BROOKHAVEN BULLETIN
Vol. 48 - No. 34 September 2, 1994
BROOKHAVEN NATIONAL LABORATORY

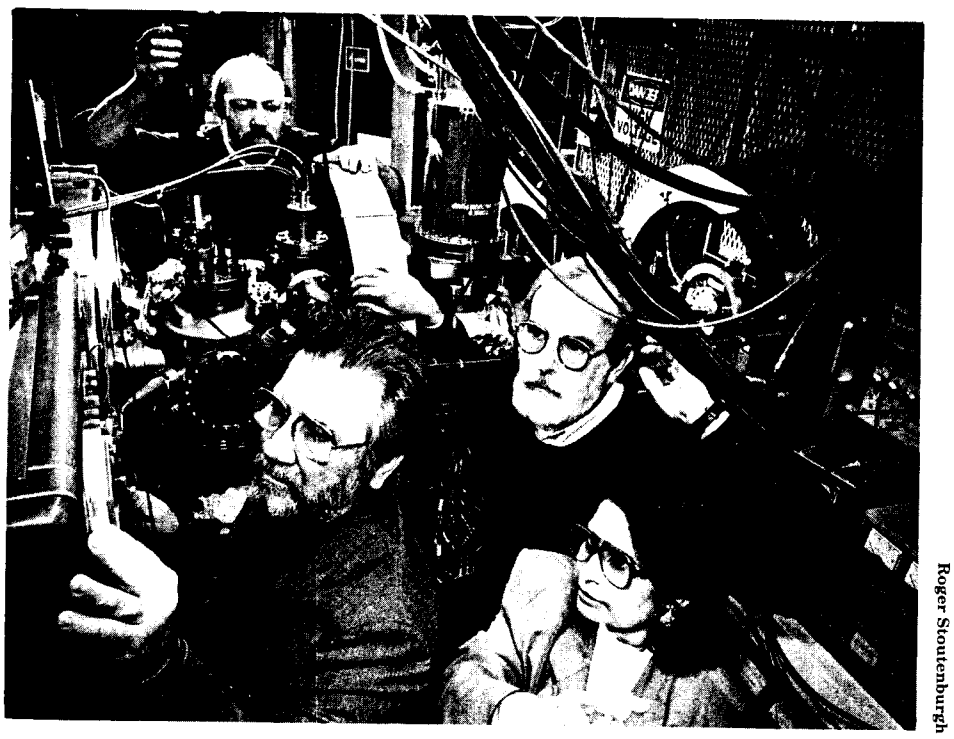
Positrons Point Out Paint Imperfections Prior to Peeling, Puckering

It takes just as much time to paint a house with good paint as it does with cheap paint, so most people use the best paint that they can afford for one simple reason: It lasts longer.

While professional painters have favorite brands of paint, recent changes in environmental laws, such as those requiring the removal of lead compounds from paint, have led to changes in the paint formulae, and that has resulted in changes in durability, even in the best brand names.

Interest in knowing how well and how long newly formulated paints adhere to walls extends beyond painters and paint manufacturers to wallboard makers. Since no one can afford to wait a year or more after application to see how well new paints hold up, the paint and wallboard industries have an interest in developing a reliable, nondestructive and noncontact technique that will detect paint failure early.

So, scientists at BNL and Oak Ridge National Laboratory (ORNL) are attempting to prove that positron-annihilation spectroscopy may be just what the paint manufacturers and paint users are looking for.



Roger Stoutenburgh

Examining paint chips at the positron beam line in the Physics Department are: (background) Bent Nielsen, Department of Applied Science (DAS); (foreground) Lester Hulett of Oak Ridge National Laboratory; Kelvin Lynn, DAS and Physics Department; and Vinita Ghosh, DAS.

"BNL has pioneered this technique for basic research in solid-state physics, to study metals, semiconductors and other materials, so it is exciting to see that it has an industrial application of national importance because everyone paints their homes," states BNL Senior Physicist Kelvin Lynn, who heads the Materials Science Division in the Department of Applied Science (DAS) and leads the Particle Investigations of Solids Group in the Physics Department.

Lynn became involved in this problem when Lester Hulett of ORNL, who had been studying paint weathering for industry, contacted Lynn about using Brookhaven's unique positron facility to evaluate weathered paint chips. Using a positron beam that he developed in BNL's Physics Department, Lynn and his DAS colleagues Bent Nielsen, Csaba Szeles and Vinita Ghosh have taken aim at weathered paint chips, to find that changes due to weathering can be seen by a technique called Doppler broadening of annihilation radiation (DBAR).

"While there was no difference to the eye between paint samples that had been weathered and those that had not, DBAR has revealed significant structural changes in the weathered paint," says Lynn.

Used for decorative and protective purposes, architectural paints differ not just by color, but by formulation, depending upon the kind and proportions of binder, pigment, solvent, drier and/or emulsifier. Applied in thin layers, paint changes from liquid to solid over time due to the evaporation of the solvent.

The durability of paints depends upon polymer binders, as well as the pigments in the paint. Because positron spectroscopy has been used to detect changes in polymers, using positrons to study paint failure seemed ideal.

The antiparticle of an electron, a positron is an elementary particle that has a mass equal to that of an electron and a positive charge of equal magnitude to an electron's negative charge. Though stable, a positron cannot exist indefinitely in the presence of matter: It will ultimately interact with an electron, and the two particles will be annihilated, liberating photons in the process.

The energy spectrum of the annihi-

(continued on page 2)

U.S. and Russia Renew Research Agreement

Roger Stoutenburgh

A cordial handshake between two co-chairmen — and the scene is set for the continuation of 19 years of collaborative experiments, primarily in high energy and nuclear physics, between the United States and Russia, as well as many institutions in Armenia, Georgia and Ukraine.

Each year since 1975, U.S. scientists have reaffirmed these collaborations — until 1991 with researchers from the Soviet Union and since then with representatives of the Russian Federation.

Always, however, the goal has been the same: To free physicists to concentrate on creative science rather than all the more complicated administrative details arising from international agreements.

On Thursday, August 25, the 17th meeting of the U.S./Russian Federation Joint Coordinating Committee for Research on Fundamental Properties of Matter was held at BNL. It culminated in an agreement signed by the two co-chairmen: Arlant A. Vassiliev (right), who heads the Main Division of Fundamental Problems of Nuclear Physics and Thermonuclear Fusion of Russia's Ministry of Atomic Energy, and Wilmot Hess, U.S. Department of Energy, Associate Director of the Office of High Energy and Nuclear Physics in the Office of Energy Research.

