarial duties: type manuscripts, and other materials; transcribe taped interviews; conduct library searches; arrange travel. Excellent typing and organization skill, command of English required, as well as two and a half years' experience. B79-469 (8/15)

Sr. Secretary to 4 faculty members and research staff of the Chemical Engineering Dept. will type class materials, technical reports, proposals, etc.; arrange meetings, coordinate travel; maintain records. Excellent typing, organizational, interper-

sonal and machine transcription skills necessary.
At least 2.5 years experience also necessary.
Technical typing skill helpful. B79-448 (8/15)

Sr. Secretary to Nutrition and Food Science faculty member to monitor accounts; assist in manuscript preparation; type research grants and proposals; act as liaison between research staff and Dept. headquarters. Secretarial experience required, as well as excellent typing and the ability to work with minimal supervision. Position requires occasional overtime. B79-450 (8/15)

Sr. Secretary to the Director of the Harvard-MIT Division of Health Science and Technology to prepare and maintain faculty appointment materials, make seminar arrangements including the scheduling of speakers; type reports and other materials; do some library research and handle special projects as necessary. Excellent typing and familiarity with medical terminology required. At least 2.5 years experience required. B79-419 (8/15)

Sr. Secretary in the Alumni Association to assist in activities which support Alumni Fund programs: type correspondence; arrange travel; prepare promotional mailings and materials; arrange major Fund meetings. Will be trained to operate word processing equipment. Excellent secretarial skill, including shorthand, required. Interpersonal skills, secretarial experience and command of English grammar also necessary. B79-440 (8/15)

Sr. Secretary, Technical, in Chemistry to two faculty members will type correspondence, technical manuscripts, and other materials; monitor monthly accounts; arrange travel. Excellent typing and organization skills required, as well as at least 2.5 years of experience. B79-425 (8/15)

Sr. Secretary to the Director, MIT Press to type correspondence and reports; schedule meetings; arrange travel. Position includes substantial contact with other Institute staff and with individuals outside the Institute Excellent typing, machine transcription skills required, as well as command of English language and at least 2.5 years secretarial experience. B79-426 (8/15)

Sr. Secretary to a faculty member in the Sloan School of Management to answer and screen telephone calls; type manuscripts including technical content, as well as correspondence. Excellent typing and command of English grammar required. Applicants should have machine and secretarial experience. Technical typing desirable. B79-293 (8/15)

Sr. Secretary to 3 faculty members in Political Science to arrange travel and meetings; compose routine correspondence; type manuscripts and class materials. Two and one half years' experience required, as well as excellent secretarial and organization skills. College training preferred. B79-431 (8/15)

Secretary, Technical, in the Plasma Fusion Center to perform secretarial duties for the Assistant to the Director and staff: type correspondence, reports; maintain files; arrange travel; answer phones. Good general secretarial and interpersonal skills required. as well as ability to organize own workload. B79-517 (8/29)

Secretary, temporary, in Career Planning and Placement to assist with a wide range of tasks related to recruiting of MIT students by private industry and other organizations: assist in student sign-up process; maintain records on students; compile and type lists and interview schedules. requires flexibility to work occasional overtime. Temporary 9/79-4/80. B79-516 (8/29)

Secretary, part-time, in Biology to type various materials; file; answer phones; maintain supplies. Typing skill and at least 1 year's experience required. Shorthand and a science background desired. B79-515 (8/29)

Secretary, Editorial, part-time, will assist faculty member in the Psychology Dept. with teaching and research related tasks: type from tapes and handwritten copy; assist in course preparation; maintain office supplies and records. Good typing, organizational and interpersonal skills necessary, as well as interest in psychology. 20 hrs./wk. B79-512 (8/29)

Secretary to 2 faculty members and research staff of the Chemical Engineering Dept. will type classroom materials, proposals, reports, etc.; arrange meetings; coordinate travel plans; maintain records; interact with students, faculty and advisees. At least 1 year of applicable experience, or equivalent combination of education and experience, required. Excellent typing (preferably technical typing), interpersonal and organizational skills and ability to transcribe machine dictation also required. B79-488, B79-489 (8/29)

Secretary in Chemical Engineering headquarters will answer phones; type correspondence and manuscripts; arrange travel; maintain files; transcribe machine transcription; assist in general office duties. One year of applicable experience and/or education required. Good interpersonal, organizational and typing skills also required. Must be willing to learn technical typing. B79-490 (8/29)

Secretary in the Dept. of Urban Studies and Planning will type reports, correspondence, manuscripts, etc. from draft, machine dictation or verbal instructions; answer phones; schedule appointments; handle mail; arrange seminars and meetings; maintain files and records. Command of English language, ability to transcribe machine dictation and excellent typing skills essential. B79-493' (8/29)

Secretary in the Student Financial Aid Office will type correspondence and similar materials from rough draft; provide information and assistance to students; handle routine and miscellaneous office duties. Excellent typing and interpersonal skills and ability to handle a variety of tasks required. Secretarial experience ireferred. B79-477 (8/29)

Secretary to Assistant Direct, Center for Policy Alternatives, to work with research staff on projects related to matters of current interest (environmental issues, etc.). Will perform general secretarial duties including manuscript typing, project coordination, preparation o course materials. Excellent typing, some secretarial experience, organization skills required, 37.5 hrs./wk.

