BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

BNL Cleanup Method for Toxic Wastes Gains Notice

Armed only with sunlight and citric-acid-devouring bacteria, BNL scientists are perfecting a way to remove radionuclides and toxic metals from contaminated sites — and their approach is already gaining attention as an attractive waste-reduction solution.

The Department of Applied Science (DAS) researchers, A.J. Francis and Cleveland Dodge, were recently awarded U.S. Patent No. 5,292,456 for the process, which uses citric acid to bind up pollutants as soluble metal-citrate complexes for later recovery by biodegradation and photodegradation (see diagram on page 2).

As the subject of a Cooperative Research and Development Agreement (CRADA), the process has been shown to be useful in removing lead from municipal-trash incinerator ash.

This week, the U.S. Supreme Court ruled that such ash can be classified as hazardous waste, overturning a 1984 Congressional exemption for municipal waste ash and creating a greater potential that the BNL approach may be used to help reduce hazards in trash incinerator ash.

The process can also extract metals such as cadmium, cobalt, chromium, nickel, lead, strontium and zinc, and the radionuclides thorium and uranium from soil and other materials. Last month, Francis described the method at a U.S. Department of Energy (DOE) Biotechnology and Biomolecular Sciences Colloquium.

A Pressing Issue

Around the nation, the legacy of America's 20th century industrial and defense technology prowess lingers in the environment — radionuclides, toxic metals and other contaminants.

At several DOE sites, as well as industrial facilities, mines and incinerators, these residues must be treated in order to prevent pollution of nearby groundwater and to reduce the enormous volume of material that must be carefully disposed of as hazardous or mixed waste.

One method already in use to extract these metals and radionuclides from soil involves citric acid, the same acid that is present in and lends its name to citrus fruit. After mixing with the soil, the acid seizes up many different kinds of transition metals and actinide elements in a process called chelation. The result is a yellow witches' brew that must be classified as hazardous waste.

A Germ of an Idea

That's where the BNL method comes in handy. As a microbiologist, Francis had spent some time investigating the basic mechanism of biodegradation, or digestion by bacteria, of chelating agents that are used in radionuclide contamination.

In 1990, realizing that citric acid was being used in this way, he says, "I thought we should come up with an organism that could digest the organic part of the complexing agent to carbon dioxide and water, leaving the radionuclides to precipitate out. While looking at the various mechanisms of deg-

(continued on page 2)

Roger Stoutenburgh

A.J. Francis examines a flask of pollutants extracted from sludge using citric acid.

Women and Heart Disease: Lecture by Renowned Physician

Although heart disease is the number one cause of death of women over 50, most studies of the disease have involved only men. Consequently, women's symptoms are often unnoticed by the medical profession because they do not fit textbook criteria based on studies of men.

Lila Wallis, Clinical Professor of Medicine at Cornell University Medical College, will discuss this issue, among others, in a lecture entitled "Women and Heart Disease" on Tuesday, May 10, at noon in Berkner Hall. Her lecture is cosponsored by Brookhaven Women in Science, BNL's Medical Department and the Upjohn Corporation. All are invited to attend.

Wallis's talk will focus on risk factors, symptoms and treatment of heart disease in women. She will also discuss the effect of estrogen replacement therapy in preventing heart disease and decreasing its complications in menopausal and postmenopausal women.

Wallis is an internationally recognized expert on osteoporosis, estrogen replacement therapy and menopause. She is also the only physician in the U.S. to hold concurrent board certifications in the three specialties of internal medicine, hematology and endocrinology/metabolism. Recently retired from her clinical practice, Wallis lectures and writes extensively on women's health issues.

Lila Wallis

A former president of the American Medical Women's Association, in 1990, Wallis won that organization's most prestigious award, the Elizabeth Blackwell Medal, for her contributions to women in medicine and women's health. Wallis is also the founder and first president of the National Council on Women's Health.

To join Lila Wallis at an on-site luncheon after the lecture, send a check for $20, payable to Brookhaven Women in Science, to Jean Howard, Bldg. 490, by Friday, May 6.

Coming Up

Scientist Jeffrey Coderre, Medical Department, will deliver the next Brookhaven Lecture on Wednesday, May 18. His talk about boron neutron-capture therapy research at BNL will begin at 4 p.m. in Berkner Hall.

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Robert Serber, emeritus Professor of Physics at Columbia University, will deliver a Pegram Lecture Series collectively entitled "Peace and War," in three 8 p.m. talks, on Tuesday, Wednesday and Thursday, June 7-9.

As a protégé of J. Robert Oppenheimer, Serber was at the leading edge of U.S. high-energy physics before World War II, played a key role in the development of the first atomic bombs at Los Alamos National Laboratory and has remained involved in peacetime physics since the war ended in 1945. He will give his eyewitness account of these seminal events in lectures entitled, respectively, "War: Berkeley and Los Alamos," "War: Tinian and Japan," and "Peace: Early Days at Berkeley, Cal Tech and Brookhaven."

Oil Heat Feeds the Troops — And Conference Attendees

Roger Stoutenburgh

Field cooking for the troops at Camp Upton 50 years ago would have gone a lot more smoothly with a technology demonstrated recently at BNL. During the 1994 Oil Heat Technology Conference, held March 24-25, conference attendees, including (from left) Skip Hayden, of the Combustion Research Laboratory in Canada; BNL's John Andrews, Department of Applied Science (DAS); and Master Sgt. Ron Abernathy of the U.S. Marine Corps, were served a hot lunch during a demonstration of a military-personnel feeding system designed and manufactured by Babington Engineering, Inc. Sealed trays of chicken cacciatore, turkey with gravy, and beef with green peppers were heated in a tank of water kept at a required minimum temperature of 60°C (140°F) by a low-firing-rate, air-atomizing oil burner. The feeding system provides "heat on the move," as the military calls it, enabling hot meals to be served to frontline troops under battlefield conditions.

The technical agenda during the two-day workshop was a keynote talk on the future of oil-heating technology, by John Beckett, president of R.W. Beckett Corporation, one of the world's leading manufacturers of residential oil burners; presentations of technical papers; and workshops on advanced heating systems, during which the Lab received feedback from industry on future research directions. Drawing nearly 200 oil-heat marketers, equipment manufacturers and researchers, the conference was organized by BNL's Combustion Equipment Technology Program, DAS.

