BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

ARC Successful in Predicting Results of Heavy-Ion Collisions

In an office on the second floor of the Physics building, you can see two beams of heavy ions collide at nearly the speed of light. You can watch relativistic effects appearing to flatten the ions in the direction of travel. And, from their color coding, you can identify the particles produced after the collision.

All these are computer events. But when the results are compared with relevant data from heavy-ion experiments at BNL's Alternating Gradient Synchrotron (AGS) — they fit. The computer data have actually predicted significant experimental results.

The innovative computer code that provided these successful predictions is called ARC, acronym for "A Relativistic Cascade." ARC was the idea of Sidney Kahana, a scientist in the Physics Department's Nuclear Theory Division (NTD). It provides a computer visualisation of some of the particles that emerge from a heavy-ion experiment, and it's being designed and developed by NTD's Yang Pang and Thomas Schlagel, along with Kahana.

"'Relativistic' refers to the projectile energy we are looking at, and 'cascade' indicates the way we describe the transport of particles, with straight-line trajectories between collisions of particles," explained Kahana. "ARC is a method of computationally evaluating the hadronic content of heavy-ion data, which will be crucial for identifying the interesting data at RHIC."

RHIC, the Lab's Relativistic Heavy Ion Collider, is expected to be ready for experiments by about 1999. It will be the world's first accelerator to collide two beams of heavy nuclei at 100 billion electron volts (GeV) each. At these extreme thermodynamic conditions, the theory of Quantum Chromodynamics (QCD) predicts that the forces binding ordinary hadronic matter — the stuff of most of the universe — may be overcome.

Hadronic matter is usually made up of fundamental particles called quarks, or of a quark and an antiquark — and gluons, which carry the strong, or binding force. If this force is overcome by the conditions in RHIC, a fundamental change, or phase transition, could occur, in which the quarks deconfine and form a QCD plasma. A similar plasma is believed to have existed shortly after the Big Bang of the early universe, and, from it, the elementary particles that make up matter as we know it condensed.

The aim of RHIC experiments will be to detect the particles emerging from relativistic heavy ion collisions, search for the quark-gluon plasma, and study its properties.

"Since each RHIC collision will produce thousands of particles, the difficulty will be in sorting out events of interest," said Kahana. "ARC should provide some reliable insight as to where to look first."

Roger Stoutenburgh

The late stages of a gold-plus-gold heavy-ion collision are shown on the computer in this ray-traced image produced by the ARC code, the creation of (from left) Thomas Schlagel, Yang Pang and Sidney Kahana.

Building the ARC

Fortunately, ARC, which requires an exceedingly powerful, fast computer, can work on Schlagel and Yang's desk-top IBM RISC workstation.

"We started by working up a draft code with Sid," said Schlagel. "Then we collected experimental data and made tables of elementary hadron collisions producing broad spectra of particles at various energies, and entered the information in the code. It took a long time to look up all the available data, and to make the necessary assumptions when there were no data. It's complicated work — we went down a lot of blind alleys before we got there."

"It's often been said that young scientists are better trained for computing than thinking," commented Kahana. "But that is a misstatement in Tom and Yang's case. They really use the computer to think with."

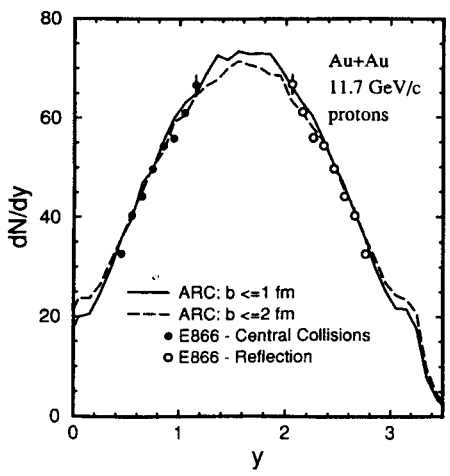
Thanks to this work, the detailed space-time evolution of important parameters—for example, local nuclear density—can now be studied, giving valuable insight into what happens at high densities. With ARC computer experiments tracing the evolution of collisions between two silicon beams, a silicon with a gold beam, and two colliding gold beams, researchers can study the experimental momentum distributions of outgoing particles to learn about the properties of hadronic matter under highly unusual conditions.

Keeping It Simple

To get the simple final picture ARC provides, the computer averages over literally thousands of simulations with randomly selected initial conditions. This Monte-Carlo approach is very powerful indeed and mirrors what happens in the actual experiments.

"Our aim is to understand what is

(continued on page 2)



A rapidity distribution plot showing ARC predictions for protons in central gold-plus-gold collisions, with preliminary data from AGS experiment E866, as published in *Nuclear Physics A*, A566 (1994), page 601c.

Coming Up

Marc Abrahams, Editor of the *Journal of Irreproducible Results*, will present a special Chemistry Department seminar on Wednesday, April 6, at 12:30 p.m., in Berkner Hall.

The journal—which the Boston Globe has called "a sort of *Mad* magazine for the Stephen Hawking crowd"—targets the worlds of science and research, including such things as life in the laboratory, the jargon of scientific research, and the customs and rituals of academic life.

All are invited to this entertaining lecture based on excerpts from the journal.

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Dance to the music of Swingin' Easy at the Country-Western Line Dance, to be held on Friday, April 8, at the Brookhaven Center. Sponsored by Brookhaven Women in Science and the Upton Chapter of Professional Secretaries International, the evening begins with dance instruction by Country Kate at 7 p.m. and line dancing at 8 p.m.

All are invited. For tickets, at $10 each, contact: Patricia Durcan, Bldg. 460, Ext. 5406; Sharon Jones, Bldg. 30, Ext. 2493; Terri Lacker, Bldg. 750, Ext. 2112; Harriet Martin, Bldg. 477, Ext. 3484; Sue Monteleone, Bldg. 130, Ext. 7235; or Flo O'Brien, Bldg. 475, Ext. 4962.