Secretary to two Center for Policy Alternatives staff members to transcribe machine dictation; type proposals, reports, correspondence; operate word processing equipment (will be trained); arrange travel and appointments; maintain accounts and files. Good general secretarial skills, at least 1 year's secretarial experience, or equivalent education and experience required. B79-467 (8/15)

Secretary, Technical, part-time, in the Operations Research Center to act as headquarters secretary: answer phones; maintain files; type manuscripts (some technical). Ability to type technical material and ability to work independently required. Applicants should have 1 or more years' experience. 17.5 hrs./wk. (9AM-12:30PM) B79-453 (8/15)

Secretary in the Laboratory for Information and Decision Systems to assist senior secretaries in preparation of course materials, typing of technical material; scheduling of travel and other routine secretarial duties. At least 1 year secretarial experience and willingness to learn technical typing required. 37.5 hrs./wk. B79-451 (8/15)

Secretary to four staff members of Career Planning and Placement Office will type correspondence, notes. reports, etc.; open mail and respond to routine requests; copy and circulate job information; maintain log books and bulletin boards; handle mailing and billing of resume books; answer inquiries; provide assistance on projects as necesary. Will also perform sign-up desk duties during recruitment season for 2 hours a day. Good typing, organizational and excellent interpersonal skills required. B79-418 (8/15)

Secretary to 2 faculty members in the Civil Engineering Dept. to perform general secretarial duties: type; monitor various accounts; arrange travel and meetings; assist students and vistors; answer routine correspondence; develop and maintain files. Completing of formed executions in the completion of the control of the answer routine correspondence; develop and main-tain files. Completion of formal secretarial training required. Command of English language and good secretarial skills required. Technical typing and editing experience helpful. B79-422 (8/15)

Secretary in the Patent and Copyright Office to work for patent attorney: type patent applications; answer phones; perform general offcie tasks. Excel-lent typing and at least 1 year's secretarial ex-perience required. Some shorthand helpful. B79-428 (8/15)

Secretary in the Political Science Dept. to assist 3 faculty members: type class materials, manuscripts; maintain calendar; assist in administration of Dept.'s undergraduate program. Position involves substantial amount of student contact. At least 1 year of secretarial experience, excellent skills required. College training and an interest in political science desirable. B79-432 (8/15)

Secretary to faculty members in the Center for Theoretical Physics/Physics Dept. to handle cor-respondence; type technical materials; arrange meetings; schedule appointments; answer phones-handle travel arrangements; occasionally perform reception duties. Secretarial experience required Excellent technical typing skill also required. B79-

Secretary in an international nutrition program in Nutrition and Food Science to a faculty group. Will type correspondence, course material; maintain files; answer phones; receive and assistivistors. Excellent typing and organization skills required as well as secretarial experience. Machine transcription skills are desirable. B79-414 (8/15)

Secretary in Military Science to type and proofread reports, letters and forms; open and route mail; greet and assist visitors; schedule ap pointments and meetings. Excellent typing and in terpersonal skills, as well as office experience required. B79-413 (8/15)

Secretary to the Executive Office and Administrative Assistant of the Sustaining Fellows Program/Office of the Vice President, Resource Development will type correspondence; maintain files; schedule and coordinate appointments; answer phones; answer visitor's inquiries. Excellent typing and shorthand skills, good interpersonal and organization skills required. At least one vegar of experience also necessary, R79-446 (8/15) year of experience also necessary. B79-446 (8/15)

Secretary in the Student Assistance Services sec-tion in the Office of the Dean for Student Affairs. Will perform general secretarial duties and assist the Deans who provide advice and counsel to students with a myriad of needs. Ability to deal thoughtfully with students, faculty, staff, and parents essential. Good typing skills necessary. One year of experience required. B79-472 (8/15)

Administrative Assistant in the Sloan School to as sist Director of research group in management of activities related to sponsorship of the program. Will originate correspondence and oversee master files; arrange publication details of reports; organize semiannual meetings and serve as genera information service. Required: excellent organizational and interpersonal skills and an ability to edit and compose correspondence. Typ-ing skill and 3 to 5 years applicable experience also necessary. Bachelor's degree preferred. B79-267 (8/29)

Administrative Assistant to provide support to Utility Systems Program manager and director in the Energy Lab will supervise clerical personnel monitor budget; authorize routine purchases and alert manager to possible problems; schedule production deadlines; insure progress reports deadlines are met; organize and coordinate meeting and conference activities and program staff travel. At least 4.5 years directly related experience essential. MIT experience and/or college training desirable. B79-500 (8/29)

Administrative Assistant to Meteorology research group involved in oceanography and meteorology research, will assist in purchasing functions; prepare correspondence and reports; maintain budgets and records. May use computers to generate or maintain records and to edit text. Posi-tion includes contact with a large number of students and staff. Excellent typing and at least 4.5 years' applicable experience required. B79-503

Accounting Assistant in the Comptroller's Accounting Office will perform internal cost audits on research programs; prepare monthly invoices and fiscal reports; assist in cash flow and forecast functions. At least 2 years college or business school training required. General business background and 2-3 years applicable accounting experience also required. B79-475 (8/29)

Technical Assistant, part-time, in the Chemical Engineering Dept./Biomedical Engineering Project will fill small plastic columns with gas beads, and coat beads with solutions of experimental polymers. Manual dexterity and ability to work with small pieces essential. 8 hrs./wk. B79-471

Project Documentor will provide support services in the Information Processing Systems Office: gather, organize, edit, rewrite, format and update documentation; advise team members about documentation; advise team members about documentation requirements; advise and assist in documentation development; maintain meeting log; assist in arranging and executing program development data; update and maintain project development support library; perform miscellaneous related duties. Associate's degree, or equivalent, and 2.5 year's applicable experience required. Thorough familiarity with practice of data processing and business methods and procedures also required. B79-387 (8/29)

Admin. Assistant in Earth and Planetary Sciences Dept. to oversee office management will monitor research contracts, including proposal preparation, daily accounting purchasing and budgeting; act as liaison with Headquarters; arrange travel; handle student payroll. Will also type proposals and cor-respondence; supervise part-time typists. Excel-lent typing and good organizational skills required. MIT experience and college education helpful. Ap-plicants must have at least 4.5 years' experience. B79-466 (8/15)

Admin. Assistant in the Alumni Association to perform central support functions: schedule com-puter reports; coordinate status report mailings; maintain volunteer records; assist in preparation of program materials; monitor program results; assist in telethon related activities. Several years' ap-plicable experience, typing skill and ability to organize and maintain projects simultaneously required. B79-435 (8/15)

Admin. Assistant to Executive Officer in the Electrical Engineering and Computer Science Dept. to coordinate catalog copy and class schedules; initiate and process faculty and junior staff appointments; prepare and verify student payrolls; arrange proctoring assignments; main-tain records; handle general correspondence; solve administrative or academic problems. Several years' experience, organizational, management skills, attention to detail and willingness to learn interactive computer system required. Knowledge of MIT policies and procedures desired. B79-322