The meeting site alternates between various institutions in the Russian Federation, and BNL, Fermi National Accelerator Laboratory and Stanford Linear Accelerator Center in the U.S. This year, BNL hosted the delegation of seven committee members from Russia and one invited expert from Armenia, as well as the six U.S. committee members, which include BNL Director Nicholas Samios, and 11 other U.S. participants.

Joint BWIS-Biology Seminar

FISHing for Genes On Chromosomes

Barbara Trask

Prenatal diagnosis, tumor biology, gene amplification, gene mapping and cytogenetics — all these research areas have increasingly benefited by going FISHing, using a technique called fluorescence in situ hybridization (FISH).

Since the technique was introduced in the late 1970s, the application of FISH in biological studies has expanded rapidly. A leader in perfecting this methodology for ordering DNA sequences along a chromosome is Barbara Trask, Research Professor in the Department of Molecular Biotechnology at the University of Washington School of Medicine.

Trask will discuss her work with FISH in a seminar on Thursday, September 8, at 3:45 p.m., in the conference room of the Biology Department, Bldg. 463. Jointly sponsored by Brookhaven Women in Science (BWIS) and Biology, her talk is entitled "Chromosomal Organization and Polymorphism Revealed by FISH."

With FISH, DNA molecules carrying fluorescent tags can be deposited in chromosomes at specific sites of complementary DNA sequences. The discrete fluorescent signal thus visible in the sample can specifically highlight a single unique sequence location or chromosomal subregions. Fluorescent patterns can thereby differentiate gene sequences that may have changed or moved, exhibiting polymorphism.

In describing this technique, Trask will also explain how it is used in her department's work for the Human Genome Project. In an ongoing effort, she has applied FISH technology to map DNA sequences in human chromosome 19. Approximately 60 million base pairs (bp) of chromosome 19 have been divided into smaller stretches of 35,000 bp called cosmids. So far, Trask and her colleagues have determined the locations of 540 cosmids and 70 genes.

Recently, she described a method to put sequences in relative spatial order as

(continued on page 3)

Positrons (cont'd)

lation radiation depends upon the annihilation site and, in this case, is different for polymer binder sites and pigment sites. So, changes in the polymer binder and the pigment due to weathering will result in changes in the DBAR measurements. A depth-resolved picture of weather damage can be made by changing the energy of the positron beam, so the depth at which the positrons are implanted into the samples can be controlled.

Specifically, Lynn and his colleagues are using positrons to examine water-solvent paints with two types of polymer binders: One is styrene acrylic, the other all acrylic. The water-solvent samples either contained only binder or binder plus titanium-dioxide pigment. Also under study is one organic-solvent paint, which has an alkyd-polymer binder and titanium-dioxide pigment.

The samples came from painted aluminum panels, which had been weathered at a test facility located near Phoenix, Arizona. There, the panels covered with water-solvent paints were subjected to 15 days of sunlight, which was concentrated and reflected by a mirror array. During the day, the panels were sprayed with water every hour, while at night, water was sprayed on them every three hours.

The panels painted with solvent-based paints had been exposed to an intense xenon lamp for five days, while water was sprayed on them every 102 minutes for 18 minutes.

Until now, the effects of this kind of weathering have not been visible to the eye for at least a year, at which time paints begin to blister and peel. And, until now, the techniques used to study the weathering process, such as scanning electron microscopy, have not only destroyed the samples in the process of evaluating them, but also have not seen any microscopic effects for a year.

As a nondestructive, noncontact technique, DBAR is not only revealing paint changes within a year, but it also can be used to study the same sample over time, to determine the sequence of structural changes that paints undergo as they weather.

"So far, we have concluded the surface of paint and transparent binder film suffer about the same effects due to weathering, but that the pigment in the paint reduces the penetration of weathering into the paint," concludes Lynn. "A determination of the nature of changes in the paint — that is, whether they are free-volume changes or chemical changes — has not been accomplished by these initial studies, but useful information on this aspect will be forthcoming in future work."

Until all the paint-failure results are in, adds Lynn, "We all have one more excuse not to paint the house."

— Marsha Belford

Stockroom Closings

All Supply & Materiel Division (SMD) stockrooms will be closed for inventory on Thursday and Friday, September 15 & 16. Please make all necessary stock withdrawals prior to 3 p.m. on Wednesday, September 14, to give SMD sufficient time to prepare for the inventory.

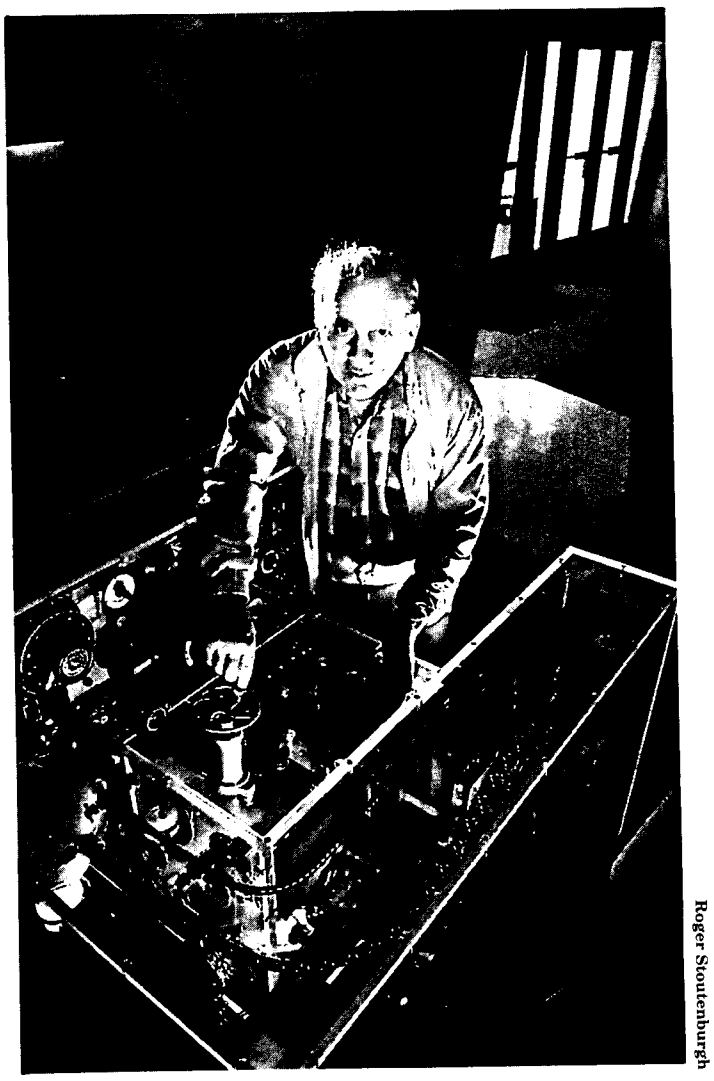
Process emergency requirements through John Scharpeger, Ext. 2974.