Brookhaven Council Convenes

For 32 years, the Brookhaven Council has advised the Director on matters pertaining to the scientific staff. Its 15 members, elected to three-year terms from the Lab's tenured staff, work together to make recommendations on staff appointments, tenure, involuntary terminations and other matters on which the Director may request advice; as well, the council may act as a channel for concerns that the scientific staff wishes to bring to the Director's attention.

Roger Stoutenburgh

Shown here at their March 14 meeting, the first for the 1994-95 council, are current members: (seated, from left) Betsy Sutherland, Biology Department; Council Secretary Stephen Shapiro, Physics Department; Council Chairman Louis Remsberg, Chemistry Department; Arjun Chanana, Medical Department; (standing, from left) T. Laurence Trueman, Physics; Benjamin Burr, Biology; Erik Johnson, National Synchrotron Light Source Department; James Powell, Department of Advanced Technology (DAT); Thomas Ludlam, RHIC Project; Joanna Fowler, Chemistry; Walter Kato, DAT; Ignatius Tang, Department of Applied Science (DAS); and Y.Y. Lee, Alternating Gradient Synchrotron Department. Not pictured are: Paul Falkowski, DAS; and Peter Thieberger, Physics.

Equipment Demo

Leviton Manufacturing Co. will hold a technical seminar on power quality, including transient voltage-surge suppression, on Thursday, April 7, in Room D, Berkner Hall, 1-3 p.m. Highlights will include demonstrations of TVSS device performance, training material and product documentation, and solutions to power-quality problems. A mini-trade show, featuring Leviton's industrial products, will also be held from 10 a.m. to 3 p.m., and refreshments will be provided throughout the day.

Winners' Circle

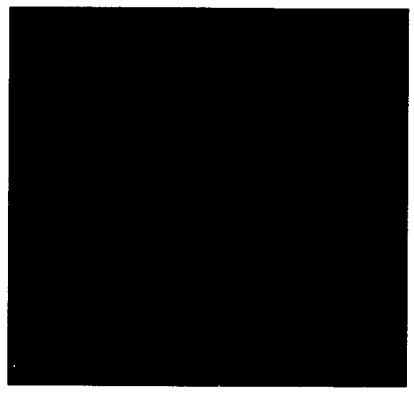
Employees with ideas for enhancing Lab safety or saving BNL money in areas outside their own job responsibilities should consider submitting their suggestions to the Employee Suggestion Program (ESP). ESP forms are available in department and division offices and through Personnel, Bldg. 185. An original idea could win 10 percent of the estimated savings, up to a maximum of $10,000.

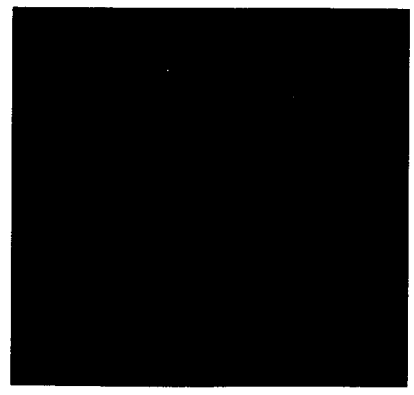
Congratulations to the following BNLer who has entered the ESP winners' circle:

John Becan, an electrical technician in the Alternating Gradient Synchrotron Department, has been awarded $390 for his suggestion to implement the use of a can-puncturing device to release the pressure from aerosol cans and remove residual contents. To ensure the safety of the operator and the environment, the contents of the can will be trapped in a drum while the propellant will be vented through carbon filters. While the contents of the cans must still be disposed of as hazardous waste, once emptied, the cans themselves will be disposed of as non-hazardous waste.

Expected to reduce the Lab's cost for hazardous-waste disposal by $3,900 annually, Becan's idea will be put into effect shortly by the Safety & Environmental Protection Division's Hazardous Waste Maintenance personnel.

New Light on Dark Matter





Two landmark photographs from the Hobbled Telescope, revealing what may prove to be definitive observations of dark matter viewed from obtuse angles.

The latest sightings of the non-appearance of dark matter were the subject of an illustrated lecture at a Light Source on April 1 at 12 a.m. Entitled, "Oh, Dear, What Can the Matter Be?", the talk was presented by Justin D. D'Arc, professor of physics at l'Université du Jour, Souterrain-le-Ville, France.

Although astrophysicists have taken a somber view of dark matter's absence because it condemns the universe to eternal expansion into the void, D'Arc takes a lighter view. "I like a bright, closed universe; it's more cozy and you know where everything is," he remarks.

D'Arc dismisses previous findings based on star-flickering effects as mere aberrations, which should, however, be treated with gravity. "The main trouble with previous searches is that they have been carried on at night, when dark matter doesn't shine — but everyone gets night-shift pay," he explains. While D'Arc's brightest discoveries are still under wraps because of short-sighted referees, he offers as a hint: "Think sunspots—it's not just dirt up there."

In addition to his work at the Université, D'Arc is Chief of Operations of the Hobbled Telescope, which is devoted to day-time astronomy, when the light is better. "On a clear day, you can see forever — a considerable improvement over just a few light-years," he claims. D'Arc's program is part of the renowned radiotelescope system DIS-ARRAY (Deep-Inter-Stellar) located almost everywhere. — Liz Seubert and Joe Weneser

April Fool!

Reports Available

The following reports are available to Lab staff and affiliates of DOE, AUI and NRC. Others may purchase them from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. Staff members should call the designated contact.