Technical Assistant, Radio Astronomy Observer/Operator, in the Haystack Observatory to operate the radio telescope and related equip-ment; perform routine adjustments and tuning of microwave receiver equipment; assist visiting microwave receiver equipment; assist visiting scientists with data processing. Will be trained to make independent observations; and will maintain observation logs. Working knowledge in electronic and microwave equipment (oscillators, mixers, amplifiers, recorders) required, as well as strong organization skill and ability to handle detail with precision. Must be able to work all shifts as neces-sary (days, evenings, weekends). Average work week is 42 hrs./wk. B79-290 (8/15)

Reactor Operator in the Nuclear Reactor Laboratory to serve as shift operator. Ability to pass Nuclear Regulatory Commission Operators' Licensing Examination and to handle emergency situation required. Graduation from a 2 year technical college, or equivalent, also required. 40 hrs./wk. B79-436 (8/15)

Technical Assistant in the Radioactivity Center, Medical Dept. to perform research involving the measurement of breath radon and theron in the lab and breath radon in the field, mainly in elderly subjects: complete subjects' health questionnaires subjects: complete subjects health questionnaires, assist in search for new subjects. Will also measure body gamma activity; perform library research; maintain related files. Bachelor's degree in radiological health sciences or related field required. Ability to relate and respond to elderly subjects also required. B79-455 (8/15)

Jr. Programmer in Information Processing Services to modify document maintain and develop administrative applications programs written in PL/1. Programming skill, written and verbal communications skills and an analytical aptitude required. A degree is desirable. B79-470 (8/15)

Sr. Office Assistant in the Treasurer's Office will assist in entering data for computer runs; verify assist in entering data for computer runs, vering and reconcile reports; update and maintain files; perform miscellaneous duties. Applicable ex-perience necessary. Ability to handle detail work accurately, typing skill and facility with figures also necessary. B79-494 (8/29)

Sr. Office Asst. in the Center for Space Research to maintain records; prepare and submit jobs for computer processing; produce plot of computer processing results from an automated plotting computer processing; produce plot of computer processing results from an automated plotting system; distribute and file computer processing results. A college degree, accuracy, dependability and willingness to learn required. Familiarity with digital computers a plus. B79-525 (8/29)

Sr. Technical Typist, part-time, in the Research Laboratory of Electronics will type and proofread technical manuscripts; verify footnotes and references. At least 2.5 years direct/related ex-perience essential. Good technical typing skill also required. 20 hrs./wk. B79-521 (8/29)

Office Asst. in the Comptrollers Accounting Office to answer phones; file; type; complete forms; mail payroll sheets, and perform other clerical functions as necessary. Typing skill, at least 1 year's ex-perience required. B79-520 (8/29)

Receptionist in the Medical Dept. to schedule ap pointments; answer phones; prepare patientriage; order medical charts; secure patient infor mation and medical forms; maintain appointment sheets. May also relieve other reception desks dur ing lunches, vacations, etc. Experience in a similar setting, dealing with the public, required. Excellent interpersonal skills also required. B79-478

Office Assistant in the Medical Record Room to be Office Assistant in the Medical Record Room to be responsible for pulling and filing of medical records: dispatch records to proper station; assist in maintenance of patient index file and periodic purging of active files. May be assigned special projects occasionally. Ability to work as a team and to stand on feet all day required. Clerical experience also required. 37.5 hrs./wk. (9:45-6:15pm). B79-479 (8/29)

Office Assistant in the Admissions Office to res Office Assistant, in the Admissions Office to respond to requests for materials: read correspondence, send materials, and type labels. Occasionally assist in large volume mailings and special projects. Will be trained to operate IBM Magcard machine. Excellent typing and organizational skills and at least I year's expensions. rience necessary. Non-smoking office. B79-481

Office Asst. in the Office of Personnel Services to Office Asst. in the Office of Personnel Services to process and distribute Personnel actions; answer phone inquiries; operate DEC word processor; coordinate records and salary with other sections of Personnel and with Payroll; maintain office supplies; perform related duties and projects as necessary. Good typing and interpersonal skills, discretion and initiative necessary. High school graduation and at least 2 years' clerical expressions; also tion and at least 2 years' clerical experience also necessary. Word processing experience probut will train if necessary. B79-465 (8/15) ce preferred,

Sr. Keypunch Operator in the Admissions Dept. to Sr. Acypunch operator in the Admissions Dept. to keypunch on "029" keypunching unit freshmen ap-plication data; keypunch additions and correc-tions; mail referral forms. Accuracy and speed in keypunching essential. Permanent 9 month posi-tion (Sept.-May). Non smoking office. B79-457 (8/15)

Office Assistant in the Registrar's Office to prepare undergraduate records transcribe grades; prepare data for computer entry; answer telephone in-quiries. Good typing and interpersonal skills and facility with detailed work required. B79-421 (8/15)

Office Assistant in the Comptroller's Accounting Office to type vouchers; charge and credit various projects; file; perform miscellaneous duties as necessary. Good typing and bookkeeping skills including ability to clear and reconcile accounts required. One year's experience also necessary. B79-492.49(15)

Office Assistant in the Energy Laboratory to type correspondence, budgets, financial reports from rough draft; prepare forms; supervise final assemblng and routing of proposals for approved signatures; maintain files and records; answer and signatures; maintain free and recovers, answer and recovers, answer and recovers an required. B79-441 (8/15)

Office Assistant in the Laboratory for Information and Decision systems to provide clerical and ac-counting support to Laboratory headquarters and accounting offices. Will prepare records; type forms, correspondence and other materials; maintain files; answer phones; provide procedural information to Lab members and others. Typing skill ability to use adding machine and at least 1 years. applicable experience required. 37.5 hrs./wk. B79-452 (8/15)

Cashier, part-time, in Food Service will total customer trays; take cash and meal tickets and make change; handle cash and cash reports. High school graduation necessary. Ability to add multi-ple amounts and good interpersonal skills also necessary. 20 hrs./wk., 11am-3pm, Mon.-Fri. B79-483 (8/29