It All Comes Down to the Wire

High above the center ring, a circus tightrope walker uses a thin wire as the base for many astounding tricks. A little closer to the ground, and in a slightly different manner, so does a pair of machines in BNL's Light Machine Shop known as traveling-wire electric discharge machines (EDMs).

But, while the tightrope walker walks along the wire, the traveling-wire EDMs use wire to carry a voltage that can cut intricate and precise shapes out of any solid, conducting material up to 25.4 centimeters (10 inches) thick. For BNL scientists, engineers and other staff who need one-of-a-kind parts for their prototype instruments, the traveling-wire EDM can fill the bill in short order.

In addition to an older, conventional EDM machine, BNL's shop has two high-tech traveling-wire EDMs, the most recent purchased in 1992. Although the older machine does certain jobs best, according to EDM toolmaker Chris Manning, the two newer machines are the stars of the show.

Using powerful computer memories to store detailed patterns programmed by Bob Lamb and Chris Robertson, Central Shops Division, the traveling-wire EDMs can make cuts in steel, aluminum, copper and alloys with amazing movement control that is precise to 0.005 millimeters (two ten-thousandths of an inch). The wire seemingly glides through the metal, like a huge cheese slicer. As the job progresses, Manning explained, "a monitor shows where the wire is, where it's been and where it's going at all times."

By running 45 volts of electricity down a brass or zinc wire that's only slightly thicker than a human hair, the machine creates a voltage gap between the wire and the material being cut, and causes both to be eroded away. A jet of water, which ionizes and allows the current to flow to the workpiece, also keeps things from overheating; the entire process makes a hiss "that's like French fries cooking," Manning said.

So what can the traveling-wire EDM do that's so amazing? One look at Manning's workshop shows it: intricate toothed gears, perfect disks with cleanly fitting plugs for odd-shaped holes, barbell-like shapes made on an electric "lathe," tiny copper I-beams, and the most eye-fooling of all — a 10.16 centimeter (four-inch) metal cube in which an oval hole on one face metamorphoses into a rectangular hole on the opposite face (see photo).

Roger Stoutenburgh

Toolmaker Chris Manning, Central Shops Division, peers through a metal part he made using the electric discharge machine in the background. He's surrounded by many of the intricate metal parts that he has made for BNLers.

Parts like these created by Manning are now being used by researchers Labwide, from the National Synchrotron Light Source and the Relativistic Heavy Ion Collider to the Fire/Rescue Group. —Kara Villamil

Sister Lab Helps in Planet Discovery

Last month's announcement that a Pennsylvania State University astronomer had confirmed the existence of the first planets to be found outside our solar system was based in part on research first performed at a sister laboratory to BNL, the National Radio Astronomy Observatory (NRAO).

The earlier work was done at NRAO's Very Large Array (VLA) telescope in Socorro, New Mexico. Like Brookhaven, NRAO is operated by Associated Universities, Inc., but it is funded by the National Science Foundation.

In 1991, NRAO astronomer Dale Frail and Alexander Wolszczan of Penn State combined data from their work at, respectively, the VLA and a radio telescope run by the National Astronomy and Ionospheric Center at Arecibo, Puerto Rico, to get the first signs that three planets might be orbiting the neutron star PSR B1257+12 in the Virgo constellation 1,500 light years from Earth. Their research measured changes in the star's radio signals that are thought to be produced by the planets' gravitational pull.

This month's confirmation of that earlier discovery came about through Wolszczan's additional three years of work at Arecibo to measure the planets' sizes, orbital speeds and distances from the neutron star. Two of the planets are heavier than Earth, while one is closer in mass to our moon.

— Kara Villamil

Cleanup Method (cont'd)

radation, we found that there is a difference between the degradation of the type of complex formed with uranium and that of other metal citrates."

That difference allows all the metals except the radionuclide, in this case uranium, to be separated and recovered in concentrated form.

Francis and his team had only to turn back to the waste sites themselves for a suitable microbe: *Pseudomonas fluorescens*, a common soil bacterium. By mixing a few million of these hungry organisms into the citric acid-metal solution, a flurry of biodegradation is set off as the bacteria digest the bulk of the citric acid. The metals are released and then recovered, along with the bacteria, through centrifugation.

After biodegradation, the only compound left is that of the radionuclide with citric acid — *P. fluorescens* can't metabolize it. But the story isn't over: To reduce the hazardous-waste volume even more, that solution, when exposed to sunlight, undergoes photochemical degradation, which results in the precipitation of uranium as a uranium trioxide, or $UO_3 \cdot 2H_20$.

The BNL researchers were able to determine this precisely using the National Synchrotron Light Source and spectroscopy equipment at the State University of New York at Stony Brook.

Francis emphasized the process' importance for waste disposal. "What we have done is to take a mixed waste, with radionuclides and toxic metals, and separated the toxics from the radionuclides so you have a hazardous waste and a radioactive waste," he said. "This makes waste disposal much simpler, because disposal requirements for mixed wastes are much more stringent than for the others."

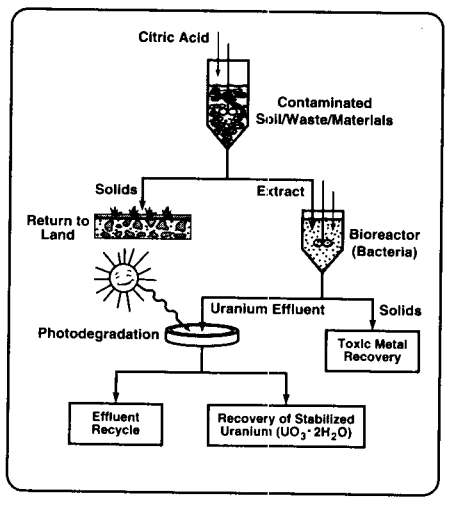

Diagram of BNL's patented hazardous-waste treatment method.

A Promising Future

The process is highly adaptable to different types of waste forms, Francis said, including soils, sediments and other materials, both solids and liquids. This allows it to be fine-tuned for individual waste sites. For example, Francis said, "Citric acid is used at naval shipyards to remove rust from ship bilges and tanks. With this process, the waste water can be treated to degrade the iron citrate and recover the iron."

The recent patent and the ongoing CRADA are the initial signs of success for this technique, which sprang directly from basic research supported by the Subsurface Science Program of DOE's Office of Health and Environmental Research.