BNL-NUREG-51581
NUREG/CR-2907
Contact: L.F. Dudzick, Ext. 2954
Radioactive Materials Released From Nuclear Power Plants. Annual Report 1990, Vol. II. J. Tichler, K. Doty, J. Congemi

BNL-NUREG-52364
NUREG/CR-5995
Contact: D. Storan, Ext. 2716
Technical Specification Action Statements Requiring Shutdown: Risk Perspective With Application to the RHR-SSW Systems of a BWR. T. Mankamo, I.S. Kim, P.K. Samanta, A. Oy

BNL-52389
Contact: E. Zukowski, Ext. 4949
Future Directions in Particle and Nuclear Physics at Multi-GeV Hadron Beam Facilities. D.F. Geesaman

BNL-52392
Contact: A. Waltz, Ext. 5834
Proceedings of the 1993 Oil Heat Technology Conference and Workshop. R.J. McDonald

BNL-NUREG-52393
NUREG/CR-6111
Contact: L. Hanlon, Ext. 7517
Integrated Systems Analysis of the Pius Reactor. R. Fullwood, P. Kroeger, J. Higgins, R. Youngblood, H. Cheng, G. Martinez-Guridi, G. Van Tuyle, W. Shier, R. Morante, P. Soo

BNL-52403
Contact: J. Hurst, Ext. 3844
Annual Report - Department of Applied Science. L. Petrakis

Addled Addresses

- Brookhaven National Labor Plant Engie
- Rookhaven Natl Lab
- Broolchaven Labro Jor
- Brookhaver National Laboratory Liptor Long Island
- Brookhaven National Systems Division

Looking Back — And Ahead

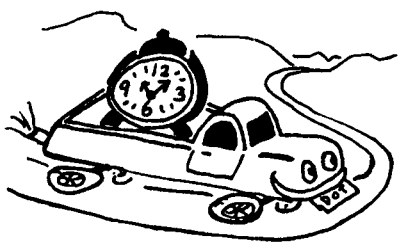
As spring takes hold, we leave you with one last glimpse of this winter — as seen through their Bldg. 197 window by Cyndy Chisare and others in the Composition Group in Photography & Graphic Arts. And we give you a preview of life springing up, as represented by the egg-laying snapping turtle above and the egg-sitting Canada goose below, both photographed on site by Roger Stoutenburgh.

Time Springs Forward on Sunday

Remember, this is the dread weekend when clocks are to be set forward one hour at 2 a.m. on Sunday — leaving one hour less to doze before attacking the Sunday papers.

Who loads us up with daylight saving time rules? According to the National Institute of Standards and Technology (NIST), it's the U.S. Department of Transportation (DOT).

Zones of Responsibility



In addition, NIST disclaims responsibility for time zones — they are also DOT's business. Times zones were originally needed when railroads were used for interstate commerce, and the zones were controlled by the Interstate Commerce Commission (ICC). On November 18, 1883, the United States was first divided into Eastern, Central, Mountain and Pacific time zones. Then, in 1967, Congress transferred these ICC duties to DOT.

12 a.m.? 12 p.m.?

With time in mind, what time of day is 12 a.m? Since so much confusion is caused by the terms 12 a.m. and 12 p.m. to denote noon and midnight — or is it midnight and noon? — NIST suggests that neither should be used.

Since a.m. is short for "ante meridiem," Latin for "before noon," and p.m. stands for "post meridiem," meaning "after noon," neither term decribes noon itself. As for midnight, it is both 12 hours before noon and 12 hours after noon. NIST's real time answer is to use "noon" and "midnight" and leave the a.m.s and p.m.s for other occasions.

ARC (cont'd)

the minimum amount of hadron physics that needs to be entered into the code," said Pang. "We are keeping everything very basic, so that when we compare results with available experimental data, it is easier to find out if there are important differences."

For example, ARC at first did not include hadronic resonances — internal excitations of hadrons — as its elementary entities. "It's a question of how one propagates the energy during the cascade," said Schlagel. "We found that, by allowing resonance formation and rescattering, there was a much better agreement with experimental AGS data."

"Eventually, we will be inserting the known quark substructure for hadrons," added Pang. "For now, we are still finishing the basics, but there are other things on the drawing board."

Other Applications

Because their approach has been so general, the researchers expect their techniques to be useful in other applications. As an example, ARC methods could be used to help solve problems in general hydrodynamics.

— Liz Seubert

Vroom, Vroom

If you ride up other people's bumpers and into their trunks, think that yellow lights mean go even faster, and drive through red lights like you were going to your own funeral—then have we got a course for you.

The six-hour class is called defensive driving, and it is approved by the National Safety Council, which means that those who complete the course qualify for insurance-rate reductions and/or driver's license points reductions. So, even already safe drivers will benefit by attending.

Due to popular demand, defensive driving courses will resume at the Lab, to be offered once a month from April through December. Sponsored by the Safety & Environmental Protection Division and the Health Promotion Program of the Occupational Medicine Clinic, the classes will be held 6-9 p.m. weekdays or 9 a.m. to 3:30 p.m. on Saturdays.

The course is open to all employees, guests and their family members, and the fee is $19.95 per person. To sign up, send your name and extension to Ronnie Zambelli, Bldg. 129A, or Mary Wood, Bldg. 490.

Basketball

Games as of March 24

Scram	**57**	**Knicks**	**49**
Steve Nappi	11	Greg Mack	12
Al Boerner	10	Chris Ingoglia	11
Tim Powers	10	Al Langhorn	9
Steve Coleman	9	Ed Gregory	7
John Duggan	8	Tom Snow	7
Alan Jones	5	Al Ratti	3
Joe Barkwill	4		

Three-point shots: Ingoglia (3), Ratti

Magic	**96**	**Deep Six**	**73**
Terrence Buck	22	Charles Kirkland	18
Pat Browne	17	Dwayne Eleazer	17
Mitch Williams	17	Tracy Fountaine	14
Ray Jackson	12	Neil Tyler	11
Troy Mayo	12	Brian Hobson	7
Neil Donahue	8	Ulysses Tapley	6
James Rank	6		
Jim Garrison	2		

Three-point shots: Williams (3), Buck, Eleazer, Fountaine, Hobson

Bowling

Red/Green League

R. Larsen bowled a 278/246/215/739 scratch, R. Raynis 262/621 scratch, H. Arnesen 254/219/658 scratch, A. Warkentien 239/213/211/663 scratch, R. Mackinnon 231/212/613 scratch, R. Mulderig Jr. 229, E. Beadle 226/205/630 scratch, R. Wiseman 222/213/213/648 scratch, E. Larsen 211.