Bookchecker, part-time, to monitor Student's reading room and library in the Chemical Engineering Dept.: maintain room; issue books and periodicals; follow-up on unreturned books. 1pm-5pm, M-F. B79-491 (8/29)

Jr Cashier in Food Service to check contract meals from master list; give and receive transfers from other units; maintain accounting records; explain policies and answer inquiries. Must speak English, High school graduation preferred. B79-484 (8/29)

Clerical Assistant in Chemical Engineering Dept will route information to appropriate offices; xerox; post grade and miscellaneous information; maintain office supplies; type. Ability to perform light typing and willingness to perform routine duties typing and willingness to perform routine duties necessary. B79-492 (8/29)

Clerical Assistant in Purchasing and Stores, type purchase orders arrange for signatures, dis-tribute and mail. File various material. Typing skill required. B79-506, B79-507 (8/29)

Hourly, Technician B (Electronic), will share responsibility for maintenance and expansion of a medium scale interactive graphics computing laboratory in the Architecture Dept.: maintain special purchase I/Ohardware (touch sensitive panels, television projectors, data digitizer tablets and joy sticks); maintain computer peripheral in-terfaces. Graduation from a 2 year day technical chool or equivalent experience necessary. H79-118

Hourly, Technician B (Elec./EM), will be involved in construction of very long baseline interferometry electronics in the Haystack Observatory (Middleton, MA): operate and maintain VLBI equipment; assemble mechanical components; solder components into circuit boards; insert integrated circuits into wire-wrap panels and rack wiring; handle quality control inspection of submodels. Graduation from a two year technical school or Graduation from a two year technical school or equivalent applicable experience required. Thorough familiarity with soldering techniques: wirewrapping, operation of connector crimping tools, and ability to identify electronic compo-nents, read color codes, operate simple test equip-ment, read circuit and logic diagrams, and make sound soldered joints also required. H79-114 (8/29)

Hourly, Technician B (Electronic), in the Laboratory for Nuclear Science (Middleton, MA) will operate experimental and technical equipment; assist in maintenance, repair and construc-tion of a vareity of control equipment and DC power supplies. Graduation from a 2 year day technical school or equivalent in applicable ex-perience required. Knowledge of AC wiring desired. H79-115 (8/29)

Hourly, Technician A, (EM) in Chemistry to assist in daily upkeep, routine maintenance, repair and building of electronic equipment in the Spectroscopy Laboratory. Applicants should be a graduate of a 2 year day technical school, or equivalent. Demonstrated skills related to maintenance and repair of sophisticated electronic equipment required. Familiarity with sophisticated chemical and analytical instruments (nuclear magnetic resonance spectrometers, mass spectrometers, ultraviolet and infrared spectrophotometers) preferred. H79-134 (8/29)

Hourly, Waiter/Waitress, in the Faculty Club to take members orders; pick-up and serve fo bancquet trays; clear an years of age. H79-112

Hourly, Project Machinist, in Aeronautics and Astronautics will make machined parts from prints, sketches and verbal instructions; coordinate work of A & B machinists; estimate job times; plan tooling and setup. Applicants must have served a formal apprenticeship (3 years), and have had 10 additional years of applicable experience working to close tolerances. H79-91 (8/29)

Hourly, Technician A. Mechanical, in the National Magnet Laboratory to assist in work involving fabrication of plasma diagnostic conponents from stainless steel stock. Will also work on high current buswork. Position requires graduation from a 2 year day, or equivalent, technical school and at least 2 years' applicable experience. Extensive ex-perience with millwork especially stainless steel and capability to use precise measuring instru-ments also necessary. H79-135 (8/29)

Hourly, Sr. Stock Clerk, in the Research Hourly, Sr. Stock Clerk, in the Research Laboratory of Electronics to perform various stock functions: manage supply room; initiate stock orders; check requisitions for accuracy; monitor stock supplies. Will be responsible for experimental machine shop tool crib; cut metal and wood as ordered. Handle related duties as necessary. Applicants should be high school graduates and have at least 2 years experience. A general knowledge of all common machine tools and machine attachments is also necessary as well as familiarity with comis also necessary as well as familiarity with com-mon alloys of metal and their end uses. Position also requires ability to operate saw heavy stock loads. H79-122 (8/29) erate saws and to handle

Hourly, Machinist B, in the Nuclear Reactor machine shop to work on experimental machine and reactor components fabrication. Position includes handling of and exposure to radioactive materials. At least 3 years' applicable experience required. H79-127 (8/15)

Hourly, Machinist A, in the Nuclear Reactor Laboratory to set up and operate all commonly used machine tools working from blue prints, specifications, verbal instruction and sketches. Position includes handling of and exposure to radioactive materials. At least 5 years applicable machinist's experience required. H79-129 (8/15)

Hourly, Technician C (Electromechanical), in the Hourly, Technician C (Electromechanical), in the Haystack Observatory (Westford, MA) to assist in construction of very long baseline interferometry electronics equipment. Work includes mechanical assembly, soldering components into printed boards; quality control inspection of submodules. Ability to make sound soldered joints, familiarity with soldering techniques, wirewrapping, operation of connector crimping tools required. The tion of connector crimping tools required. The ability to identify electronics components, read color codes, to operate simple test equipment and read circuitry and logic diagrams also necessary. H79-124 (8/15)

Hourly, Pot Washer, in the Food Service to wash pots and perform general kitchen cleaning; clean appliances; sweep and mop floors; remove trash. High school graduate preferred. Applicants must be able to read and follow instructions. H79-132

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

ADMINISTRATIVE STAFF:

A77-3, Admin. Staff, Systems Programmer, Information Processing Services (2/26)
A79-9, Admin. Staff, Mechanical Engineering (2/14)