In Memoriam

Joseph L. Henriques, who retired from the Chemistry Department as a technical associate II on August 31, 1986, died on June 2. He was 71 years old. He had started at BNL on November 4, 1963, as a machinist in the Central Shops Division.

New Sculpture Turns Spectators *On-On-On*

The latest arrival to be *On-On-On* -going in Berkner Hall lobby is a fascinating sculpture by Stephen Rueckert. The sculptor himself, however, is no newcomer to BNL, as those who saw his previous work, *Standard Model (abandoned)*, which was exhibited in Bldg. 1005 in 1989, will remember.



Roger Stoutenburgh

Andy Brizzi, a contractor working on the RHIC Project, is one of the many spectators intrigued by Stephen Rueckert's *On-On-On* sculpture on view in Berkner Hall lobby.

The present piece, *On-On-On*, was commissioned by the Public Art Fund for Metrotech Plaza in Brooklyn, where it has been on exhibit since 1993. Measuring about two meters square by one meter high, it is made up of four consoles, or workstations, arranged in a grid and mounted on painted steel bases. Each console's uniquely attractive composition of different materials draws the spectator into an interactive role. Bold spirits who try out the intriguing array of knobs and dials will find that lights flash, wheels spin and clocks go round.

Said Rueckert, "I wanted to make people aware of the *look* of science — the *surface* beauty, both visual and textual, of past and present science and technology. Even if you don't understand the implications, there's an excitement in a scribble of numbers glimpsed on a scientist's blackboard, or in a bunch of knobs that control some complicated machine. When people see *On-On-On*, I hope they become aware of that excitement."

In fact, much of the sculpture's concept originated during visits to BNL in the late 1980s, when Rueckert was working on, then exhibiting *Standard Model (abandoned)*, before it was moved to the Tomoko-Liguori Gallery in New York in the fall of 1989.

For example, massive concrete blocks stacked up to shield high-energy physics experiments inspired the form of one of the four consoles.

Said Rueckert, "The blocks are so huge and heavy, with their own beauty, and they are in such strong contrast with the incredibly small energetic subatomic particles in the experiments. The impression they had on me became an integral part of this work."

Rueckert, who graduated with a BFA in sculpture from the Rhode Island School of Design in 1975 and studied at the Ecole des Beaux Arts in Paris in 1979, has drawings in the permanent collections of the Metropolitan Museum of Art, New York City, and the Brooklyn Museum. As proprietor of Sculptural Engineering, Rueckert also provides welding services for other artists and for displays, such as a recent full-scale reproduction of the *Tyrannosaurus rex* skeleton from the American Museum of Natural History.

— Liz Seubert

BNLers Rewarded for Helpful Ideas

You may not know it, but you may be enjoying the benefits of suggestions made through the Employee Suggestion Program by concerned BNLers, such as the following four employees who have been awarded cash prizes for ideas that will save BNL more than $2,000 per year, and increase Lab safety and services.

Steve Kemp, a technical associate in the National Synchrotron Light Source (NSLS) Department, has been awarded a total of $150 for two recent suggestions. His first, which earned him $100, was to conserve energy at the NSLS by using energy-efficient fluorescent lamp adapters, photocells, timers and occupancy sensors, and to eliminate unnecessary high-pressure sodium fixtures.

His second idea was for a volunteer Interpreter/ Translator Registry Network at BNL to serve non-English speaking visitors, new experimenters and BNL employees. The service includes first verbal contacts and short translations.

The Technical Information Division has incorporated this idea into the INFORM program, a database of information about the Lab that can be accessed on the Internet. To access INFORM, telnet to "suntid.bnl.gov" and at the log-in prompt, type "inform" in all capital or all small letters. The Translator/Interpretor database is option 14.

Lists of registry volunteers, both active and retired employees, are currently available in the NSLS User Administration Office, Bldg. 725; the Office of Scientific Personnel, Bldg. 185; the Public Affairs Office, Bldg. 134; and the Office of Educational Programs, Bldg. 438. So far, the list includes 27 people with some expertise in reading, writing or speaking a total of 19 languages. Additional volunteers are welcome.

Kemp said he recognized a need for this service when he found in a library book what appeared to be an old birth or marriage certificate written in a foreign language. He eventually found Eva Bozoki, a physicist at the NSLS, whose translation assistance helped Kemp get the birth certificate back to its Czech owner.

Andrew Como, a computer analyst for the Computing and Communications Division, also had an idea for increasing communication within the Lab. He suggested a "Rumor Hotline," a voice-mail line that people could call to ask questions about any rumors they have heard concerning the Lab.

The Hotline, which was put into service last year, is available by dialing Ext. 2751, or "ASK1." Rumors are recorded and a member of the Public Affairs Office finds out the facts and returns the call, keeping the caller's name completely confidential.

Roger Stoutenburgh

Andrew Como calls the Rumor Hotline — ASK1 — initiated as a result of his suggestion.

Como was awarded $50 for his suggestion.

David Elling, a technical associate for the Department of Applied Science, was worried about pedestrian safety in front of Berkner Hall on Brookhaven Avenue. So he suggested putting up signs to make motorists more aware of the crosswalk, which is at the top of a rise in the roadway and not readily seen until motorists are almost upon it.

Elling's concern won him $25.

David Bingham, a reactor operator at the High Flux Beam Reactor, has been awarded $200 for reducing radioactive waste.