As well, Francis and Dodge have already tested the process on a sludge sample from the DOE Y-12 uranium processing facility at Oak Ridge, Tennessee, successfully removing and recovering more than 87 percent of the uranium. They were also able to remove cobalt, chromium, manganese, nickel, strontium, thorium and zinc from the sludge.

And DOE is considering citric-acid remediation paired with biodegradation and photodegradation for its uranium-contaminated sites: Francis and his team are currently testing their method on four liters of citric acid-metal solution sent to them from the DOE Fernald site in Ohio, as part of the Uranium in Soils Integrated Demonstration Project funded by the DOE Office of Environmental Restoration and Waste Management. "Initial results are very encouraging, and testing will continue," Francis said.

And, now that the CRADA partner, Forrester Environmental Services Inc. of New Hampshire, has seen that the process can remove lead from municipal solid-waste incinerator ash, it is negotiating with industry for a pilot-scale demonstration of the technique.

In any event, Francis expresses hope for the process' future, in either industrial or DOE settings. After all, he says, it has many things going for it: It uses a non-caustic agent, causes little damage to soil and materials, leaves no secondary waste stream behind, and, most importantly, effectively removes environmentally and economically important metals while allowing them to be recovered and recycled. —Kara Villamil

Note to Employees

Attendance at lectures, meetings and other special programs held during normal working hours is subject to supervisory concurrence.

Database Can Help In Choosing Suppliers

If you're looking for a supplier of a product or a service, you may first wish to consult the supplier database now available through BNL's Quality Assurance (QA) Office.

The database was prepared by the Supplier Quality Information Group (SQIG), which was formed in 1991 by a number of managing and operating and other contractors of the U.S. Department of Energy (DOE). The group's purpose is to share supplier quality information throughout the DOE community, which it does through the database — a listing of more than 500 supplier audits performed by SQIG members for a variety of products and services.

Updated quarterly, the database is available through the QA Office, either on a PC disk or as hard copy, along with instructions on how to use the database to evaluate a supplier. For more information, contact Steven Stein, QA Office, Ext. 5694.

CRAY Supercomputer Demonstration

Since Monday, a CRAY EL92 parallel-vector supercomputer has been available to users of the BNL Compute Farm in the Computing & Communications Division (CCD). Like the eight other seed machines in the Compute Farm, the CRAY EL92 may be used by anyone at the Lab free of charge (see Brookhaven Bulletin, March 4, 1994).

On loan for one year, the CRAY EL92 is a UNIX workstation with two central processing units (CPUs) rated at 130 megaflops per CPU. As the newest and most powerful member of the Compute Farm, this CRAY supercomputer can be used to develop software to run on the top-of-the-line CRAY T3D, a massively parallel supercomputer that uses many processors working simultaneously on different aspects of the same problem to come up with the solution faster than otherwise possible.

The CRAY EL92 will be demonstrated at 1:30 p.m. on Tuesday, May 10, in the CCD seminar room, Bldg. 515. Compiler options, switches and debugging will be discussed at that time. For more information, contact Ed McFadden, Ext. 4188.

Visa Lottery

The U.S. Department of State has announced the new DV-1 visa lottery program. Foreign nationals from the following countries are ***not*** eligible to participate: Canada, China (mainland-born), Dominican Republic, El Salvador, Great Britain and its dependent territories (those from Northern Ireland ***are*** eligible), India, Jamaica, Mexico, Philippines, South Korea, Taiwan, and Vietnam.

Others may file applications while inside or outside the United States between June 1 and June 30 of this year. Obtain information packets by calling the Office of Scientific Personnel, Ext. 7831.

Rifle & Pistol Club

The next meeting of the Rifle & Pistol Club is Wednesday, May 11, at noon, Room 202, Bldg. 911B. Anyone interested in club activities may call Otto Jacobi, Ext. 3471.

PSI Meeting

At the next meeting of the Upton chapter of Professional Secretaries International (PSI), on Tuesday, May 10, at 6 p.m., in the South Dining Room of the Brookhaven Center, the guest speaker will be Debra Morris, an employment service representative from the New York State Department of Labor. She will talk about resumes, applications and cover letters. For more information, call Susan Carlsen, Ext. 7647.

Children's Summer Swimming Lessons

BERA's summer recreation program so far features swim lessons for children of all Lab employees. For their safety, children must be a minimum of 42 inches tall.

The lessons will begin Wednesday, July 6, and end Tuesday, August 30, and will be given Monday through Friday, 2:15 to 3:15 p.m. Each child will take one lesson a week, for a total of eight lessons. At the end, American Red Cross swim certificates will be awarded to children who qualify.

The cost of the lessons is $40 per child, payable upon registration. For each class, the daily pool fee of $2 or a season pass must be presented, and children should arrive by 2 p.m.

Pick up applications at: Personnel, Bldg. 185, 8:30 a.m. to 5 p.m.; the BERA Sales Office, Berkner Hall, 9 a.m. to 1:30 p.m.; or the BNL swimming pool during open hours. Deliver completed applications, with checks payable to BERA, to the Recreation Office, Bldg. 185, by Friday, June 17.

In Memoriam

William Patanjo, who retired from the Staff Services Division as a chauffeur on December 31, 1979, died on April 22. His 32 years at the Lab began on March 24, 1947, when he joined the Architectural Planning & Plant Maintenance Division as a chauffeur. He was 79 years old.

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Time to Apply for Two Awards

Applications are now being accepted for the following awards:

• **DOE Distinguished Postdoctoral Research Program** — The U.S. Department of Energy (DOE) established this program to attract outstanding postdoctoral scientists and engineers to the national laboratories to participate in DOE's research programs directed at understanding and finding solutions to energy-related problems of national importance. These include research in the physical sciences, computer sciences, engineering and supporting disciplines.

Fellowships, which include a $52,800 stipend, will be awarded to postdoctoral researchers who earned doctorates in an appropriate discipline after 1991. Fellowships must begin between January 2 and March 31, 1995. Each award may be extended for up to two more years.

U.S. citizens and permanent residents may submit applications, which must be received by July 1. For forms and more information, contact the Oak Ridge Institute for Science & Education, which administers the award for DOE, at (615) 576-9934, or BNL's Office of Scientific Personnel, Bldg. 185A, Ext. 7813.