A79-24, Admin. Staff, Programming Analy part-time, Information Processing Services (5/16) A79-25, Admin. Staff, Programming Analyst, In-

formation Processing Services (5/16) A79-35, Admin. Staff, Programming Analyst, In-formation Processing Services (5/30) A79-36, Admin. Staff, Asst. Curator, Committee

for Visual Arts (6/13)
A79-43, Admin. Staff, Director of Development,

esource Planning (7/11)
A79-44, Admin. Staff, Asst. to the Director of dmissions, Admissions Office (7/11)
A79-45, Admin. Staff, Sr. Consultant Trainer, Office of Personnel Development (7/25)

A79-47, Admin. Staff, Engineer/Operations, Physical Plant (8/15)

A79-49, Admin. Staff, Data Base Administrator, Information Processing Services Office (8/15)

SPONSORED RESEARCH STAFF: R77-91, Spons. Res. Staff, Sr. Accelerator Physicist, Lab for Nuclear Science (5/18) R77-137, Spons. Res. Staff, Experimental Physicist, Bates Linear Accel. (8/31) R77-928, Spons. Res. Staff, Dlama, Physicist

R77-228, Spons. Res. Staff, Plasma Physicist, Res. Lab of Electronics (1/4)
R78-58, Spons. Res. Staff, Plasma Physicist, R78-58, Spons. Res. Staff, National Magnet Lab

(4/12)
R78-93, Spons. Res. Staff, Res. Engineer, Civil Engineering (5/10)
R79-102, Spons. Res. Staff, Research Associate, Mechanical Engineering (5/30)
R78-105, Spons. Res. Staff, Temp., Lab for Nuclear Science (5/31)
R78-117, Spons. Res. Staff, Temp., Economics (7/12)

R78-135, Spons. Res. Staff, Research Lab of R78-145, Spons. Res. Staff, Electronics ngineer, Lab for Computer Science (8/16)

R78-208, Spons. Res. Staff, Postdoctoral Research, Nuclear Materials, Nuclear Reactor 'R78-209, Spons. Res. Staff, Postdoctoral Research, Nuclear Materials, Nuclear Reactor

R78-217, Spons. Res. Staff, Research Associate, Civil Engineering (10/18) R78-228, Spons. Res. Staff, Research Engineer, temporary, Energy Lab (10/18)

R78-246, Spons. Res. Staff, Systems Programmer; Lab for Computer Science (11/1) R78-253, Spons. Res. Staff, Digital Engineer, Research Lab of Electronics (11/15) R78-279, Spons. Res. Staff, Electron Microscopy Engineer, Material Science and Engineering (12/43)

(12/13)
R78-285, Spons. Res. Staff, Accelerator Physicist, Lab for Nuclear Science (12/13)
R78-286, Spons. Res. Staff, Systems Programmer, Lab for Computer Science (12/13)
R78-306, 307, 308 Spons. Res. Staff, Laboratory for Information and Decision Systems (1/10)
R78-311, 312, Spons. Res. Staff, Lab for Computer Science (1/10)
R79-4, 5, 6, 7, 8, 9, 10, 11, Spons. Res. Staff, Postdoctoral Research, Center for Theoretical Physics (1/17)

Physics (1/17)

R79-21, Spons. Res. Staff, Research Scientist, Energy Lab (1/24) R79-22, Spons. Res. Staff, Lab for Nuclear Science (2/7) ns. Res. Staff, Research Scientist,

R79-24, Spons. Res. Staff, Research Associate, Heterocyclic Chemist, Chemistry (3/7)

R79-27, 28, 29, Spons. Res. Staff, Transportation Systems, Center for Transportation Studies (2/14) R79-38, Spons. Res. Staff, Policy Analyst, Energy Laboratory (2/28) R79-43, Spons. Res. Staff, Laboratory for

Nuclear Science (2/16)

Rt9-55, Spons. Res. Staff, Research Scientist/Engineer, Energy Lab (5/2) R79-75, R79-76, Spons. Res. Staff, Research Engineer/Design Engineer, Energy Laboratory

(4/11)
R79-100, Spons. Res. Staff, Associate Group
Leader, Lab for Nuclear Science (4/25)
R79-104, Spons. Res. Staff, Energy Lab (5/2)
R79-105, Spons. Res. Staff, Research Associate,
Meteorology Dept. (5/2)
R79-106, R79-107, Spons. Res. Staff, Experimental Plasma Physicist, National Magnet Laboratory
(5/9):

R79-117, Spons. Res. Staff, Research Associate, Earth and Planetary Sciences (5/16) R79-125, Spons. Res. Staff, Counselor, Upward

Bound Program (6/6) Spons. Res. Staff, Experimental Plasma Physicist, National Magnet Laboratory

R79-131, Spons. Res. Staff, Electrical Enginee emporary, Center for Materials Science an temporary, Engineering (6/6) R79-135, Spons. Res. Staff, Microwave

R79-133, Spons. Res. Staff, Microwayer Engineer, Research Laboratory of Electronics R79-147, Spons. Res. Staff, Research Associate, Architecture Dept. (6/27) R79-150, Spons. Res. Staff, Laboratory for Nuclear Science (7/11)

Juclear Science (7/11) R79-154, Spons. Res. Staff, Center for Cancer lesearch (7/11) R79-155, Spons. Res. Staff, Laboratory for fuclear Science (7/11) R79-156, Spons. Res. Staff, Project Specialist,

R79-156, Spons. Res. Staff, Project Specialist, Center for Space Research (7/11) R79-157, Spons. Res. Staff, Technical Asst., Chemistry (7/11) R79-158, Spons. Res. Staff, Sr. Scientific Programmer, Meteorology (7/11) R79-160, Spons. Res. Staff, Research Specialist,

Earth & Planetary Sciences (7/11) R79-168, Spons. Res. Staff, Technical Asst.,

Riology Dept. (8/15) R79-170, Spons. Res. Staff, Research Specialist/Technical Asst., Biomechanica and Human Rehabilitation Laboratory, Mechanical Engineering (8/15)

R79-171, Spons. Res. Staff, Research pecialist/Technical Asst., temporary, Mechanical

