BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

HFBR: 30 Years Later, Neutrons — and Science — Keep Coming

For 30 years, the gray dome of the High Flux Beam Reactor (HFBR) has been BNL's most recognizable landmark, rising above the landscape atop Rutherford Hill. But it's what has happened underneath that dome that has made the HFBR famous — world-class studies of some of nature's most intriguing phenomena, materials and molecules.

Those experiments were conducted at a research reactor whose original, patented design is still truly unique and still copied for its remarkable thermal neutron delivery and safety. The investigations pursued under the dome have contributed to humankind's understanding of nature's intricacy and to many useful applications.

With the reactor's 30th birthday coming on October 31, the Bulletin salutes the HFBR's past accomplishments, current prominence and future promise.

The Reactor Itself

The anniversary celebrated on the 31st actually marks the day on which the HFBR first achieved a self-sustaining nuclear-fission chain reaction, or criticality.

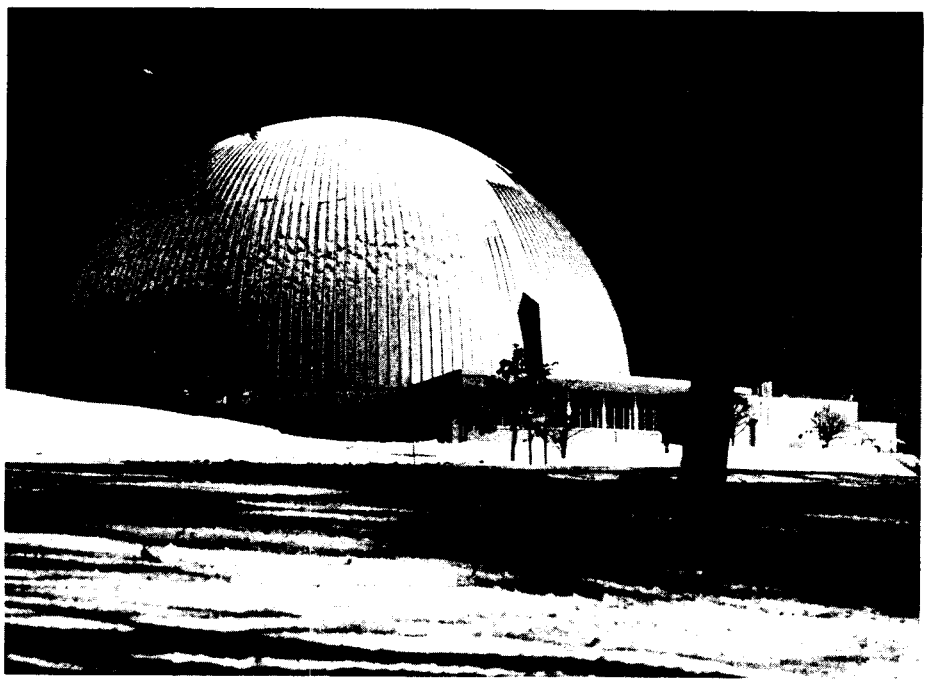
On that day, its uranium-235 fuel elements began emitting neutrons toward the moderating layer of heavy water that surrounds the core. While this ingenious design allows enough neutrons to be reflected back onto the core to keep the reaction going, most are slowed down in the moderator and enter nine horizontal beam tubes.

From there, the neutrons travel out to the experimental floor and make their way along beam lines to 15 experimental stations. Some neutrons are also put to work irradiating samples that are fed from the top level of the reactor into the core area through long tubes called thimbles. Though its power level is 100 times less than that of nuclear power reactors, the HFBR's core provides scientists with beams of relatively low-energy neutrons, with energies around 1/40th of an electron volt, that can probe deep into materials, revealing much about their inner structure and dynamics.

The HFBR was designed at BNL under the leadership of Donald Hughes and patented by Lab scientists Jack Chernick, Kenneth Downes, Julius Hastings, Herbert Kouts and Joseph Hendrie. Even today, the reactor stands alone for its nearly pure beams of thermal neutrons.

Several reactors, including those at the Institut Laue-Langevin in Grenoble, France, and Saclay, outside Paris, have been built using the same design, and Germany has announced plans for a similar reactor in Munich.