• **Gertrude S. Goldhaber Prize** — Brookhaven Women in Science (BWIS) will award this $500 prize to a woman graduate student in physics at the State University of New York at Stony Brook, in recognition of her substantial promise and accomplishment. The award was established to honor nuclear physicist Gertrude Scharff-Goldhaber, who, in 1950, became the first woman Ph.D. physicist appointed to the BNL staff.

The winner of this award will be expected to give a seminar on her work at the award ceremony next fall. To be eligible, she must be a candidate for a doctoral degree, still active as a physics graduate student and *not* receiving her degree before October 1 of this year.

Any member of the BNL staff or the faculty in Stony Brook's Physics Department may nominate a candidate by the deadline of May 27. For more information, or to make a contribution to the prize fund, contact BWIS Goldhaber Prize, P.O. Box 183, Upton, NY 11973, or call Vinita Ghosh, Ext. 3527, or Louise Hanson, Ext. 7709.

UNIX Training

Intermediate C++ programing and selected Solaris system-administration topics will be discussed during two classes, which are the next round of UNIX training to be offered by the Computing & Communications Division. June 13-24, intermediate C++ will be taught from 8:30 to 11:30 a.m., while Solaris system administration will be covered from 1:30 to 4:30 p.m.

The cost for each class will be approximately $400 per person. To reserve a place in either or both classes, call Maria Gatz, Ext. 5196.

AIX Users Group

At the next meeting of the AIX Local Users Group on Wednesday, May 11, at 10 a.m., in Room 2-160, Bldg. 510, the Public-Domain Software Team of the Computing & Communications Division will give a presentation on this new service, emphasizing software that runs on AIX.

For further information, contact Ronnie Evans, Ext. 2851.

Arrivals & Departures

Arrivals

Shun-Ming Huang ..... App. Science
Hong Wang ..... Adv. Tech.

Departures

This list includes all employees who have terminated from the Lab, including retirees:

Martha A. Heine ..... Saf. & Env. Prot.
Tammy A. Heinz .... Sfgrds. & Sec. Div.

Golf Tournaments

The second BGA Tournament will be held on May 19 at Montauk Downs. For information and sign-up, call Rick Jackimowicz, Ext. 3803.

The first BGA Tournament was held on April 20 at the Heatherwood Golf Club, with the following results:

Flight	Callaway/Net	Low Gross
A	Joe DePace	John Usher
B	Barry Karlin	Curt Bergh
C	Tom Dilgen	Bob Eich
D	Bill Liccardi	Beau Yatauro
E	Walter Powell	Emil Varrichio

Closest-to-the-pin: Hole 1, Bill Licciardi; Hole 9, Hank Arnesen.
Longest-drive: Hole 5, Andy Marone; Hole 14, Jack McQuade.

1-on-1 Counseling From TIAA-CREF

A TIAA-CREF representative will visit BNL Wednesday through Friday, June 1-3, to answer employees' questions on the TIAA-CREF Retirement Plan in one-on-one counseling sessions. Questions might include:

- What are the differences between TIAA and CREF?
- How should I allocate my money between TIAA and CREF?
- How can I save on taxes?
- What options and flexibilities do I have for my existing dollars with TIAA-CREF?
- What are my options for the retirement years?

To arrange an appointment with the TIAA-CREF representative, call Joyce Wund, Personnel Division, Ext. 7516, by Tuesday, May 17.

Howdy, Partner!

If you're looking for a fun workout to music, join the new BNL Country-Western Dance Club. Lessons by Judy & Paul Cutler will be given on Tuesday evenings, from 5:30 to 7 p.m. in the Brookhaven Center, beginning May 24, for six weeks, and will include both line and couples dances. At $20 per person, the class is open to Lab employees and their spouses or guests. Class size is limited, so join soon.

Call Ginny Morante, Ext. 3555, or Lois Marascia, Ext. 3315, for an application.

UNS Tag Sale

The Upton Nursery School (UNS) will hold its annual Tag Sale on Saturday, May 14, from 9 a.m. to 4 p.m., at 8 Brightview Drive, Rocky Point. The sale will feature children's toys and clothing, and many other things. UNS will also accept donations of sale items. Proceeds will be used toward much-needed UNS equipment.

A nonprofit, cooperative nursery school, UNS holds classes September through June, Monday, Tuesday and Thursday, 8:30 to 11:30 a.m. Children of Lab and AUI employees and their relatives, as well as guests, visitors and on-site contractors, are welcome.

For more information on UNS, or directions or donations to the Tag Sale, call Cindy Anderson, 744-1090, or Sue Ellen Gerchman, 929-3732.

Film badges will be changed tomorrow. Please place your badge in its assigned rack space before leaving work today.

BNL Hosts Long Island Team in National Science Bowl

Five students on a team from Baldwin Senior High School are the local champions in the National Science Bowl, sponsored by the U.S. Department of Energy (DOE) and organized on Long Island by BNL's Office of Educational Programs. They competed against 48 schools in the Nassau-Suffolk regional competition in which outstanding students answered science and math questions.

Shown at WLIW television studios are three of the winning Long Island Science Bowl team members from Baldwin High School: (from left) team captain Daniel Lifshitz, Staci Mesher, Adam Jacobs and team coach Barbara Riess. The other team members are Lee Ashendorf and Jason Bressner.

On April 22-25, the Baldwin team was provided with an all-expense-paid trip to Washington, D.C. to take on the challenge of the national competition.

In 1991, DOE initiated the annual contest to increase interest in science and mathematics among American precollege students. About 7,000 students from 1,400 high schools across the nation participated in regional contests this year, with 54 teams making it to the national finals. The winning team from the Westminster School in Atlanta, Georgia, can now attend either the 36th International Youth Science Forum in London, England, or the Fifth International Research Week in Geneva, Switzerland.

At the regional competition held on site, BNL scientists volunteered as moderators, rules judges and timekeepers, while BNL Museum Program staff members kept score.

In addition to Baldwin, the other high schools that placed among Long Island's top eight were: Brentwood, Central Islip, Chaminade in Mineola, East Meadow, Half Hollow Hills-West in Dix Hills, Schreiber in Port Washington, and Ward Melville in Setauket.

WLIW-TV, Channel 21, is broadcasting the top eight teams competing in a program called *Brainstormers Science Bowl*, sponsored by Associated Universities, Inc., and Dairy Barn. The program is showing each Sunday at 9:30 a.m., until May 22, and each Saturday, at 4:30 p.m., to May 28.