Specialist/Technical Asst., temporary, Mechanical Engineering (8/15)
R79-172, Spons. Res. Staff, Research Specialist/Technical Assistant, temporary, Mechanical Engineering (8/15)
R79-176, Spons. Res. Staff, Research Engineer, Electronic, Haystack Observatory (8/15)
R79-177, Spons. Res. Staff, Programmer, Earth & Planetary Sciences (8/15)
R79-179, Spons. Res. Staff, Electric Utility Systems. Programmer/Analyst, Energy Laboratory

Systems, Programmer/Analyst, Energy Laboratory R79-180, Spons. Res. Staff, Design Engineer, National Magnet Laboratory (8/15)

C78-17, Acad. Staff, Research Associate (7/12) C79-7, Academic Staff, Associate Director of

Libraries (5/9)
C79-8, Academic Staff, Technical Instructor,
Physics Dept. (5/9)
C79-15, Academic Staff, Technical Manager, Department of Aeronautics and Astronautics

C79-16. Academic Staff, Postdoctoral Associate Nutrition and Food Science (7/11)
C79-17, Academic Staff, Asst. Librarian, Rotch

EXEMPT: E79-20, Exempt, Shift Supervisor, Physical Plant (7/11) E79-24, Exempt, Engineering Asst., National Magnet Laboratory (8/15)

BIWEEKLY:

B79-167, Secretary, Medical Dept. (4/11) B79-179, Sr. Secretary, Material Science and Engineering (4/18) B79-182. Sr. Secretary. Center for Transporta-

tion Studies (7/25)

tion Studies (7/25)
B79-185, Secretary, Energy Lab (4/25)
B79-186, Secretary, Materials Science and Engineering (4/25)
B79-188, Accounting Assistant, Comptrollers Accounting Office (4/25)
B79-205, Sr. Secretary, Mathematics (5/2)
B79-210, Sr. Secretary, Earth & Planetary Sciences (5/9)

ciences (5/9)
B79-214, Secretary, National Magnet

B79-219, Office Assistant, Medical Dept. (5/9) B79-234, Administrative Assistant, Center for

International Studies (5/30)
B79-248, Secretary, Chemistry (5/30)
B79-255, Secretary/Receptionist, Graphic Arts

5/6) B79-261, Sr. Secretary, Physical Plant (6/6) B79-265, Secretary, Sea Grant College Advisory rogram (6/6) B79-280, Secretary, Research Laboratory of

B79-303, Sr. Secretary, MIT Press (6/27) B79-320, Secretary, Electrical Engineering and omputer Science (7/11)

B79-321, Sr. Secretary, Mechanical Engineering B79-331, Secretary, Laboratory for Information

and Decision Systems (7/11) B79-340, Sr. Secretary, Student Financial Aid B79-343, Sr. Keypunch Operator, Physical Plant

B79-350, Sr. Secretary, Treasurer's Office (7/25) B79-351, Secretary, part-time, Center for Cancer earch (7/25)

B79-355, Sr. Secretary, part-time, Energy aboratory (7/25) B79-357, Sr. Secretary, Physical Plant (7/25) aboratory (7/25) B79-357, Sr. Secretary, Physical Plant (7/25) B79-364, Sr. Secretary, Mechanical Engineering

(725) B79-368, Sr. Secretary, Physical Plant (7/25) B79-370, Sr. Office Asst., Medical Dept. (7/25) B79-373, Sr. Office Asst., Artificial Intelligence Laboratory (7/25)

Sr. Staff Asst., Laboratory of Architecture and Planning (7/25)
B79-391, Library Asst., part-time, Center for
Policy Alternatives (8/15)
B79-393, Admin. Asst., Chemical Engineering

B79-393, Sr. Secretary, Nuclear Engineering

Dept. (8/15) B79-399, Dental Asst., Medical Dept. (8/15) B79-402, Sr. Secretary, Sloan School of Manage-

B79-403, Secretary, Sloan School of Managenent (8/15) B79-405, Office Asst., Laboratory for Information and Decision Systems (8/15)

Dry Ice Shortage **Proves Mystery**

During the hottest weeks of summer there was a shortage of cold at MIT-anad we don't mean air conditioning.

A shortage of dry ice found professors hoarding supplies or making visits to the local ice cream makers so that experiments could be conducted on schedule.

But unfortunately, as in the case of the gasoline shortage, there was no good explanation for the shortage of dry ice. A lack of carbon dioxide due to a cutback in petroleum processing was named as the culprit by one processor and Danti J. Scarponi, manager of the Office of Lab Supplies at MIT, said that he has heard that one company has gone out of business and another is undergoing remodeling.

'During the last week or two the situation has eased," said Mr. Scarponi. "I got two shipments last week and we expect another this week, so maybe the worst is past."

Mr. Scarponi said that during a normal month his office receives 200 fifty pound blocks of dry ice, but that actual usage is higher than that because some departments and laboratories buy the frozen carbon dioxide directly from outside sources-when they can.

Nauta, Feirtag Coauthor Article

Dr. Walle J.H. Nauta, Institute Professor in the MIT Department of Psychology, and Michael Feirtag, a member of the board of editors of Technology Review, are authors of an article, "The Organization of the Brain," in the September, 1979, issue of Scientific Ameri-

Talbot House

Talbot House in South Pomfret, Vt., is available on the weekends of September 21 and 28. Groups of up to 24 people may reserve the house for meetings, or simply to enjoy the recreation the area provides. Information and applications at the Preprofessional Office, Rm 10-186, x3-4158.