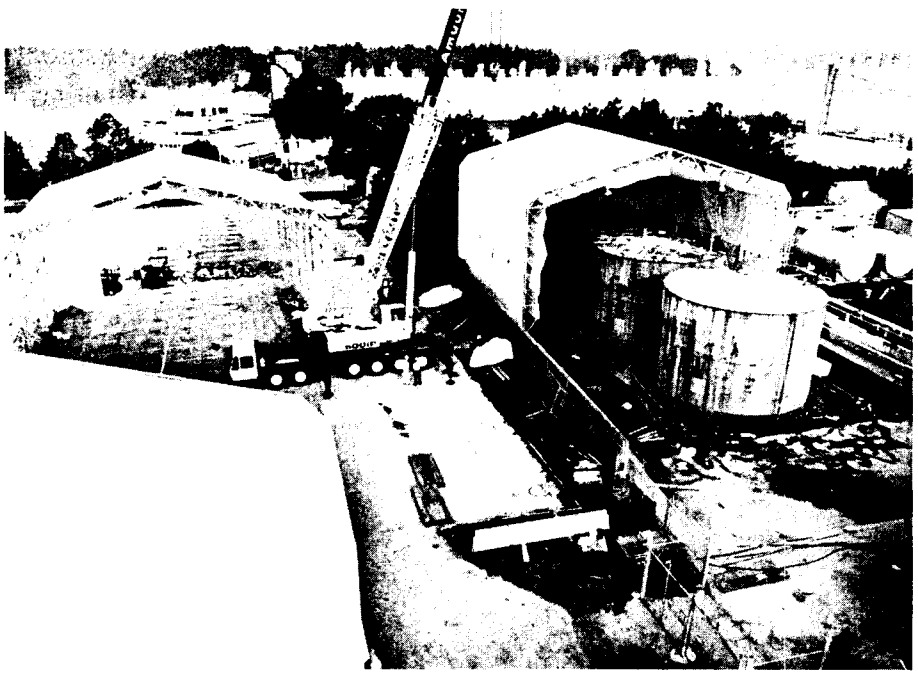
Condensate collected from the reactor's primary cell coolers requires special processing prior to disposal because of its radioactive content. Bingham suggested that the condensate be added to existing radioactive water in the canal, eliminating the need for further processing. His idea will save the Lab $2,000 annually.

"The idea coalesced over an amount of time," Bingham said. "Sometimes we just overlook the obvious because the established procedures worked so well and were within EPA guidelines. My idea was just a different way of looking at the problem."

Forms for employee suggestions are available from department or division offices, the Personnel Office or at the Cafeteria. More information can be found in the Employee Suggestion Program section of the Employee Guide, or call Karen Adelwerth, Personnel Division, Ext. 4262.

— Georgia Moore

The Big Top Goes Up



Roger Stoutenburgh

In preparation for the environmental remediation project discussed in the Bulletin of August 12, a large tent-like containment structure was erected in three pieces in the parking lot at Fourth Avenue and Thomson Road last week, then set in place over the three large tanks at right by a giant crane. With the tent and filtration systems in place, potentially hazardous dust from the dismantling and packaging of these three and six other radioactivity-contaminated tanks will be contained. The project is being carried out by ENSR Remediation and Construction for BNL's Office of Environmental Restoration.

Seminar (cont'd)

the distances between them shrink. This method is based on the use of different colored fluorescent tags to mark the sites of different sequences before the DNA is packaged in the condensed form found in chromosomes.

Barbara Trask earned her B.S. in wildlife ecology and M.S. in biology at Purdue University, in 1975 and 1977, respectively. She then moved on to Leiden University, The Netherlands, where she earned a doctoraal (M.S.) degree in biology in 1979 and a doctorate (Ph.D.) in medicine in 1985. While there, she was a research scientist at the Radiobiological Institute TNO in Rijswijk, from 1979 to 1985. She was also a visiting scientist at Los Alamos National Laboratory during 1982-83, and at Lawrence Livermore National Laboratory (LLNL), 1983.

In April 1985, Trask joined the LLNL staff as a biomedical scientist. She left in September 1992 to assume her present professorship at the University of Washington School of Medicine, where she is one of ten specially selected faculty members in a new department headed by Leroy Hood and funded by Bill Gates, founder of Microsoft Corporation. In the April 8, 1994, issue of *Science* magazine, the facility is described as "a new breed of academic department in which physicists, engineers, chemists, and computer scientist would work side-by-side with biologists to develop the technology that Hood believes will revolutionize biology in the 21st century."

To join the speaker for lunch in Berkner Hall or for dinner at the Port Jefferson Country Club at Harbor Hills, at $16 per person, contact Eva Bozoki, Ext. 3701, or Iris Mastrangelo, Ext. 3387.

BROOKHAVEN BULLETIN

Published weekly
by the Public Affairs Office
for the employees of
BROOKHAVEN NATIONAL LABORATORY

ANITA COHEN, Editor
MARSHA BELFORD, Assistant Editor

Bldg. 134, P.O. Box 5000
Upton NY 11973-5000
Tel. (516) 282-2345; Fax (516) 282-3368

Potluck Picnic

On Saturday, September 10, the Plant Engineering Division invites all BNLers and their families to the Recreation gazebo by the softball fields for an end-of-summer potluck picnic and get-together. Rain or shine, it will take place from 1 to 6 p.m.

Picnic-goers are asked to bring enough food to share at the potluck table, and their own picnic, party and play supplies. No extra cost is involved.

For more information, call Rich Scheidet, Ext. 5284.

The Early Bird Gets . . . A Digitized License Photo?

The New York State Department of Motor Vehicles (DMV) will bring its high-tech instruments to BNL, Monday through Wednesday, September 12-14 — but not to do scientific research. Instead, the DMV will be taking digitized photos of BNLers who wish to be "Early Birds" and avoid having to go to a DMV office when their drivers' licenses are due for renewal. The photos will be kept on file in a DMV computer so that renewals or replacements can be done by phone or mail.

Two teams of two DMV employees each will visit a total of 12 areas around the Lab site to take photos and give eye exams; no fee is involved. Bring your current photo license (that is, if you don't already have the new license with a digitized photo and magnetic strip on the back) or non-driver ID card. A complete list of dates, times and locations will be sent to all employees this week. For more information, contact Bob Kelly, Personnel Division, Ext. 3782.

Software Demo

On Thursday, September 8, at 3 p.m. in the CCD seminar room, Bldg. 515, Amdahl Corporation will present three topics: A+ Solaris for SPARC servers, Disk Array RAID 1, 3 & 5, and the performance management tool OpenTune for SunOS and Solaris. For more information, contact Ed McFadden, Ext. 4188.

Arrivals & Departures

Arrivals

None

Departures

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

Pingyun Chen ..... Chemistry
Wendy Lynn Schaffer ..... Physics
Melvin Schwartz ..... Dir. Off.
Michael R. Torres ..... Comp. & Comm.
Hong Zhang ..... Biology

Money Talks: Series Begins With Retirement, Financial Planning

To help employees plan for their financial security, the Personnel Division has established a new lecture series. Entitled "Money Talks," the new series will cover the gamut of personal finance, from basic budgeting, to buying a house, to saving for your children's college education, to planning for retirement.