White League

Pete Wynkoop bowled a 217, Mike Meier 216, Bob Geib 213, Joe Mayeski 205, Sharon Smith 190, Jerry Riker 190, L. Roecklein 180. Lorraine Petro converted the 4-5 split.

Arrivals & Departures

Arrivals

Ray C. Craft ..... Saf. & Env. Prot.
Tan-Yun Cheng ..... Chemistry
Cornelius Donahue Jr. ..... Physics
Jorg B. Kewisch ..... RHIC
Eric J. Scanlan ..... Saf. & Env. Prot.
Paul T. Singer ..... Biology
William L. Smith ..... Physics

Departures

This list includes all employees who have terminated from the Lab, including retirees:
Young K. Bae ..... Chemistry

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Coming Together for Equality

The Lab may have an Assistant to the Director for Equal Opportunity and an Office of Equal Opportunity, but for identifying and resolving affirmative action (AA) and equal employment opportunity (EEO) issues for BNLers in their individual departments and divisions, these Equal Opportunity Representatives are key.

At their March 16 training meeting, the first of four for 1994, the representatives heard from Donald Johnson, Director of Human Resources and Affirmative Action Officer of Rider College in Lawrenceville, New Jersey, who presented a historical overview of AA and EEO law and an AA/EEO forecast. Johnson was introduced by BNL Deputy Director Martin Blume, who reinforced the need for equal opportunity at the Lab.

During the morning of training, organized by Frances Ligon and Nanci Hoey of the Office of Equal Opportunity, the representatives who attended were also informed of their new duties regarding diversity and disability issues, and gathered together for this portrait.

Roger Stoutenburgh

Pictured are: (front row, from left) Jackie Larrie, Occupational Medical Clinic; Marie Hicks, Technical Information Division; Amalia Ruggiero, Medical Department; Michael Torres, Computing and Communications Division (CCD); Nancy Sobrito, Personnel Office; Marsha Kipperman, Personnel; Donna Dowling, Personnel; Georgia Irving, Directors Office; June Herbert, Alternating Gradient Synchrotron (AGS) Department; Pamela Manning, Relativistic Heavy Ion Collider (RHIC) Project; Agnes Abola, AGS; Charles Flood, Safety and Environmental Protection (SEP) Division; (middle row, from left) Sol Rosario, Budget Office; Patricia Fox, Department of Applied Science (DAS); Joanna Fowler, Chemistry Department; Juanita Beatty, Staff Services Division; Pamela Yerry, Reactor Division; Marilyn Johnson, Plant Engineering (PE) Division; Jane Hodgkinson, Department of Advanced Technology (DAT); Bonnie McGahern, Biology Department; Barbara Kponou, DAT; Eleanor Grist, Biology; Sandi Sullivan, DAT; Susan Monteleone, DAT; Pauline Dixon, DAT; Barbara Crothamel, DAT; Wenzel Rowan, Supply and Materiel Division (SMD); (back row, from left) Maurice DuBois, Fiscal Division; April Donegain, Fiscal; Betty McBreen, Physics Department; Larry Toler, Physics; Sam Logan, Central Shops; Thomas Roza, Reactor; Larry Jones, PE; Donald Tarrant, PE; Sarah Ebron, PE; Kara Roman, DAT; Eena-Mai Franz, DAT; Charles Meinhold, DAT; and Kathryn Lancaster, DAT. Missing are: Charles Bloxon, AGS; Edwin Casana, RHIC; Leonard Chimienti, AGS; Ahovi Kponou, AGS; Stephanie LaMontagne, RHIC; Richard Melucci, DAS; Alice Costantini, DAT; Melvyn Cowgill, DAT; Theodore Ginsburg, DAT; Charles Hofmayer, DAT; William Horak, DAT; Victoria McLane, DAT; Susan Pepper, DAT; Narinder Tutu, DAT; John Valente, DAT; Bruce Penn, DAT Department Representative; Dennis Hall, Contracts and Procurement Division; Mary Kelley, Instrumentation Division; Michelle Cummings, Management Information Systems (MIS) Division; Michael Seidman, MIS; Lydia Lever, National Synchrotron Light Source Department; Terry Jones, Photography and Graphic Arts Division; Oscar Blevin, PE; Rafael Jimenez, PE; Elke Dedner, Safeguards & Security Division (SSD); Thomas Gilbert, SSD; Michael Guacci, SMD; and Brian Mayo, SMD.

Attn: Women Re-Entering School

If you're a woman who had to interrupt formal studies in the natural sciences, engineering or mathematics, but who is now back to the books, you may be eligible to win the Renate W. Chasman Scholarship for Women — which has been raised this year to $2,000.

This one-time award is given annually by Brookhaven Women in Science to a woman who is currently enrolled or has been accepted in a degree program at an accredited institution. To be considered for the 1994 scholarship, you must be studying for 1993-94 at the junior or senior undergraduate level or first-year graduate level on a half-time or greater basis. You must also be a U.S. citizen or permanent resident alien who lives in Nassau or Suffolk County or the boroughs of Brooklyn or Queens.

If you're the winner chosen by an independent committee, the award will be presented to you in August, and you will be expected to complete at least two consecutive school terms in good academic standing.

For application forms and more information, write to: Chasman Scholarship Fund, P.O. Box 183, Upton, NY 11973. The deadline for applying is May 1.

First awarded in 1986, the scholarship honors the late Renate Chasman, a noted BNL nuclear physicist and accelerator theorist. She co-designed the Lab's National Synchroton Light Source, and her work influenced the design of other synchrotons around the world.

Sign Up for Disney

Openings are still available for BERA's fourth annual trip to Disney World in Florida, September 28-October 4. To sign up, bring a deposit of $100 per person to Recreation Supervisor M. Kay Dellimore, Personnel, Bldg. 185, where you can also stop in and see a "Disney Family Collage."