"You may ask, 'How can a 30-year-old reactor operate safely and with the maximum benefit for scientific users?'," said Mike Brooks, Deputy Associate Director for Reactor, Safety & Security. "Without a doubt, it's because of the inherently safe and efficient design of its core and auxiliary systems, and the vigilant watch kept by successive generations of scientists, engineers and technicians. The dedication of the reactor operators and supervisors toward safe operations has been our most important and reliable factor in operating the reactor safely since 1965."



The High Flux Beam Reactor

Three Decades of HFBR Science History

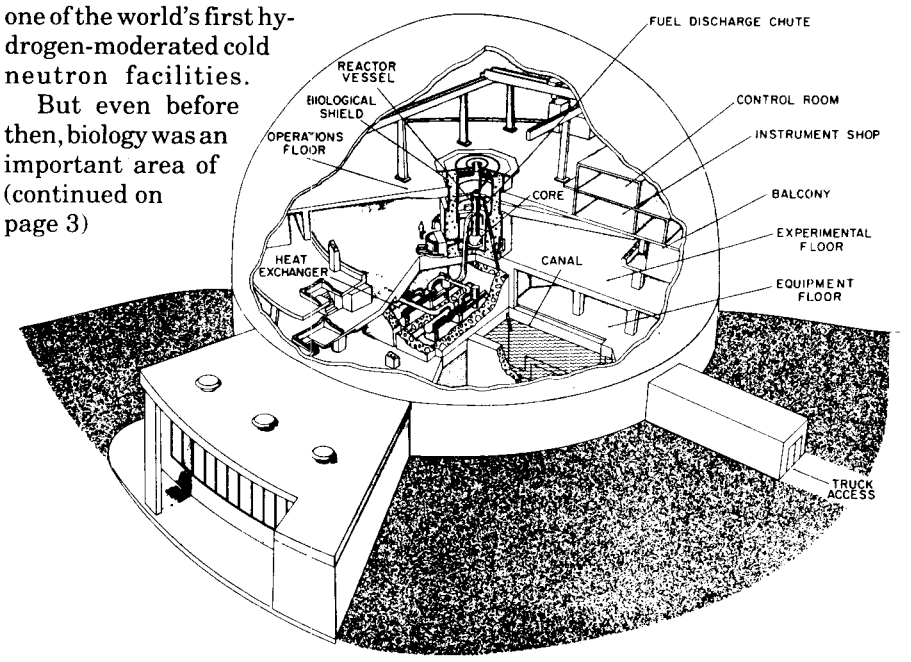
The HFBR was built from 1961-1965 as BNL's second large research reactor. It replaced its predecessor, the Brookhaven Graphite Research Reactor, which had begun operating in 1950. A much smaller reactor, the Brookhaven Medical Research Reactor, had been built to reach criticality in 1959.

From the very start, the HFBR's neutrons provided the means for discoveries in many areas, from nuclear and condensed matter physics to chemistry and biology. Here are some highlights:

• **Biology** — Neutrons, particularly thermal ones slowed even further to become "cold," make good probes for determining the structure of biological molecules. In 1980, the HFBR welcomed one of the world's first hydrogen-moderated cold neutron facilities.

But even before then, biology was an important area of

(continued on page 3)



A cutaway view of the HFBR, without many of the experimental-floor scientific stations where scientists use the reactor's neutrons.

Current Research

High-temperature superconductors, biological molecules, magnets and rare isotopes have all been studied at the HFBR during its three decades of operation. And studies of them continue today, albeit at a 1990s level.

Because of ever-increasing sophistication of neutron detectors made by the BNL Instrumentation Division and improved neutron guides, which conduct beams of neutrons much like fiber-optic cable conducts light, neutron science at the HFBR continues to improve.

Now, proteins can be studied as they sit within membranes, their natural "habitat." Scientists are also investigating polymer interfaces, which have applications as diverse as lubricants for computer hard disks and emulsifiers to clean up oil spills.

A newly constructed, high-resolution powder diffractometer permits rapid and routine determination of the structure of such materials as complex industrial catalysts.

In many cases, scientists can get complementary data on a single sample by using both the neutrons of the HFBR and the x-rays of BNL's National Synchrotron Light Source.