On Thursday, September 8, the first Money Talks lecture, entitled "Retirement Overview," has been scheduled to be presented twice, at 9:30-11 a.m. and again at 1:30-3 p.m., in Berkner Hall. Representatives from TIAA-CREF, Fidelity and Vanguard will discuss their funds, fees and performance, as well as asset allocation at various stages of life. Representatives will also be available in the lobby from 9:30 a.m. to 3 p.m., so employees may stop by for pamphlets and informal discussions.

The second seminar in this new series will cover financial planning and income options for retirement. It is scheduled for Wednesday, September 21, from noon to 1 p.m. in Berkner Hall, and more information will be announced in the Bulletin of September 16.

Employees who wish to attend these seminars must obtain their supervisors' approval. For more information about Money Talks, contact Denise DiMeglio, Ext. 2881.

Sock Hop Sold Out

Wake up, little Susie — tickets for the September Sock Hop, from 7:30 to 11:30 p.m. on Friday, September 9, in the North Ballroom, are sold out. But the BNL Ballroom, Latin & Swing Dance Club has established a waiting list of those who pressed their poodle skirts, polished their saddle shoes — but didn't yet buy their tickets.

To get on the waiting list or turn in already-purchased tickets, contact Gwyn Williams, Ext. 7529, Bldg. 725D.

Weight Watchers

Registration for the next 12-week session of the on-site Weight Watchers group will be held on Wednesday, September 7, from noon to 1 p.m., in the Tap Room of the Brookhaven Center. For more information call Mary Wood, Ext. 5923.

Cafeteria Menu

Monday, September 5 — Labor Day	
Snack bar service - 9 a.m. to 2 p.m.	
Tuesday, September 6	
Soup: Chicken noodle	.90/1.20
A la Carte: Sausage & pepper calzone	3.50
Fitness: Macaroni & cheese	3.65
Deli: Virginia ham	3.20
Grill: Denver omelet	3.30
Wednesday, September 7	
Soup: Sausage & pasta minestrone	.90/1.20
A la Carte: BBQ spareribs	4.25
Fitness: Spinach & feta quiche	3.65
Deli: Roast beef	3.20
Grill: Meatball hero	3.30
Thursday, September 8	
Soup: Tomato & rice	.90/1.20
A la Carte: Bonnie's chicken	3.85
Fitness: Pork chops	3.85
Deli: Corned beef	3.20
Grill: Ham & cheese	3.30
Friday, September 9	
Soup: New England clam chowder	90/1.20
Display Cooking: Grilled chicken Caesar	4.65
Fitness: Pasta primavera	3.65
Deli: Roast turkey	3.20
Grill: Tuna melt	3.30

Deli, burger and other specials daily.

Hospitality News

The next Hospitality Committee get-together will be Tuesday, September 6, at 9:30 a.m., in the lounge of the Recreation Building. This informal meeting will be a good time for newcomers in the apartment area to meet their neighbors. Future activities will be discussed, so bring suggestions.

Spouses of Lab employees and guests are welcome. Bring the children, but also bring a toy or two. Coffee and cookies will be served.

Volleyball

It is time to organize teams for the 1994-95 BERA Volleyball season. While last year's captains have already received their roster forms, those interested in forming new teams may obtain forms from Rick Wagener, Ext. 5886 or E-mail wagener@bnl.gov, or Terry Sullivan, Ext. 2840 or E-mail sulliva1@bnl.gov. Bring completed forms to the first captains' meeting on Wednesday, September 14, at noon, in Berkner Hall.

To be included in a players' pool, those interested in playing, but who are not yet on a team may also contact Wagener or Sullivan. There is a league for every player's skill level, and women are especially encouraged to join the fun.

Pool & Gym Schedule

The pool will be closed for the Labor Day weekend, Saturday, September 3, through Monday, September 5. It will reopen and resume fall hours on Tuesday, September 6, as follows:

Monday through Friday

11 a.m. - 1:30 p.m.	employees only
1:30 p.m. - 2 p.m	reserved for speed swimming and training
5 p.m. - 9 p.m	employees, families guests

Saturday and Sunday

1 p.m. - 5 p.m.	employees, families, guests

The gymnasium will resume Saturday hours on Saturday, September 10, when it will be open from 10 a.m. to 5:30 p.m. for general activities.

Note to Diners

With the Lab closed on Monday, September 5, for Labor Day, food services will be affected as follows:

- The **Cafeteria** snack bar will be open from 9 a.m. to 2 p.m., Saturday through Monday, September 3-5.
- The **Tap Room at the Brookhaven Center** will be closed Sunday, September 4, but will reopen from 5 to 9 p.m. on Monday.
- The **vended food service** in Bldg. 912 will be in operation all weekend.

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.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees.

DD 2789. ELECTRICIAN A - Under minimum supervision, will lay out, construct, install, maintain, repair and operate electrical systems, equipment, controls and related devices. Plant Engineering Division.

DD 2790. PLUMBER A - Requires substantial commercial/industrial experience. Under minimum supervision, will lay out, construct, install, repair and maintain water, sewage and gas systems, related facilities and auxiliary equipment. Plant Engineering Division.

DD 5548. COMPUTER SECURITY POSITION - Requires a BSCS or equivalent, MS preferred, and several years' experience providing system administration and security support for UNIX systems in a networked computer environment. Must have experience in UNIX and C and in testing, installing and monitoring security products across multiple architectures, as well as planning and administering a site-wide technical security program. Must be able to obtain and maintain a security clearance. Computing & Communications Division.

DD 3066. SECRETARIAL POSITION - (part-time) Requires an AAS in secretarial science or equivalent experience, excellent communication skills and demonstrated organization skills. WordPerfect 5.1 and IPAP/JCARS experience also required. Will provide varied secretarial support, including producing publications, proposals and correspondence, and arranging travel. Department of Applied Science.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside candidates.

DD 2791. PLUMBER A - (temporary position) Requires substantial commercial/industrial experience. Under minimum supervision, will lay out, construct, install, repair and maintain water, sewage and gas systems, related facilities and auxiliary equipment. Plant Engineering Division.

MK 2414. LICENSING SPECIALIST POSITION - Requires an advanced degree in a related discipline and significant experience in marketing and licensing scientific technologies. Will be responsible for evaluating Laboratory technology, developing and implementing strategic plans for the transfer of scientific technologies to the private sector, performing market analyses for commercial applications, and negotiating patent-licensing agreements with the private sector. Office of Technology Transfer.

LS 2770 HEAVY EQUIPMENT MECHANIC OPERATOR - Will maintain, operate and repair all material-handling, earth-moving, road and ground maintenance and similar equipment, including complete repair and maintenance of gasoline and diesel engines and the use of required machine tools. Experience in crane operation is desirable. The ability to obtain and maintain a valid Class 1 driver's license is also required. Plant Engineering Division.