The seven-day, six-night trip includes round-trip airfare, six nights at Disney's Dixie Landings Resort, and much more. Costs for adults are: $798 - 4/room, $840 - 3/room, $925 - 2/room, $1,257 - single. When in an adult's room, children 3-9 pay $536 each, ages 10-17 pay $592 each, age 2 pay $316 each for airfare only, under 2, no cost.

For more information, call Dellimore, Ext. 2873, or Andrea Dehler, Ext. 3347.

WordPerfect Users

The next meeting of the WordPerfect Users' Group will be on Tuesday, April 5, from 10 a.m. to 11 a.m., in the Computing & Communications (CCD) seminar room, Bldg. 515. The topic will be working with tables in WordPerfect 6.0 for Windows.

Seating is limited, so call the group moderators, Pat O'Connor, Ext. 7341, or Donna-Ree Rodriguez, Ext. 4127, to confirm your attendance.

Hospitality Committee

Vegetable gardening will be the topic of the Hospitality Committee's next monthly get-together on Tuesday, April 5, at 9:30 a.m., in the Recreation building in the apartment area. The guest speaker, Nancy Kuehner, who is a master gardener, will present slides and some tips on how to start and maintain a vegetable garden.

Spouses of Lab employees and guests are welcome. Come and bring the children, but also bring along a toy or two. Coffee, tea and cookies will be provided.

Archery Club

The Archery Club will hold its monthly meeting on Thursday, April 7, at noon, in the large seminar room, Bldg. 510. New members are always welcome. For further information, contact Bill Schoenig, Ext. 2377.

Mountain Club

For its first canoe trip of the year, the BNL Mountain Club will paddle the Peconic River starting at 10 a.m. on Saturday, April 9. Meet at the river dressed for the weather. For information, call Sheryl Carey, Ext. 7716, or Al Kuehner, Ext. 4226.

Cafeteria Menu

Monday, April 4	
Soup: Chicken noodle	.80/1.10
A la Carte: London broil w/mushrooms	3.65
Fitness: Tomato & scallion pizza	3.00
Deli: Pastrami sandwich	2.95
Grill: Reuben	2.95
Tuesday, April 5	
Soup: Cream of mushroom	.80/1.10
A la Carte: Codfish	3.45
Fitness: Pasta Primavera	3.20
Deli: Ham sandwich	2.95
Grill: Western omelet w/French fries	2.35
Wednesday, April 6	
Soup: Lentil	.80/1.10
A la Carte: Herb-crusted pork chops	3.85
Fitness: Vegetable lasagna	3.35
Deli: Roast beef sandwich	2.95
Grill: Steak sandwich	2.95
Thursday, April 7	
Soup: Cream of spinach	.80/1.10
A la Carte: Deviled hen	4.00
Fitness: Spinach & feta quiche	3.45
Deli: Corned beef sandwich	2.95
Grill: Ham & cheese	2.75
Friday, April 8	
Soup: Seafood chowder	.80/1.10
A la Carte: Display cooking of Oriental entree	
Fitness: Baked flounder d'Uxelles	3.75
Deli: Turkey sandwich	2.95
Grill: Fried shrimp	3.25

Deli, burger and other specials daily.

Highlights Delivered

This week, all employees should have received their copies of the 1993 Brookhaven Highlights. If you did not, contact your department or division main office or call Public Affairs, Ext. 2345.

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.

SCIENTIFIC RECRUITMENT - Doctorate normally required. Candidates may apply directly to the department representative named.

POSTDOCTORAL RESEARCH ASSOCIATE - trained in physics or materials science, with experience in ultra-high vacuum techniques and photoemission spectroscopy. Project will involve high-resolution VUV/soft x-ray spectroscopies, mostly photoemission, of materials, thin films, interfaces and multilayers. Contact: Jerome Hastings, National Synchrotron Light Source Department.

POSTDOCTORAL RESEARCH ASSOCIATE - trained in materials science and/or chemical engineering, with corrosion experience and knowledge of scanning Kelvin probe techniques, to study fundamental aspects of the action of corrosion inhibitors. Contact: Hugh Isaacs, Department of Applied Science.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees.

MK 108SC. MASTER WELDER, GROUP LEADER - Central Shops Division.

MK 0000. MATERIAL HANDLERS - (temporary, o/a 6/6/94 - 9/2/94) - Supply & Materiel Division.

DD 2743. OFFICE SERVICES POSITION - (term appointment) Requires an AAS or equivalent experience, excellent communication skills and demonstrated organizational skills. Will assist in the Plant Engineering Safety Office, providing varied clerical support such as preparing reports, arranging travel, maintaining filing system and JCARS/workcard. Previous WordPerfect, Word, Data-ease and IPAP/JCARS experience highly desirable. Plant Engineering Division.

DD 2042. OFFICE SERVICES POSITION - (term appointment) Requires an AAS or equivalent experience, strong interpersonal skills and demonstrated organization skills. Will be responsible for maintaining the Physics Reading Room/Library. Duties include assisting Physics Department staff, shelving materials and entering data. Experience with the administrative modules of the INFORM system is required. Physics Department.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside candidates.

LS 3065. CHEMISTRY ASSOCIATE POSITION - Requires an MS in organic chemistry or equivalent and a minimum of two years' experience in organic chemistry. Experience with HPLC, GC, FT-IR and x-ray spectroscopy desirable. Responsibilities include doing interdisciplinary geochemistry and environmental research. Department of Applied Science.

DD 8771. BIOLOGY ASSOCIATE POSITION - Requires a BS/MS in plant biology, strong relevant training and experience in plant physiology/protein chemistry. The ability to accept assignments of several months' duration at field sites is also required. Will assist the FACE Program conducting CO_2 enrichment field experiments at several sites in the U.S. and abroad. Department of Applied Science.

Motor Vehicles & Supplies

92 TOYOTA PASEO - red, ac, p/s, p/b, sunroof, am/fm cass., 5-spd., 28k mi., orig. owner, mint, asking $9,500. 254-6180 or 584-5765.

91 CAPRI - red, convertible, 38k mi., anti-theft, a/t, ac, p/w, p/l, gar., excel. cond., $6,000. Jan, 751-6734.

91 VOLKSWAGEN CORRADO - all options, 39k mi., red, sports, like new, must sell, asking $12,000. Jonathan, 732-9370 after 6 p.m.