Bowling

Red/Green League

E. Larsen bowled a 257/601 scratch series, R. Wiseman 256/214/643 scratch, F. Griswold 235/204/632, K. Asselta 234/225/224/683 scratch, R. Mulderig Jr. 225/201, K. Koebel 214, M. Palumbo 211, P. Ouvrard 210, H. Arnesen 210, R. Raynis 203, R. Mulderig Sr. 202, S. DiMaiuta 202.

Purple League

Fred Schaefer bowled a 255/224/214/693 scratch, Eric Larsen 250/217/659 scratch, Rick Larsen 222/612 scratch, George Munoz 219, Ray Raynis 209, Pete Stemalschuck 202, Debbie Keating 194, Maryanne Reynolds 188, Tracey Ryan 188, Kay Conkling 182/180, Maria Yanez 181.

Cafeteria Menu

Monday, May 9	
Soup: Spicy potato kale	.80/1.10
A la Carte: Bourbon-herb chicken	3.85
Fitness: Pepper steak	4.25
Deli: Pastrami sandwich	2.95
Grill: Bratwurst & peppers	2.95
Tuesday, May 10	
Soup: Corn chowder	.80/1.10
A la Carte: Shepherd's pie	3.45
Fitness: Curry chicken	3.85
Deli: Ham sandwich	2.95
Grill: Spanish omelet	2.55
Wednesday, May 11	
Soup: Split pea	.80/1.10
A la Carte: Tortellini carbonara	3.45
Fitness: Cod Florentine	3.85
Deli: Roast beef sandwich	2.95
Grill: Monte Cristo	2.95
Thursday, May 12	
Soup: Egg-drop	.80/1.10
A la Carte: Mandarin chicken	3.85
Fitness: Stir-fry beef	3.85
Deli: Turkey sandwich	2.95
Grill: Cuban sandwich	2.95
Friday, May 13	
Soup: Manhattan clam chowder	.80/1.10
A la Carte: Display cooking omelet	2.75
Fitness: Flounder w/julienne veg.	4.25
Deli: Corned beef sandwich	2.95
Grill: Fried clams w/cheese roll	3.25

Classified Advertisements

Placement Notices

The Laboratory's placement policy is to select the best-qualified candidate for an available position. Consideration is given to candidates in the following order: (1) present employees within the department/division and/or appropriate bargaining unit, with preference for those within the immediate work group; (2) present employees within the Laboratory; and (3) outside applicants. In keeping with the Affirmative Action plan, selections are made without regard to age, race, color, religion, national origin, sex, handicap or veteran status.

Each week, the Personnel Division lists new placement notices. The purpose of these listings is, first, to give employees an opportunity to request consideration for themselves through Personnel, and second, for general recruiting under open recruitment. Because of the priority policy stated above, each listing does not necessarily represent an opportunity for all people.

Except when operational needs require otherwise, positions will be open for one week after publication.

For more information, contact the Employment Manager, Ext. 2882, or call the JOBLINE, Ext. 7744 (282-7744), for a complete listing of all openings.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside candidates.

DD 8191. HAZARDOUS WASTE MANAGEMENT TECHNICIAN - Requires AAS in chemistry, engineering, physical science or equivalent experience. Responsibilities include but are not limited to the pickup, packaging, storage and bulking of hazardous waste for the Division. Familiarity with RCRA regulations and/or DOE Order 5820.2a desirable. Additional responsibilities include completing and maintaining certifications required for the operation of this facility. (reposting) Safety & Environmental Protection Division.

Motor Vehicles & Supplies

93 HYUNDAI SONATA - black, V-6, anti-lock brakes, p/sunroof, anti-theft stereo, tinted windows. Ext. 2459 or 287-3262 after 5 p.m.

93 HONDA CBR600FL MOTORCYCLE - low mi., header, jet-kit, Arai Quantum helmet, tank bra, showroom cond., $5,800. Matt, 472-0706.

92 ACURA INTEGRA - 26k mi., red, p/windows, sunroof, am/fm cass., 5-spd., alarm, ext. warr., mint, $13,500. Lora, 758-5957.

91 VW JETTA GL - Calypso green, 5-spd., extras, excel. cond., best offer. 874-2953, leave message.

91 HONDA PRELUDE Si - black, 5-spd., 40k mi. orig. owner, mint cond. George, Ext. 4137.

89 ROCKWOOD CAMPER - v.g. cond., $2,500. 727-8020 days or 878-6978 eves.

89 HYUNDAI EXCEL GLS - 5-spd., 4-dr., ac, am/fm cass., 55k mi., mint cond., $2,500. Ext. 5881, leave message.

89 JEEP WRANGLER - 6-cyl., 1.5 scl, extras, 69k hwy. mi., mint, $9,200. Joan, Ext. 3305 after 5 p.m. or 277-3824.

89 PONTIAC 6000LE - 4-dr., 94k mi., p/s, p/b, ac, a/t, am/fm, $3,000. Oleg, Ext. 4984.

89 VW CABRIOLET - convertible, ac, a/t, Blaupaunkt, 58k hwy. mi., excel. cond., $9,500. 821-0686.

88 MUSTANG LX 5.0 - 7.1k mi. on motor, CD player, immac. cond., must sell, $6,500. 732-1243.

87 CHRYSLER LE BARON - coupe, 54k orig. mi., full power, like new, asking $6,100. Ed, 369-9006 eves.

87 KAWASAKI KZ305B2 MOTORCYCLE - 13k mi., new rear tire, recent tune-up, excel. cond., $800. John, 367-6684.

87 MITSUBISHI PRECIS - h/b, 60k mi., new clutch, brakes, tires, $1,200. Ext. 4940 or 331-5695.

86 AUDI 5000S - 80k mi., ac, sunroof, new tires, front-end damage but runs well, $900. Steve, Ext. 4555.

86 FIERO GT - p/w, p/l, ac, sunroof, new tires, prof. maint., high mi., runs well, $3,200. Patrick, Ext. 5377 or 289-7807.

86 MERCURY SABLE WAGON - 126k mi., needs some work, body excel., $1,500. Ext. 3034.

86 MONTE CARLO - new exhaust, fuel pump, V-6, p/s, p/b, a/t, good cond., $2,500. 286-1097.

85 HONDA 200X ATC - & '84 Honda 200S 3-wheeler, orig. adult owner, many extras, excel. cond., $1,600 for both. Bill, Ext. 4986 or 567-5631.