Motor Vehicles & Supplies

92 DODGE SPIRIT ES - V-6, 4-dr., air bag, all power, alarm, 4 wheel disc brakes, $10,000. Harvey, 281-7568.

91 MAZDA NAVAJO LX - blue/gray, 4wd, 5-spd., 72k mi., excel. cond., $13,500. Pete, Ext. 4028.

90 DODGE CARAVAN SE - blue, 36k mi., excel. cond., $8,300. Obelix, Ext. 4014.

90 DODGE SHADOW - 83k mi., 4-dr., driver-side air bag, am/fm, ac, excel.. $4,000. Jeanne, Ext. 7722.

89 T-BIRD LX - all power, digital dash, sunroof, loaded, $5,300. Camille, 325-1756.

89 VW CABRIOLET - convertible, ac, a/t, Blaupunkt, 68k hwy. mi., excel. cond., $8,750. 821-0686.

87 PLYMOUTH SUNDANCE - 67k mi., well maintained, 2-dr., driver's door needs repair, $3,000 neg. Wayne, Ext. 7238.

87 HONDA ACCORD LX - 5-spd., ac, 4-dr., all power, 82k mi., orig. owner, $4,400. 286-0384.

87 VW VANAGON - Wolfsberg Edition, 55k mi., am/fm cass., seat folds to double bed, built-in table, asking $5,000. Ron, Ext. 4104.

87 PLYMOUTH VOYAGER MINI VAN - 4-cyl., a/t, ac, cruise, folding bed, new tires, battery, brakes, body excel., $3,900. Bob, Ext. 4637.

86 SUBARU XT - turbo, 4wd, 5-spd., ac, sunroof, low mi., $3,300. Phil, 281-2907.

86 MONTE CARLO S.S. - a/t, p/s, p/w, high mi., as is, $3,800. Clarence, 281-0586 after 5:00 p.m.

86 MITSUBISHI GALANT - 4-dr., full power, ac, at, sunroof, cruise, 15" wheels, excel. cond., $2,500. Ext. 2673 or 473-6546.

86 PONTIAC GRAND AM - p/s, p/b, ac, p/w, am/fm stereo cass., new tires, runs well, $1,500 neg. Andy, Ext. 3572.

85 NISSAN STANZA - a/t, 4-dr., p/s, p/w, new CVJs, muffler, good body, runs well, $2,800. 689-5062 eves.

84 OLDS DELTA 88 ROYALE - 4-dr., V-8, a/t, p/s, p/b, a/c, cruise, new exhaust & tires, good cond., asking $1,700. Yujie, Ext. 3983.

83 FORD F250 - p/s, p/b, a/t, cap w/camperette, custom wheels, excel.; '87 351 engine. 585-7780.

83 OLDS WAGON - 9-pass., V-8, p/equipment, CB, 135k mi., burns no oil, runs well, $1,350. Danby, Ext. 4684 or 929-4530.

82 CHEVY MALIBU CLASSIC - looks good, runs well, new paint, asking $700. Kathy, 924-1590.

82 HONDA CIVIC WAGON - 4-dr., 5-spd., am/fm, 120k mi., runs well, $1,000, Valerie, Ext. 5881, leave message.

82 CHEVY CHEVETTE - 4-spd., 4-dr., runs well, reliable, $500. 924-8213.

82 CADDY - coupe, burgundy, good cond., $1,800. Bert, Ext. 5156 OR 581-4436.

81 LINCOLN TOWN CAR - Signature, excel. cond., must sell, best offer. Ext. 4663.

81 BUICK REGAL - 125k mi., new shocks & brakes, runs well, $1,200. Steve, 286-1474 after 6 p.m.

81 FORD GRANADA - 6-cyl., good station car, $700. Ext. 2816 or 878-0480 eves.

80 FORD F-150 - white, 4wd, good work truck, $1,000 or best offer. Pete, Ext. 4028.

78 BMW 320 - parts car, $200. Jarred, 728-5122.

76 OLDS STARFIRE GT - 88k mi., 4-spd., V-6, best offer. John, Ext. 2913.

69 FLEETWOOD CADILLAC - collector, orig. owner, 69k mi., excel. cond. Charlaine, 924-4258.

69 MUSTANG - convertible, 6-cyl., 3-spd., am/fm cass., recent top, tires, brakes, shocks & exhaust, $4,800. Tirre, Ext. 3288 or 281-0360 after 6 p.m.

66 DODGE CHARGER 383 - a/t, restorable, parts, $800. Bob, 281-5210.

63 CHEVY II - 4-dr., s/t, orig. ownr, $950. Dick, Ext. 7185 or 744-6794.

RACK - for pickup truck, new, $275. Roy, 727-6714.

ROOF RACK - gutter-mount HD, v.g. cond., asking $15. Jan, 929-4522.

TRAILER HITCH - Class III, Draw-Tite model, removed from Dodge, $20. Don, Ext. 7237 or 744-2921 after 5:30 p.m.

TIRES - 2, F78x14", decent cond. 924-6751.

CAMPER - pop-up, needs new canvas, sleeps 6, refrig., extras, good cond., $300. 924-2298.

TIRES - P225X75R14, 2, excel., $40/ea. 698-9274.

Boats & Marine Supplies

28' CARVER - 1990 twin 305 Crusaders, 144 hrs., fully encl. bridge, trim/tabs, swim platform w/shower, p/windlass, head/shower, $49,900. John, 929-4450.

23' AUX KETCH - centerboard, shallow draft, 6 h.p. ob, sleeps 2, $1,500. Ext. 3749 or 286-5897.

21' RENKEN - 1980 c.c., FWC, 140-h.p. Volvo Penta, trim tabs, trailer, p/winch, $3,200; Formula, '70s, $800; trailer. Patrick, Ext. 5377.

16' STARCRAFT - 35-h.p. Evinrude, Cox galvanized trailer. 325-0447 after 6 p.m.

Furnishings & Appliances

BED - queen-size, brand-new, not used, Sealy Posturepedic, box & frame. 732-0432 after 10 p.m.

BED - adjustable, w/massage; large sectional sofa; maple secretary; 20" jigsaw; stationary bicycle; metal chairs; accordian; tables; best offers. 286-0478.

BEDROOM SETS - sectional sofa, love seat, tables, chairs, TV, more. 924-4927.

BLENDER - Waring, 14-spd., new, in box, $20. Stephen, Ext. 4477.

BOXSPRING - brand-new, twin, never used, $30. Diana, Ext. 3681 or 399-3910.