89 SAAB - 40k mi., 4-dr., black, very clean, $9,900. Joe, Ext. 5979.

89 PONTIAC 6000LE - 4-dr., p/s, p/b, ac, a/t, tilt, am/fm cass., excel. cond., $4,900. Ext. 2548 or 698-3283 after 7 p.m.

89 HYUNDAI EXCEL GLS - 4-dr., white, 5-spd., m/t, ac, am/fm cass., 53k mi., excel. cond., $2,900. Julian, Ext. 3403 or 874-3643.

89 NISSAN PICKUP 4x2 - 5-spd., 40k mi., am/fm, rad., bedliner, good cond., asking $5,800. Ext. 7678.

88 FORD FESTIVA - 48k mi., 4-spd., good cond., must sell, $2,500 neg. Eric, Ext. 1062/7648.

88 ISUZU TROOPER - 4wd, 4-dr., ac, am/fm, roof rack, low mi., excel. cond., $6,800. 722-3905.

88 LINCOLN LSC - orig. owner, fully loaded, anti-lock brakes, leather int., asking $9,000. 924-7809.

87 HYUNDAI EXCEL - 2-dr. h/b, blue, 4-spd., m/t, 60k mi., $1,100. Zoltan, Ext. 5341 or 341-1021 eves.

87 HONDA CIVIC - 2-dr., 4-spd., runs well, new battery & muffler, $1,200 neg. Tomo, Ext. 4357.

87 MAZDA RX7 - turbo, 30k mi., like new, $8,200. Ron, Ext. 5905 or 298-5625.

87 STERLING 825s - gold sports sedan, engine trouble, $2,000. Tyson, 286-3165 after 5:30 p.m.

86 CHEVY MONTE CARLO - Super Sport, red, T-top, new brakes, tires, $5,500. Pete, Ext. 5105 or John, 737-9614 after 6 p.m.

86 MITSUBISHI MIRAGE L - 5-spd. h/b, engine needs work, use for parts, $300 neg.; '82 Mazda GLC, h/b, a/t, am/fm cass. stereo, runs well, $1,000 neg. 331-9849.

85 LASER - black, high mi., new rack, rebuilt tranny, new timing belt, good tires, $1,195. Ext. 5265.

84 HONDA CIVIC - 4-dr. sedan, a/t, low mi., orig. owner, maintained well, body in good cond., $1,900 neg. Joe, Ext. 4638 or 474-3695.

84 HONDA PRELUDE - needs front body work, otherwise in good cond., $450. 864-1798.

84 NISSAN STANZA - 125k mi., looks good, new clutch & timing belt, asking $1,500. Weston, Ext. 4373.

83 CADILLAC ELDORADO BIARRITZ - good cond., needs engine work, best offer. Jerry, Ext. 2907.

83 DODGE COLT - 130k mi., orig. owner, runs well, good cond., asking $950. Diane, 924-4879.

81 320I BMW - white, new clutch, tires, 85k mi., runs well, excel., $3,000. Malry, Ext. 4100 or 653-8966.

81 HONDA MOPED - red, $400. Maryann, Ext. 2944 or 286-3377 after 7 p.m.

81 PONTIAC PHOENIX - 4-dr. h/b, 135k mi., new tires, needs water pump repair, $400. 473-6546.

81 SUBARU DL WAGON - 4wd, runs, needs front end work, $450. Paul, Ext. 7577.

80 NISSAN 280ZX - 10th anniversary edition, red/black w/red leather int., motor good, needs clutch, best offer. Pete, Ext. 4028.

79 MERCEDES 300 SD - turbo diesel, loaded, good cond., $3,800. Sorin, Ext. 2765.

CAMPERETTE - for a pickup truck, 8' bed, seat belts, good cond., Joann, Ext. 3802 or 321-6720.

ENGINE - '91 Ford 302 Mustang, just rebuilt, $750 or best offer. Marge, Ext. 5167 or 588-0677.

ENGINE - Ford, 289 c.i., cheap. John, Ext. 4028.

TIRES - P225x75R15, $20 ea. or 4/$60. 698-9274.

Boats & Marine Supplies

22' BOSTON WHALER - 1990, 175-h.p. Yamaha w/180 hrs., Yamaha instrumentation, custom console, many extras. Brian, Ext. 2799.

19½' SEA SPRITE - 1989, cuddy cabin, low hrs., 130-h.p. Merc i/o, Shore Line trailer, dDF, SS radio, excel. cond., $9,300. Phil, Ext. 4030 or 732-8124.

18' HOBIE CAT SAILBOAT - b/w mainsail, red jib, gray trampoline, w/trailer, $3,500. 473-1456.

16' SILVERLINE RUNABOUT - 70-h.p. Johnson, Cox trailer, extras. Marge, Ext. 5167 or 588-0677.

14' SEA STAR - f/g, 40-h.p. Evinrude, $550 without trailer or trade for quad in good shape. Joe Bush, Ext. 5409 or beeper, 2703.

12' ALUMINUM BOAT - w/trailer & 5-h.p. Yamaha ob., v.g. cond., $850. Sorin, Ext. 2765.

10' INFLATABLE - 1987, 9.9-h.p. Yamaha. $1,350. Dan, 878-6007.

ANCHOR - mushroom, 100 lbs., 50', 5/16 galvanized chain, large buoy, hardware, nylon line, $165. Joe, Ext. 2975.

SAILS - for windsurfer, North 4.5 Wave, $100; Gaastra 6.4 sp. sl., $110. Joe, Ext. 4139.

Furnishings & Appliances

AIR CONDITIONER - Freidlich, 8,000 Btu, excel. cond., $250 neg. Ellie or Ken, Ext. 3395 or 325-1537.

BEDROOM SET - $250; Singer sewing machine, $150. Sue, 878-5917.