B79-406, Secretary, Office of Facilities Manage nent Systems (8/15)

B79-408, Sr. Secretary, Linguistics and Philosophy (8/15) B79-410, Sr. Secretary, Technical, Information Processing Services (8/15) B79-411, Sr. Computer Operator/Jr. Program-mer, Physical Plant (8/15)

HOURLY:

B79-354

R79-133

B79-336

B79-424

B79-382

B79-427

B79-439

E79-17

H78-106, Hourly, Sr. Technician (Electronic), ational Magnet Lab (8/16) H78-184, Hourly, Technician A, Lab for Nuclear Science (12/6)

H79-33, Hourly, Technician A (Electronic), mistry (4/11) H79-44, Hourly, Second Cook, Food Service

(2) H79-85, Hourly, Counter Person, Food Service H79-91, Hourly, Machinist A, Aeronautics and

utics (7/25) H79-96, Hourly, Cook, Endicott House (7/11)

The following positions have been FILLED since the last issue of *Tech Talk*: B79-289

Secretary Sr. Secretary, Editorial. Sponsored Research Staff Sponsored Research Staff Sponsored Research Staff Admin. Staff Sr. Secretary Sr. Secretary, Editorial Sr. Secretary

Sr. Staff Asst. Library Asst. Secretary Secretary Sponsored Research Staff Sr. Staff Asst. Exempt

B79-394 Sponsored Research Staff Secretary B79-162 Sr. Secretary Admin. Staff Admin. Secretary A79-30

Sr. Secretary Sr. Secretary Office Asst Sr. Secretary Spons. Res. Staff Sr. Office Asst. Sr. Office Asst. B79-181 R79-185 Admin. Staff Staff Asst

The following positions are on HOLD pending final A79-42 Admin, Staff

Sr. Office Asst.

Hourly Sr. Secretary Spons, Res. Staff Hourly Library Asst. Secretary B79-461

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Chrysalis Takes To Air Via Human Power

(Continued from page 1) num tube and piano wire primary structure instead of the more advanced carbon fiber filament tube and piano wire primary structure of the Albatross. Both airplanes make extensive use of styrofoam, Kevlar and Mylar in their secondary structures. It says a great deal for the aerodynamic refinement of the Chrysalis that its performance is so good con-

sidering its size and weight handicap.

The students primarily involved in the design and construction of Chrysalis are Hyong Bang of Smyrna, Ga., Mark Drela of Philadelphia, Pa., John S. Langford, III, of Atlanta, Ga., Robert W. Parks of Boston and Harold Youngren of Annapolis, Md. Professor Larrabee served as a consultant and fabricator of a few non-

critical parts. Karen Dillon of Camden, NY., Eric Shain of Fairbanks, Alaska, Shecter of East Meadow, NY, and about a dozen other friends helped with the nearly endless detail of the construction. Without the cooperation of Lincoln Laboratory, which provided hangar space, and Hanscom Field ground operation, the whole project would have been impossible.

Bryan Allen is the 20th person to fly Chrysalis. Karen Dillon is one of the women who have made Chrysalis a human-powered rather than a man-powered airplane.

The longest flights to date have been about three minutes; a steady turn of more than 90° has been maintained; an altitude of more than 20 feet attained. Since there are no prizes

for Chrysalis to win, its flights have been for fun. Three professors, Eugene E. Covert, Walter M. Hollister and Jack L. Kerrebrock, have even flown it.

Chrysalis is an aeronautical objet d'art. Its aesthetic character impresses all who see it, particularly in flight. It has lightened the life of everyone associated with it.

MIT Team Identifies First Double Quasar

(Continued from page 1) radio astronomers in other obser-

To test the gravitational lens hypothesis, the MIT scientists made a set of observations with the Very Large Array (VLA) of the National Radio Astronomy Observatory (NRAO) near Socorro, NM.

Their radio map shows two point-like images in the same places on the sky as the optical images, and in addition a powerful, extended radio source apparently associated with one of the point images. Although these findings do not completely rule out the hypothesis of a gravitational lens, they said, "our favorite interpretation is that it is the first example of a true double quasar.'

Results of their observations, they said, "are consistent with the source being a true double object, with the north component actively ejecting relativistic plasma" in a jet similar to those of better known quasars.

The new radio study of the unusual object was reported in a paper scheduled to be published in the August 31, 1979, issue of Science magazine by Dr. David H. Roberts, research staff member in the MIT Research Laboratory of Electronics, Perry E. Greenfield, an MIT graduate student in physics, and Dr. Bernard F. Burke, MIT professor of physics. The observations with the NRAO facility were made by Dr. Roberts and Mr. Greenfield. The research was supported by a grant from the National Science Foundation (NSF). The NRAO is operated by Associated Universities, Inc., under contract with the NSF.

Optical studies of 0957+561 A and B, which are about 10 billion universe.

First-year coach Dwight Smith

greeted approximately 60 players

Monday (Aug. 27) when MIT began

preparations for its second season

of club football competition. The

Engineers were 0-6 last year in

their first campaign of organized

team because there's more inter-

est this year and more kids are

coming out for the team," says

MIT returns its starting offen-

sive backfield—quarterback Bruce

Wrobel (6-2, 205) of Evergreen

Park, Ill., halfback Jeff Olson

(5-10, 160) of Edina, Minn., and

fullback Roger Sacilotto (5-10, 180)

of Manville, R.I.-from a unit

which averaged 14 points a game

Returning linemen include end

Greg Henley (6-0, 180) of Hollis,

N.Y., guard Tom Fawcett (5-11,

"We'll be a vastly improved

football since 1902.

Smith.

Address

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City

light years away, were made in late March, 1979, by Dr. Dennis Walsh and Dr. Robert F. Carswell, two English astronomers, and Professor Ray J. Weymann, of the University of Arizona, using the 2.1-meter telescope of the Kitt Peak National Observatory. In the British journal Nature they reported that the objects' spectra "leave little doubt that they are associated" but they cited difficulties in describing them as two distinct objects and suggested "the possibility that they are two images of the same object formed by a gravita-

Intrigued by this report and the fact that "little was known about the radio structure of the source,' the MIT group used the 14 available antennas of the VLA to make a radio "picture" of the same quasars in late June, 1979.

"The near identity of the radio and optical spectra of the compact objects is still remarkable," the MIT astrophysicists said in their report. They added: "We suggest that the two objects had a common origin, are similar in their basic physical parameters, and that they are evolving in similar fashions. Both radio and optical properties of the objects "are thus characteristic of this stage in their evolution." they said.

The MIT astronomers also calculated that if 0957+561 A and B are indeed a gravitational lens double image, the effect is most likely caused by an object 100 times as massive as any galaxy yet observed. "No such massive objects are known," they said, "so if the gravitational lens hypothesis is correct, a dramatic new class of objects would be required" in the

center Dave Noble (5-11, 180) of

Holdrege, Neb., Walt Crosby (6-0,

220) of Lakeville, and Bob Napor

year, but is being moved to tackle.