85 PORSCHE 911 CARRERA - conv., white, black top, leather int., p/s, p/w, ac, new brakes & sensors, Yoko-2R-16 tires, 36k mi., $26,000. Jim, 289-0876.

84 HONDA ACCORD - 5-spd., ac, p/s, c/c, stereo, good, dependable. Susan, Ext. 2184 or 821-5836.

84 CHEVY CELEBRITY - 4-dr., a/t, p/s, p/b, ac, well maint., 124k mi., needs new windshield, $1,100. Bob, 783-6331.

84 FIERO - balanced, blueprinted engine, competition cam, much more. Tom, 736-6993.

84 GMC SIERRA 3500 DUMP TRUCK - 7-yd. body, 40k mi., 292-h.p., new starter, a/t, excel. cond., asking $6,900. Randy, 286-1330.

84 MAZDA PICKUP - w/cap, 121k mi., runs well. asking $700. 734-4147, leave message.

81 BMW 320i - sunroof, Sony Benzi cass., new tires, clutch, muffler, water pump, tight engine, 105k+ mi., $2,000. George, Ext. 5288 or 878-8177.

79 FIREBIRD - a/t, V-8, new trans., v.g. cond., $2,500. 727-8020 days or 878-6978 eves.

73 YAMAHA TX750 - very clean, low mi., $750 neg. Harry, Ext. 5976 or 473-4462.

63 CHEVY II - 4-dr., 6-cyl., orig. owner, good body & engine, $1,250. Ext. 7185.

TIRES - 2, P225x75R14, excel., $35 ea. 698-9274.

CARB - Holley 750 CFM, single pumper, $75. Brett, 929-5343.

ENGINE - '81 Toyota, 1ac completely rebuilt, ready for installation & various Toyota parts, $250 firm. Bill, 281-6498.

Boats & Marine Supplies

26' CENTURY CABIN CRUISER - 1983, shower, new canvas, icebox, stove, sea pump, extras, $10,000, w/1989 EZ-Load trailer $13,000. 744-4688.

19½' SEA SPRITE - 1989, cuddy cabin, low hr., 130-h.p. Merc. i/o, Shoreline trailer, DF, SS radio, excel. cond., $8,300 neg. Phil, Ext. 4030 or 732-8124.

19' CHAPARRAL 198XL - 1988, 165-H.P. i/o Mercruiser, 1993 EZ-Load Rite trailer w/power winch, am/fm stereo, mint cond., $10,500. Ext. 3376.

19' FIBERFORM - 1976, V-8 Mercruiser i/o, V-bunk, DF, VHF radio, needs work. Bob, Ext. 5286.

19' 4 WINNS - 1987, cuddy, canvas, 190-h.p. FWC Merc. i/o, no trailer, $6,000 or best offer. Michael, Ext. 2081 or 878-9384.

18½' STARCRAFT - alum., center console, w/galv. trailer & controls, teleflex, Morse engine control, anchors, extras, $800 firm. Bill, 281-6498.

18' DORSET CLASSIC CUDDY - 1969 rebuilt 40-h.p. Johnson elec., canvas, DF, CB radio, Shoreline trailer, C.G. pkg., many extras, v.g. cond., $1,475. 698-5332.

16' SPORTCRAFT - 1968, fg, 135-h.p. Evinrude, trailer, many new parts, $1,000. Tom, 874-8463 after 6 p.m.

KAYAK - fg, Klepper Double, w/rudder & mast step, $400. Ext. 7657 or 298-9560.

PORT-A-POTTI - 6-gal. w/pump out connection & vent line, $30. George, Ext. 5288 or 878-8177.

Furnishings & Appliances

AIR CONDITIONER - Friedrich, ER 10, 8,000 Btu, excel. $250 neg. Ellie, Ext. 3395, or Ken, 325-1537.

AIR CONDITIONER - Kenmore, 6,000 Btu/hr., 7.5A, portable, window-type, $50. Alan, Ext. 7830.

AIR CONDITIONER - GE, 10,000 Btu, high efficiency, $100. 744-6423 after 6 p.m.

BED - metal frame, opens to full, $30. 821-6856.

BED - full-size, futon & frame w/storage, $80; 2 tables, 5'x3', 6'x3', $60/ea.; 3-drawer dresser, $25; bookcase, $10. Shobhana, Ext. 4940 or 331-5695.

BED/CRIB - Childcraft, w/2 drawers in base, 4-drawer separate section, extended mattress, light brown, $150. George, Ext. 5288 or 878-8177.

BEDROOM - girl's, white wood, desk w/hutch, chair, dresser w/mirror, headboard, $150. Doug, Ext. 4661.

CAPPUCINO MACHINE - Krups, small, black, rarely used. Maj Britt, Ext. 2384.

CHAIR - recliner, gray leatherette, $100; dinette, 36"x60", tinted glass top, brass trestle, 6 camel upholstery & brass chairs, $350. Ext. 2876 or 345-5365.

FREEZER - Fridgidaire, upright, 12.8 cu. ft., model UF-128T, $75. Bill, 246-5968.

DRAFTING TABLE - 6', $30. Terry, 499-8377.

DRYER - Sears, apt.-size, 110V, yellow, excel. cond., $50. Joe, Ext. 2912.

LIVING ROOM SET - Ethan Allen, blue floral, camelback sofa & loveseat, 2 Queen Anne wing chairs, drapes, like new, $1,000. Mike, Ext. 5972.

LIVING ROOM SET - rattan, 2 couches, tables, chairs w/ottoman, $600 neg. 689-9234.

LOVE SEAT - & easy chair, blue w/white flowers, very comfortable, $150/both. 821-6855.

REFRIGERATOR - apt.-size, $100; dining room table, white Formica, drop-in leaf, 6 light green swivel chairs, $250. Don, Ext. 7237 or 744-2921 after 5:30 p.m.

REFRIGERATOR FREEZER - Whirlpool, frost-free, 16.3 cu. ft., v.g. cond., energy saver, best offer. Louise, 475-6056 after 7 p.m.

SOFA BED - Sealy, full size, 6" inner spring mattress, Scotchguarded, beige, $450. Ext. 5873.

WALL UNIT - 7'x11', $350; 3-seat sofa w/2 reclining seats, $500. Louise, Ext. 3648.

The Brookhaven Bulletin is printed on paper containing at least 50 percent recycled materials, with 10 percent post-consumer waste.