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

BEDROOM SET - mattress, headboard, mirrors, dining room table, chairs, mini carpets, living/dining rm. mats, chandelier, etc. Ed, Ext. 4882.

CHAIR - high-back, Col., dark brown wood. 289-8105.

COUCHES - matching loveseats, 2, contemporary, wood trim, beige, blue & black Herculon fabric, $120/pair. Sue, 289-7218.

CRIB - Child Craft, honey oak, youthbed mattress, crib bumper, comforter & sheet set, excel. cond., $250/all. Nancy, Ext. 7976.

DINING ROOM SET - light oak table, 2 leaves, 6 chairs, breakfront w/mirrored back, glass shelves, table pad, like new. 368-6115.

FREEZER - GE, upright, $200; large air conditioner, $50; Pre-N-Simple water filtration system, new, orig. $395, sell for $200. Maryann, Ext. 2944.

LIVING ROOM - sofa bed, 2 recliners, 2 end tables, coffee table, lamp stand, wood stove, $500/all. Ext. 5265.

PLAYPEN - Century, $45; Fisher Price bathtub, $5; Sesame Street playgym, $5; quartz heater, $25. Chris, 744-6874.

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 - Whirlpool, frost-free, freezer, 16.3 cu. ft., works well, energy efficient, asking $200 neg. Paul, Ext. 7507.

ROCKING CHAIR - natural wood finish, excel. cond., $200. Donna, Ext. 2716.

SOFA - loveseat, chair, Formica coffee table, w/2 matching end tables, good cond., best offer. Jim C., Ext. 4150.

TABLE - pedestal, w/matching hutch, light oak, 1 leaf, 4 chairs, good cond., $750. Ext. 2875.

WASHER - GE, heavy duty, excel. cond., brown, $100. 289-8105.

Tools, House & Garden

BOILER - w/Beckett burner, 2 big circulators, still in operation, $200. 689-9234.

CABINETS - kitchen, Formica/birch, white trim, excel. cond., asking $150. Sharon, Ext. 5058 or 689-9869.

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

DRILL PRESS - bench-top, 12-spd., ¾ h.p.; 0-½" Jacob's super chuck, 14" swing, $200. Stephen, Ext. 4477 or 924-5510.

LAWN MOWER - Craftsman II, rear bagger, 3½ h.p., horiz. shaft engine, v.g. cond., $60. Dan, Ext. 2012.

LAWN MOWER - Ed, Ext. 4882.

LAWN MOWER - Black & Decker, 18", push, good cond., asking $50 neg. Don, Ext. 7237 or 744-2921 after 5:30 p.m.

LAWN TRACTOR - Sears, 12 h.p., 26" cut, rear bagger, plow, roller, aerator, chains, extra blades, excel. cond., $750. Art, 286-6492.

PLANTS - florist-grade, discount prices, flats of annuals & vegetables, 10" hanging fuschia or geraniums, $9. Jon or Donna, 363-3661.

STOVE - De Dietrich, coal or wood, w/hopper, $200. 286-3377 after 7 p.m.

TREES - spruce & douglas fir, b&b, sheared, 4' to 5', $25-$40/ea. depending on selection or quantity. Tom, Ext. 4507 or 878-1060.

Sports, Hobbies & Pets

AIR HOCKEY TABLE - Sears, 2 yrs. old, like new, $250 firm. Dave, Ext. 5741 or 924-6575.

BICYCLE BABY SEAT - good cond., $15. Roger, Ext. 7518 or 878-8847.

BIKE - 26", mountain, 12-spd., good cond., only $45. Bob, 369-0943.

BICYCLE - adult, 26", works well, good cond. Joan, 924-5533, Ext. 296.

BOW - compound, excel. for beginner, 30-50 lbs., 25"-28" draw, 1 dozen alum. arrows w/field tips, $125. Chris, Ext. 4672 or 399-6257.

BOW - compound, Pearson Spoiler, 29-31 draw, 70 lb., right hand, many extras. John, Ext. 4284.

DOG - Chihuahua, male, 8 mos. old, AKC, must sell. JoAnn, 321-6720.

DOG - 3-yr.-old male German Shepherd, w/papers, needs loving family w/room to run. 821-4234.

GOLF EQUIPMENT - Ping Zing drivers, $80; E-Z god pullcart bag combo, $50; Calloway graphite 5 wood, $150. Don, Ext. 2943.

HUTCH - for rabbit, outdoor, 2 section, never used, shingled roof, make offer. Joe, Ext. 2975.

PING PONG TABLE - kid's bicycles. Ed, Ext. 4882.

R/C SPEEDBOAT - ob, many access., good cond. Ryan, 878-1178.

TENNIS RACKET - $12; vacuum, $20; baby swing, $20; suitcase, $10; shop vac, $10; small heater, $15. Kathy, 744-2203.

Audio, Video & Computer

COMPUTER - XT, two 5¼" drives, VGA monochrome monitor, $200. Jan, 751-6734.

KEYBOARD - Casio CA100, 100 different instruments & beats, in box, orig. $125, asking $75. Chris, Ext. 4672 or 399-6257.

PRINTER - Star SG10, 8 pin, reel-to-reel, ink tape, works, w/cable, no manual, $15. Don, 473-6570.

RADIO/CASSETTE - Sony, like new, must sell, $45. Eric, Ext. 1062 or 7648.

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

STEREO - small, $50; end table, $25; slipcovered chair, $50. 584-7672.

STEREO - GE, dual cass., high spd. dubbing, record player, am/fm tuner, 2 speakers, great cond., $150 neg. Chris, Ext. 4672 or 399-6257.

STEREO PRE-AMP - NAD model 1020, good cond., best offer; Sony cordless telephone, mint cond., in orig. box, best offer. Jim C., Ext. 4150.

TRANSCEIVER - Kenwood TS-520 HF, AC/DC, $350; Diamond antenna, $10; Larsen mobile antenna, $15; Kenwood mobile mount, $15. John, Ext. 5750.

Miscellaneous

GOWN - pink, size 6-8, crinoline, matching size 8½ pumps, orig. $350, $50. H. Hildebrand, Ext. 3172.