CHINA CABINET - mahogany, excel. cond., 50 yrs. old, glass front, $300. Steve, Ext. 3572.

COUCH - tables, lamps, chairs, hi-riser, dresser, mirrors, wine rack, TV, radio, etc.; refrigertor, freezer, 16', Sears, $50. Allen, 581-2961.

DINETTE SET - wood table, 6 chairs, excel. cond., $125. Marge, 758-0650.

DINING ROOM - contemp., china closet, table, 4 chairs, good, $100. Linda, Ext. 2733 or 878-8491.

DINING ROOM CHAIRS - 4 ladderback, country Fr., light pickled finish, rush seats, $800. 473-2473.

DINING ROOM TABLE - white Formica, drop-in leaf, 6 swivel armchairs, $150. Don, Ext. 7237 or 744-2921 after 5:30 p.m.

DINING ROOM - contemp., table, 6 chairs, hutch, excel. cond., $300. Marty, Ext. 2214.

DINING ROOM TABLE - 6 chairs, sliding gears, 2 leaves, pedestal base, v.g. cond., $300. Tim, Ext. 4630 or 878-3947.

DISPLAY UNIT - brass, arched, 3 glass shelves, 33"W x13"Dx70"H, excel. cond., $35. 543-4820.

FLOOR LAMP - brass, 5 bulbs, w/white calla lilly covers on each bulb, contemporary, like new, $40. 345-5365.

LIVING ROOM SET - dining room set, bedroom set, etc. 286-1571.

LOVE SEAT - brown, excel. cond., arm pillows, arm protectors, used 1 yr., $150. Ext. 3872.

MICROWAVE OVEN - med., size, good cond., $65. Monica, Ext. 5455.

REFRIGERATOR - Fridgidaire, 12 cu. ft., $150. Mike, 331-1485.

REFRIGERATOR - GE, 18 cu. ft., light cream color, excel. cond., $125. John Toner, 543-7065.

REFRIGERATORS - 1 GE, $75; 1 Kenmore, $100, both clean, running cond. 474-8715.

REFRIGERATOR - 5 cu. ft., suitable for college dorm, $90. Pam, Ext. 7286.

SEWING MACHINE - JC Penny, embroidery stitches, zig zag, $50. Joe, 331-0945.

SHOWCASES - 6'-long, mirror doors, 4 shelves. Leo, Ext. 2952.

SOFA & LOVE SEAT - velour floral pattern, excel. cond., $200. Richie, Ext. 2175 or 734-7342.

VACUUM - $20; b&w TV, $20; microwave, $20; blue/white lamp, $20; kerosene heater, $20; redwood chairs. Kathy, 744-2203.

WASHER & DRYER - Sears, $300/both. Marty, 462-5230.

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

Tools, House & Garden

BELT SANDER - stationary, 6"x48", w/9" disk, cast-iron, like new, orig. $300, sell $175. Don, Ext. 5042.

PATIO FURNITURE - round table, umbrella, chairs, umbrella stand, $35. Allen, 581-2961.

PATIO TABLE - wrought iron, w/4 chairs, $200. Marty, Ext. 2214.

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

TARP - 20'x30', green, Northern Co., new, in package, orig. $42, sell for $30. John, 744-5867.

TOOLS - Shopsmith-MK5, used 20 hrs., bandsaw, jointer, lathe, duplicator, scroll saw, many extras, like new, orig. $2,000, sell for $1,000. Don, Ext. 5042.

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

Sports, Hobbies & Pets

BIKE - 20", girl's, pink, excel., $15. Roy, 727-6714.

BIKE - 21", boy's freestyle, great cond., orig. $280, asking $50. Ext. 5316 or 289-0034.

BIKE - 20". Redline, chrome frame, $65. 751-1884.

DIRT BIKE - Yamaha PW80, 1985, excel. cond., $550. Roy, 727-6714.

EXERCISE MACHINE - Sears, used very little, $25. Jack, Ext. 5442.

MEMBERSHIP - Jack LaLanne Olympic Gold, monthly dues $12, orig. $950., $400; skis, 180 cm, Olin Mark 3, bindings, w/brake, poles, $80. Beth, Ext. 4986.

PIANO - Cambridge, $400. Mike, 331-1485.

PUPPIES - Bichons, adorable, white, cuddly, AKC, champ lines, born 8/2. Caryn, 567-7813.

SKI BOOTS - San Marco, men's size 9-9½, red, front-entry, 4 clasps, excel., $65. Bob D., Ext. 5439.

SKIS - Olin, 180 cm, w/Salomon 444 bindings, runaway straps, $20 neg. Don, Ext. 7237 or 744-2921 after 5:30 p.m.

STEP WALKER - Cosco Sure, good, $10. 736-6993.

Audio, Video & Computers

CAMCORDER - RCA, VHS, low hours, case, zoom, $250. Ext. 5316 or 289-0034.

CAROUSEL - rotary slide trays, 35mm, good cond., $4/ea. Allen, 581-2961.

CASSETTE DECK - Pioneer, excel. cond., $15; b&w TV, $15. Tim, Ext. 4630 or 878-3947.

COMPUTER - Commodore Amiga 500, 2 disks, software, games, $275. Dick, Ext. 7185.

COMPUTER GAMES - Nintendo, Commodore games & equipment. Will, 473-6680.

MOVIES - VHS, orig., ten/$20; 924-7823 after 5:30.

SLIDE PROJECTOR - automatic, Airequipt model 380, $35. 924-4927.

SPEAKERS - new, Audiovox CX-15-60W peak power, 6" diameter, $15. Thomas, Ext. 2225.

TELEPHONE - cordless, Sony, w/speaker & intercom, good cond., $25. Monica, Ext. 5455.

TV - 13", Emerson, remote, almost new, half price, $125 firm. Jack, Ext. 5442.

TV - 27", color, J.V.C., programmable, cable-ready, $500; stereo system, Carver, 900 watts, amp, preamp, CD, speakers, $1,500. Bob, 281-5210.

TV - color, 20", stereo, remote, 2 yrs. old, RCA, $125. Joe, 331-0945.

VACUUM TUBES - misc. types, about 50, never used, in boxes, best offer. Warren, Ext. 2080 or 924-7552.

WOOFERS - 15", 175 watts, 350 peak, 70-oz. magnet, brand-new, asking $140/pair. 924-4927.

Miscellaneous

BABY'S BATH SEAT - $5; swing, $20; walker, $12; jumper, $5. 288-4267.