WALL UNIT - custom, Formica, mirror, glass; sofa & love seat, off-white; mirrored cocktail table; kitchen table & chairs; bedroom furn. Irv Brown, Ext. 2827.

BASSINET - for newborn, used 3 months, $30; car seat for newborn, $5; bathtub, $2. Ext. 1020.

BED - queen-size, walnut headboard, comforter, matching drapes, elec. blanket. I. Meyer, 929-4326.

CARPET - navy blue, 12'x10', $30; 2 night tables, white, 16"x12"x18", $15/ea. 286-9725.

DINING ROOM - fruitwood table w/3 leaves, breakfront, 6 chairs, $1,600; 2 Weiman end tables, marble coffee table, $200. 265-3848.

DRESSER - 6 drawers, black, 43"x17"x29", $30; dresser, 4 drawers, 2 compartments, black, 60"x17"x35", $40. 286-9725.

DRYER - Kenmore, elec., extra large capacity, white, $60. Cindi, Ext. 3651.

MICROWAVE - Litton, model 7000, large, w/manual, $85. Ext. 2000.

RECLINING CHAIR - light gray leatherette, excel. cond., $100. Ext. 2876 or 345-5365.

SOFA - peach leather, excel. cond., $250. 727-2494 after 5:30 p.m.

TABLE - drop-leaf, 4 chairs, $65; Knitking hand knitter & books, $75; circular sock knitter, new, $15. 369-9879.

TABLE - kitchen, 42"x52", oval, 4 chairs, 12" leaf, dark brown, all wood, $250. Lloyd, Ext. 5225.

VACUUM - Hoover Spirit, new, $70; coffee maker, $5; food processor & blender, $15; rice cooker, $20; ac, $80 or best offer. Shobhana, Ext. 4940.

WASHING MACHINE - good cond., works well, 473-9678 after 5:30 p.m. or wknds.

WICKER FURNITURE - love seat, table, 2 chairs w/cushions, white, $275; etagere, $25; full-length standing mirror, $100. Alice, Ext. 2274 or 744-4835.

Tools, House & Garden

FLOWERS - annuals, $10/flat; $5.50/½ flat; vegetables, $1/flat. Ray, 727-6818 after 4 p.m.

GRILL - Sunbeam, gas, 2 burner, w/tank, internals replaced recently, $35. Lloyd, Ext. 5225.

HYDRANGEAS - French, potted, 2 yrs. old, $2/ea.; Alberta spruces, dense, slow growing, 2' tall, $15/ea. John, 744-5867.

LAWN MOWERS - Craftsman II, 20" cut, 3½ h.p., rear bag, $75; Toro, 21", side bag, 3½ h.p., $50. Dan, 698-7322.

LUMBER - V-joint, tongue & groove, 12'x2"x6", 36 pieces, new, $4/ea. 744-5096.

ROTOTILLER - new transfer case, new belts, needs engine, $40. Don, 473-6570 after 7 p.m.

SWIMMING POOL - 18' dia., 4' deep, filter, 1½-h.p. pump, access., $500; Black & Decker push mower, $50 neg. Don, Ext. 7237 or 744-2921 after 5:30 p.m.

SWIMMING POOL PANELS - solar-heat exchanger, 4'x9', $40/ea., or best offer. Ext. 2165.

SWIMMING POOL VACUUM - Aquadroid, automatic, a/g pools only, used 2 seasons, orig. $300, now $150. Ken, Ext. 7915 or 929-0823.

TREES - Japanese maples, $10-$45+. Mauro, 265-6542.

WATER CONDITIONER - Culligan Mark 89, best offer; water tank, best offer. Pete, Ext. 7955 or 929-3847.

WINDOW - Andersen 30310, narrow line, high-performance. Gary, Ext. 2214.

WINDOW - Andersen, white vinyl, slide, 3'x3', like new, asking $65. Carol, Ext. 2474 or 475-7454 eves.

Miscellaneous

ENCYCLOPEDIA - *Brittanica*, 1967, 23-volume set, mint cond., $200. Pat, Ext. 2452.

GIFT CERTIFICATE - PC Richards, $100, expires 8/94, $75. Chris, Ext. 3355.

GOWNS - spring/summer, for proms, weddings, parties; shoes, high-heel, leather, narrow. Ext. 5938.

TICKETS - Billy Joel & Elton John, 7/24, Giants Stadium, section 228, 4th row, $250/three tickets. Henry, Ext. 5725.

WREATHS - grapevine, wine cork, all sizes, shapes, make great gifts. Lois, Ext. 3315.

Audio, Video & Computer

AMPLIFIER - NAD amp/preamp, 45 watts/ch., 125 watts peak, $275; Akai equalizer, 13 band, v.g. quality, $75. 924-6935.

CD PLAYER - NEC, w/remote, manual, good cond., $75. Rodger, Ext. 4630.

COMPUTER - Commodore 64, disk drive, $25. John DiNicola, Ext. 5100.

COMPUTER TABLE - $75; 19" RCA color TV, w/cable converter box, $150; Fisher VCR, new. 289-8212.

KEYBOARD - Yamaha PSS-680, stereo, portable, electronic, w/hand percussion, auto accomp., MIDI, stand, manual, like new, $200. P.K., Ext. 5648.

SPEAKERS - AR-10 TT, rebuilt, sound great, $75/pair neg. Don, Ext. 7237 or 744-2921 after 5:30 p.m.

TURNTABLE - Fisher, linear tracking, $25. Mike, Ext. 5972 or 744-4579.

TV - Zenith, 25", color, console, remote. Ext. 2930.

VIDEO GAMES - for Super Nintendo, $25/ea. Ext. 7505.

Free

KITTENS - adorable, black stripes, white chests and feet, born 4/24. Beth, Ext. 5630.

RABBIT CAGE - Ext. 7505.

RASPBERRY CANES - 369-9879.

TV - Zenith 19", color, working; Sharp Carousel microwave oven, 1500W, not working. Victor, Ext. 2395.

Lost & Found

FOUND - men's watch, Bldg. 727, you describe and it's yours. Ext. 7217.

FOUND - men's watch, Bldg. 535 men's room. Ext. 2345.

Car Pools

BOHEMIA/E. ISLIP/OAKDALE/SAYVILLE - need 1 more driver. Frank, Ext. 2314.

Wanted

CAPRICE OR IMPALA - '74-'76, need not run, reasonable. Tom, 874-8463.