Napor, a starter at defensive

Among the returning defensive

players are linebacker Keith

Therrien (5-10, 180) of Lynn, end

Art Aaron (5-11, 185) of Poland.

Ohio, safety Brad Pines (5-10, 165)

of Traverse City, Mich., and

cornerback Mike Barrett (6-0, 170)

"Offensively, we have the ability to move the ball and score points,"

notes Smith. "The offensive line is

pretty weak right now but we

should have a solid backfield. De-

fensively, there'll be a lot of new

The 27-year-old Smith, an assis-

Zip

tant last year, moves to the head

of North Tarrytown, N.Y.

last season, is being

Crosby started at center last

(5-10, 185) of Glen Ridge, N.J.

switched to the offensive line.

Engineers Take the Field

For Fall Football Practice



School ties may be the custom in the East, but in California T-shirts are the symbol of academic affiliation, says Dennis Robinson, a graduate student at the University of California at Los Angeles. Appropriately, he presented commemorative shirts to two senior MIT academic officers at the close of MIT's pioneering summer program on Principles of Toxicology. Accepting the shirts were Dr. Walter A. Rosenblith, MIT provost, and Dean Robert A. Alberty of the School of Science, who chaired the committee

that planned the program. Believed to be the first of its kind anywhere, the 10-week graduate credit program was sponsored in part by the US Environmental Protection Agency (EPA). Forty-seven persons from throughout the country were enrolled in the program which was conducted by the MIT Department of Nutrition and Food Science. Dr. Rosenblith presented certificates to Mr. Robinson and other program members at the last session on Thursday, -Photo by Calvin Campbell

Radio Station Airs in Ohio Photovoltaic

(Continued from page 1) tinuing program to bring solar cells into widespread use by the mid 1980s. With a broadcasting application of the experimental PV system, another step has been taken in exploring commercially feasible uses for a promising

energy alternative.

The project is being jointly undertaken by Lincoln Laboratory and WBNO, with the radio station furnishing the building and site, the transmitter load, and the interface equipment. Committed to informing the general public as well as experts about the experiment, Luke Thaman, general manager of WBNO, expects to welcome many visitors to the station. In addition, WBNO will monitor the system, relaying data to Lincoln Laboratory so that performance can be evaluated over a period of several

Because a solar array's output is not constant, a battery is used to store excess energy when array output exceeds the demands of the transmitter; the battery saves the energy for use by the transmitter when the array output is low. According to Burt Nichols, Lincoln Laboratory's engineer in charge of the project, the PV system will supply from 70 to 90 per cent of the total energy required by the AM transmitter on an annual basis,

local utility. The system will only draw on the utility when the sun is hidden by clouds and the state-ofcharge of the battery is low.

Surplus energy will be available from the array, however, on clear, bright days when the battery is at full charge. Then the control system will automatically connect additional studio, newsroom or production room loads to the system. If excess array power is still available, says Mr. Nichols, the control system will then disconnect portions of the array output.

"Extensive commercial use of PV power in the field of communications can be foreseen," says Marvin D. Pope, manager of the Lincoln Laboratory Photovoltaic Project, "with power provided by this means to many AM, FM and TV stations.

He explained that a daytime radio station provides an excellent application of the experimental system, with constant, predictable direct current loads and daytime operational hours. Also a plus is the space necessary to accommodate the array-in WBNO's case, one-third of an acre-which is available at any station where ground-based guy wires anchor an

Mr. Pope said that although the cost of solar-generated electricity is presently greater than that from conventional utility sources, the gap is rapidly narrowing as a result of decreasing costs for solar cells and rising costs for conventional energy.

Cost, however, is not uppermost in the minds of Luke Thaman and Bill Priest, who is program director at the station. They and other staff are enjoying WBNO's experience of being first with an exciting and hopeful technology

Other PV Projects

In addition to Station WBNO, Lincoln Laboratory field test projects include: a 25 kW peak power system at the University of Nebraska's Mead Experiment Station used for irrigation, crop drying, and fertilizer manufacturing; a 12 kW peak array at the Laboratory used to pretest potential components of PV power systems for field test applications; a 25 kW peak array at the Laboratory used for testing complete systems; ongoing development of a small, cost-"micro-pumping" competitive system consuming less that 1 kW peak; several small (100 watt peak) arrays located in various urban and rural sites.

Scheduled to begin operations in 1980 is a 100-kilowatt PV system planned for Natural Bridges National Monument in Utah, which will produce all of the power needed by the park and will relegate the park's existing diesel generators to backup service. It will be the most powerful installation of its kind in

the world. Finally, a major project dealing with development of PV systems for residential use is now being started at Lincoln Laboratory.

with the remainder supplied by the Rose. Assisting Smith this year

Shapiro, and Charlie Sardo. MIT opens its season at home at 1:30pm Saturday, Sept. 22, against Norwalk Community College at Steinbrenner Stadium.

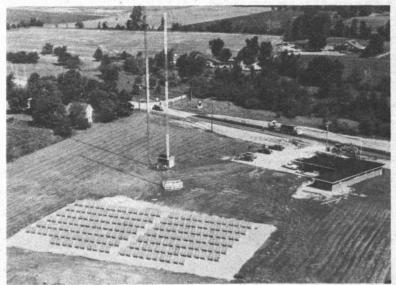
will be Gordon Kelly,

Other games on the schedule are: September 29, at Roger Williams; October 6, at Fairfield; October 13, New York Maritime (Homecoming); October 20, Fitchburg State; October 27, at Siena; November 3, Stony Brook State.

Sub	scribe to Tech scriptions are ndar year fron a check mad	\$12 per yean the startin	r via first g date. F	class mail	and run for	or a nd send it	
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State

faces.



Aerial view of AM radio station WBNO, Bryan, Ohio. Sponsored by the US Department of Energy and developed jointly by MIT Lincoln Laboratory and WBNO, the station's AM transmitter is powered by a solar array covering one-third acre of land. The array contains 33,600 photovoltaic cells and can generate 15,000 watts of electricity from sunlight.