BABY CARRIER - $8; down bunting, size 6-18 mos., blue, $15; boy's clothing, size 12 & 18 mos.; Fisher Price infant seat, $10. 736-6993.

BABY SWING - Graco, battery-powered, w/cradle & seat, $35. Cindy, Ext. 3461 or 874-3652.

BEER CANS - whole collection, U.S. & worldwide, 280 cans, $125 neg. Tim, Ext. 4630 or 878-3947.

BRIEFCASE - leather, orig. $60, sell for $25. 368-6115 after 6 p.m.

CHANGE MAKERS - 3, new units, for $1 bills, asking $110, or three/$300. Jan, 929-4522.

CRIB - light oak, w/mattress, excel. cond., $125. Rich, Ext. 2386 or beeper 0713.

CRIB - Child Craft, Chesapeake oak, w/mattress, excel. cond., $150. 929-3235.

DRAFTING TABLE - wood, good cond., rubber pad for top, $50. Beth, Ext. 4986.

JACKET - silver fox, size med., new, orig. $600, asking $200. Ext. 3872.

POSTSCRIPT CARTRIDGE - language emulation, for Hewlett Packard, $75. Mike, Ext. 5046.

STROLLER - duo, great cond., $50. Diana, Ext. 3681.

TICKETS - Kenny G., Jones Beach, Sept. 9, $120. Jim Lacy, Ext. 2138.

TRANSPORTATION VOUCHERS - American Airlines, some time restrictions apply, worth $734, will sell for $500. Dave, 475-7891.

Free

KITTENS - good home needed, female Persian & male DSH, 5 mos. old. Mike, 369-3307.

RANGE/OVEN - G.E., 30", electric, havest gold, 15 yrs. old, excel., Nutone range exhaust hood, 2 spd./light. Mike, Ext. 7941.

23' THUNDERBIRD - f.g. hull w/cuddy cabin, excel., no motor, no trailer, you haul. 281-1832 eves.

Yard & Garage Sales

WADING RIVER - Sat., 9/3, 10-5 p.m., 274 Long Pond Rd.

Car Pool

LIE EXIT 43 - 4th driver needed. Elliott, Ext. 2495 or Barbara, Ext. 5175.

HUNTINGTON - 4th driver needed. Jim, Ext. 7513.

Wanted

APPLES - I'll pick up any unwanted apples from your tree, any condition, for wildlife. Marty, Ext. 3749.

BRITISH VCR - PAL make, w/record & play, rent/buy. Dave, Ext. 5460.

CARS - that need body or engine work, reasonable, prefer 1985 or later. Mike, Ext. 3682 or 341-1086.

CARS, TRUCKS & MOTORCYCLES - reasonable. Bill, 467-1343.

COTTAGE - in Blue Point-Bayport-Sayville area, for mature working woman to rent. Barbara, 363-8152.

HARDTOP - for 88 Jeep Wrangler. Ext. 2831.

KEYBOARD - XT, cheap. Bob, 369-0943.

LOVING HOME - for chow chow pup, 10 wks., male, housebroken, great watch dog, good w/older children. Ext. 3426.

OWNER'S MANUAL - for '89 Dodge Shadow. Joe, Ext. 2898.

PEOPLE - West Point bus trip, Sat. 11/5, Army vs. Air Force, leave BNL at 7 a.m. Ron Yuhas, Ext. 4144.

TANK - fuel-oil type, 250 gal., making a barbecue, will haul. Fred, Ext. 7947 or 588-2268.

TIRES - good cond., all weather, P205/75R14. Susan, Ext. 7647.

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.*

BABY-SITTING - responsible mother will care for your child, in my home, ages 3-5, big playroom, 5 mins. from Lab. 345-6724.

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

CHILD CARE - many years experience, very dependable, raised own children, Lab refs., 15 min. from Lab, my Holtsville home. Joan, 472-3254.

CHILD CARE - Islip area, refs. Ingrid, 277-7312.

CHILD CARE - experienced mom will care for your infant in her Ridge home, refs., one-on-one attention given. Judy, 924-9332.

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

COMPUTERS - have a computer or need a computer, need help w/your programs, call me, good prices, patient. Steven, 698-5260.

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

ELDER CARE - on weekends in their home, I give TLC and stay overnight, a break for the family, reasonable. Susan, 286-4225.

ELDER CARE - personal and financial management programs. 399-5677 or 473-6432.

ELECTRICIAN - outlets, switches, lighting, repairs, service upgrades, additional circuits installed, lic., ins. Steve, 758-7002.

FINANCIAL - evaluations, retirement planning, insurance programs, tax savings. Rich, 744-4816.

PAINTED FINISHES - marbeling, ragging, sponging, combing, graining and murals on floors, walls, ceilings and trim. Philip, 286-1348.

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

HOME IMPROVEMENT - carpentry, drywall, spackling, painting, plumbing, ceramic tile, storage sheds, free est., Lab disc. Don, 744-2921.

KAYAK LESSIONS - touring, river playboats, $85/5 hrs., equip. supplied, intro to kayaking, 2 hrs./$30. Ernie, 281-7873.

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

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

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

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

NUTRITIONAL COUNSELING - body-fat analysis, weight training, martial arts. Dan, 546-2947.

PAINTING - int./ext., drywall work, plaster repair, staining, varnish, custom painting, window glaze, caulking, appliance spray. 929-5524.

PAINTING - int./ext., Sheetrock, tape spackle, wallpaper, power wash, stain, ins., refs. James, 399-4912.

PAINTING - int./ext., reasonable rates, odd jobs, done cheap. Frank, 399-4480.

PAINTING - drywall installation, spackle, stain, int./ext., power wash, bleach, mildew control, reasonable. Scott, 325-0706.

PARTY FAVORS - chocolate, bridal and baby shows, weddings, birthdays, etc. Cathryn, 821-7327.

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

PARTY TENTS - we set up & take down. Fred Kuehl, 588-2268.

PIANO LESSONS - all levels, all ages, Shoreham-Wading River area. Patti, 929-8277.

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

SHEETROCKING - & spackling, free est. 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.

TRAINING - personal computer applications, accounting, word processing, Windows, DOS-based. Gina, 929-3649.

TREE CUTTING - Bobby, 399-5677.

TYPING - resumes, term papers, correspondence, etc., Laser Jet quality printing. Cathryn, 821-7327.

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

In Appreciation

Carol and I would like to thank our friends at NSLS for your warm and caring thoughts during this time of mourning. — Bob & Carol Harrington

We appreciate our BNL friends' acts of love & sympathy following the passing of our mother/grandmother. — M. Johnson, M. Banks & C. Bell

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