CARS - trucks, 4x4's, vans, cash paid for vehicles. Paul, Ext. 2813 or 286-6341.

AQUARIUM - 20-50 gal., complete; motorcycles, 1900-1980, any cond., also antiques and motorized bikes, mini bikes. Bill, 467-1343.

CAR-TOP CARRIER - Sears X-Cargo box-type. Joe, Ext. 2898.

HOMES - apt., condos, rooms for rent, houses to share, short-term rentals for BNL guests. Marie, Ext. 4489.

PILOT - w/plane for July trip to Martha's Vineyard, will pay fuel + reasonable fee for time. Naomi, Ext. 2694.

PORCH SWING - bench-like, chain-suspended, for 2 or 3 people. John, Ext. 7671.

SAXOPHONE - good working cond., for student. John, Ext. 2913 or 422-5095.

VIOLIN - full-size, must be in good cond. & reasonably priced; *World Book* encyclopedia, used. Ken, Ext. 7915, or Linda, 929-0823.

Services

Services are listed in the first ***Bulletin*** *of every month as a courtesy to BNL employees. They are neither screened nor recommended by the* ***Bulletin****. Services forms are available in the* ***Bulletin*** *lobby, Bldg. 134.*

AUTO REPAIR - all phases of automotive repair and general service. Brett, 929-5343.

AUTOMATIC LAWN SPRINKLERS - free estimates, professional layouts, repairs, alterations and additions, prompt courteous service. Lou, 928-7042.

BRICKWORK - masonry, patios, walks, swimming pools, retaining walls, landscaping ties, Belgium bock, 25 yrs. exp., Lab disc. Tony, 698-9274.

CERAMIC TILE - installation, repairs, bathrooms, kitchens, foyers, quality work, reasonable prices. Patrick, 289-7807.

CHIMNEY CAPS - and sweeping, fireplaces, wood, coal & oil flues, stainless steel caps, custom made for pre-fab, lifetime warranty. Mike, 821-5526.

DECORATIVE PAINTING - specializing in all decorative painting techniques, faux marble, faux woodgrain, murals, sky ceilings & gold leafing. Byran, 653-9319.

DESKTOP PUBLISHING - newsletters, business cards, resumes, stationery. Tom, 434-9345.

DJ/MC - party & dance music from 40s-90s, all occasions, music & entertainment personalized for your affair, BNL refs. Lou, 698-8210.

ELECTRICIAN - outlets, switches, lighting, service upgrades and repairs, licensed. Steve, 758-7002.

HANDYMAN - odd jobs, dirty deeds done cheap, reasonable rates, competent work. Frank, 399-4480.

HOME IMPROVEMENT - carpentry, drywall, spackling, painting, plumbing, ceramic tile, sheds, free estimates, Lab discount. Don, 744-2921 after 5:30 p.m.

HOME IMPROVEMENTS - extensions, dormers, decks, kitchens, baths, siding, lic. & insured, refs., free est. Chris, 286-2780 or 286-1348.

HOUSECLEANING - dependable, affordable, honest, hardworking, refs. on request. Terry, 475-8516.

HOUSECLEANING - take a break this summer, let me clean your house for you, low rates, call early to schedule. Sue, 727-7404.

JEWELER - special orders, repairs, honest, affordable, no job too large or small. Kelly, 821-5239.

KAYAK LESSONS - touring, river playboats, $80/5 hrs., equip. supplied, intro to kayaking, 2 hrs./$25. Ernie, 281-7873.

KARATE - self-discipline, exercise mind/body, situational, confrontational, role-playing, adults, children, family discounts, certified. Richard, 289-0604.

KITCHENS - 3 styles for under $3,000, includes cabinet, top, installation. Carl, 698-9274.

LAND CLEARING - trees, stumps, brush removed, topsoil graded and raked w/450 loader, $70/hr. Tom Muller, 878-1060.

LAWN MOWER REPAIRS - & lawn tractor, fast, reliable, have trailer, will travel. Dan, 698-7322 after 5.

LAWN CARE - mowing, fertilizing, seeding, weekly or biweekly, also hedges. Tom, 434-9345.

LOCKSMITH - sales & service, 10% Lab discount, keys cut during lunch. Pete, 399-2813 after 5 p.m.

MAILBOXES - post or house styles, custom-made, heavy-gauge steel or wood, free catalog, many styles, Lab discount. Mike, 821-5526.

PAINTING - licensed, insured, free estimate. Cassella, 467-5661.

PAINTING - interior/exterior, Sheetrock, tape, spackle, wallpaper, stain, powerwash, gutters, roofing, insured, refs. James, 399-4912.

PARTY TENT - 20'x30' w/side curtains, we set up and take down, $250/38 hrs. 321-2889.

PRESSURE WASH - decks, siding, motors, etc. Brett, 292-5343.

REMODELING - professional quality, work guaranteed. Dom, 363-8206 eves.

REPAIR - TV, VCR, computers, printers, monitors, o'scopes, electronic equipment, appliances; computers, install., repairs, upgrades. Steve, 698-5260.

SCUBA LESSONS - now forming NAUI-certified instructor, private or group. Rex, 929-3235.

SHEETROCKING - and spackling, free estimate. Kevin, 567-6621.

SKIN CARE & MAKEUP CONSULTANT - facials, skin-type and color analysis, nail care, sunscreens, free first-time facials. Barbara Jean, 929-3235.

TENTS/CANOPIES - any occasion, we set up and take down, many sizes, combos. Fred Kuehl, 588-2268.

TRAINING - PC applications, Windows, spreadsheets, word processing, graphics, database management, accounting, DOS. Gina, 929-3649.

TUTORING - math/science help, all levels, esp. good w/girls. Lynne, 821-7179.

TUTOR - math, physics and engineering, all grades from HS to college. Dom, 363-8206.

VIDEOGRAPHER - capture those precious moments on video, will tape weddings, parties, all occasions Larry, 281-7240.

WOOD CHIPS - topsoil, fill, gravel, mulch, bluestone, clean-ups, free delivery. Rich, 744-4003, leave message.

On-Site Services

OMEGA LEISURE TRAVEL - located in Berkner Hall for all your travel needs, open M-F, 10 a.m.-2 p.m. Travel rep. Kerry Fitzgerald, Ext. 5918 or 5958.

Ads left out of this issue due to lack of space need not be resubmitted to appear in the next issue.