JACKET - men's, dark brown leather, size 38-40, unwanted gift, $50. Pete, Ext. 2800.

RING - women's, 14k gold, 2 carat total diamond weight, cocktail, size 10, w/$3,195 appraisal, sell for $700. Ruth, Ext. 3305.

TYPEWRITER - elect., IBM, daisy wheel, needs work, $25; girl's 18" bike, $10; shopping cart, $5. 281-4844 eves.

WATCH - women's, quartz, interchangeable leather straps & rings in 5 colors, almost new, $20. Ext. 2733 or 878-8491.

Found

FILM - 35mm, 24 exp., hi-speed, found in library. Ext. 3483.

KEYS - Louis Vuitton tag. Jennifer, Ext. 7483.

Free

BOAT - 23' Thunderbird, cuddy cabin, f.g., no motor, no trailer, you haul away. 281-1852.

RABBITS - w/cages & hutches, will deliver. Lisa, 286-1060.

Car Pools

BOHEMIA/E. ISLIP/OAKDALE - looking for 1 or 2 drivers for existing car pool. Frank, Ext. 2314.

Wanted

ATARI - Lynx games; sofat/loveseat, under 79" long. Dave, 751-1474.

BIKE HELMET - for 2-yr.-old w/good sized head. Janet, Ext. 2345, or 929-3910.

LIVE-IN CAREGIVER - for elderly gentleman, in Brookhaven Hamlet. 286-1169 or 431-3435.

MOTORCYCLES - 1900-1965, any make, foreign or domestic, any BMW, running or not. 467-1343.

PARENTS OF DAY CAMPERS - interested in a discounted group rate for your child's summer day camp, must know by April 3. Laura, Ext. 4615 or 698-4143.

1,000MM LENS - Mead or Celestron for Canon 35mm, will buy my own ring for lens. Chuck, Ext. 4688.

SCRABBLE PLAYERS - for lunchtime challenge. Ext. 2145.

USED VCR - 4-head, stereo, reasonable. George, 878-1178.

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.*

ANIMAL SITTER - animal-loving 11-yr.old will treat your pets like my own while you're away. Kate, 929-5945.

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

BABY-SITTING - student looking for job on weekend, summer, etc., very good w/children, rates neg. Candice, 732-8192 after 5:00 p.m., M-F.

BABY-SITTING - in my Wading River home by experienced mom, my 2-yr.-old as playmate. Lorraine, 929-3910.

BEEPERS - carphones, Motorola beepers, many styles & services. Rich, Beeper #237-7509, or 473-7849.

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

CESSPOOL SERVICE - emptying & installations. Jim, 321-6720.

CHILD CARE - exp. college student, loves small kids, will care for your child, has own transport., Bellport area preferred. Aleanor Seubert, 286-3917.

CHILD CARE - experienced mother of 2, in private home in Rocky Point. Jim, 744-5392.

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

CLEANING LADY - exp., looking for work, refs., reasonable. 878-2421.

COUNSELING - exp. licensed CSW will help w/individual, marital or family problems, confidentiality guaranteed, insurance reimbursable. Linda, 929-5860.

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

ELECTRICIAN - service, upgrades, lighting, outlets, additional circuits installed, repairs, licensed. Steve, 758-7002.

HANDYMAN - no job too big or too small, reasonable rates. Frank, 399-4480.

HOME IMPROVEMENTS - carpentry, drywall, spackling, painting, plumbing, ceramic tile, sheds, free est., 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.

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

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

KITCHENS - 3 styles for under $3,000, includes cabinets, 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 - and lawn tractor repair, fast, reliable service, have trailer, will travel. Dan, 698-7322.

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 guage steel or wood, free catalog, many styles, Lab discount. Mike, 821-5526.

PAINTING - licensed, insured, free estimates. Victor, 467-5661.

PAINTING - int./ext., comm./res., no job too big or small, free est. Mike, 821-4083.

PAINTING - int./ext., paint, stain, powerwash, Sheetrock, spackle. Scott, 325-0706.

PAINTING - int./ext., Sheetrock, tape, spackle, wallpaper, powerwash, staining, refs., insur. James, 399-4912.

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

PIANO LESSONS - beginners, all ages welcome, traditional theory taught w/simplicity & fun, 10% Lab discount, certified, Stony Brook. Joan, 751-7023.

PICKUP TRUCK & DRIVER - for hire, small to medium jobs, reasonable & experienced. 821-4407.

PLUMBING & HEATING - alterations & repair by retired BNL employee. Jim Morris, 472-1205.

POWER WASHING - decks, houses, masonry, pools, driveways, campers, more, free est., 10 yrs. exp. John, 727-1140.

ROOFING & SIDING - and general home repair, wood roof specialists, free quotes. 878-1178.

SHEETROCKING & SPACKLING - free estimate. Kevin, 567-6621.

SKIN CARE & MAKE-UP CONSULTANT - facials, skin-type and color analysis, nail care, 10% Lab disc, free first-time facial. Barbara Jean, 929-3235.

TAXES - prepared by tax consultant, your home or mine, reasonable, serving Lab people for almost 20 yrs. John, 732-2472.

TRAINING - computer applications, Lotus, Wordperfect, Excel, Word, Pagemaker, PowerPoint, Harvard Graphics, Words, Windows, DOS. Gina, 929-3649.

TUTORING - math, physics, all levels, esp. good w/girls, special rates for Lab. Lynne, 821-7179.

VCR SERVICE - factory-trained, 20 yrs. exp., licensed, free est., warranty. Bob, 736-0341 or Phil, 732-8124.

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

WINDOW CLEANING - all work squeaky clean, reliable, courteous service. 928-3189.

In Appreciation

Sachie and I had a great time at BNL. We thank our friends for their warm hearts and friendship.

— Meguimi Akiba

I thank my friends for your prayers and kindness. Your support has helped through my illness.

— Dinorah Silva

Classified Ad deadline is 4:30 p.m. Friday for publication Friday of the next week.