The HFBR's Future

Even as the 30th anniversary celebrations go on (see below, left), the HFBR's users and administration are looking to improve the reactor and keep it running for decades to come.

A proposal to increase the power to 40 megawatts (MW) from the current 30 MW is expected to be submitted to the U.S. Department of Energy later this year; this would greatly benefit users with increased neutron flux.

Even more ambitious is a plan, now in its early stages, for completely replacing the HFBR's reactor vessel, including its core and beam thimbles.

Although the current vessel has been determined to be in fine shape and has served scientists well, the new vessel design would feature repositioned beam thimbles to allow for higher neutron flux and improved neutron delivery to more instruments. This would permit an approximately 12-fold increase in the number of cold neutrons actually available for future neutron-scattering studies.

Celebrate the HFBR on November 4

To toast the HFBR on its 30th birthday, hundreds of neutron scientists and others who have made the reactor what it is today will gather in Berkner Hall on Saturday, November 4.

From 1 to 4:30 p.m., a special symposium, "High Flux Beam Reactor: Past, Present and Future," will feature talks by John Axe, Head of the BNL Center for Neutron Sciences; Robert Birgeneau, Dean of Science at the Massachusetts Institute of Technology; BNL Deputy Director Martin Blume; Donald Stevens, a former Director of Basic Energy Sciences for the U.S. Department of Energy; and John McTague, Director of Research at Ford Motor Company.

Following this will be a roundtable discussion, "High Flux Highlights: Recalling 30 Years at the HFBR," with a panel that includes HFBR designers Kenneth Downes, Julius Hastings, Joseph Hendrie and Herbert Kouts, as well as former Reactor Division Head Robert Powell and John Weeks, who advised on the alloys used to build the reactor vessel. Lab Historian Bob Crease will serve as moderator. Cocktails and dinner, for those invited, will follow at 6:30 p.m.

Even if you cannot make the festivities, be sure to check out the HFBR 30th Anniversary display in the Berkner Hall lobby, featuring photos and artifacts from the reactor's past and present.

Disabilities Month: Reflecting On the Law and the People

October has been designated "Disabilities Month" by the President's Commission on the Employment of People With Disabilities. In observance of this month, this week's Brookhaven Bulletin carries two stories on page 2:

One is an interview with three employees — two having disabilities at present and one who was disabled in the past — to understand their perspectives.

The second article explores the impact on Laboratory operations of the Americans With Disabilities Act of 1990, in discussions with members of two groups: the Diversity Office of the Human Resources Division, which assists the Lab in developing and maintaining a representative and diverse workforce, and in providing a workplace free of discrimination; and the Plant Engineering Division, which, in upgrading, maintaining and repairing the Lab's infrastructure, has ensured that improved access for the disabled is included in its renovations and new construction.

Some Personal Perspectives on Disabilities

"It has been said that being disabled is the only minority group that anyone can join at anytime, and, unfortunately due to accidents and illnesses, this is all too true," explains **Barbara Pringle**, an administrative assistant in the Contract & Procurement Division. Having contracted polio when she was two years old, Pringle is unable to use her left leg.

"I can't remember ever not walking on crutches, so I don't think about it and I don't miss walking unassisted," continues Pringle. "And, anyone who knows me stops seeing the crutches

Roger Stoutenburgh

Joseph Rubino

and doesn't consider me to be handicapped.

"My parents brought me up to be very independent, and they were very wise: They bought me all the things that the other kids had, so, even if I couldn't use them, I could say that I had them. Now that I'm older, I'm finding that I do have limitations, but, when I was growing up, I never thought of myself as disabled and never expected to be treated differently, only with the same courtesy and respect given other people.

"Though people mean well, they don't realize that, for the most part, I don't need their help. If they want to help me or anyone else, then the best thing they can do is first to ask — that is most appreciated."

Over her years at BNL, "I have been very fortunate in getting the understanding I need from the divisions I have worked in — for instance, if I couldn't get to a meeting, the meeting would be moved to me," she comments.

And, Pringle has noticed, "The Lab is becoming more and more aware of the general needs of handicapped people." However, as Pringle herself has noticed from the few days a month when her "aches and pains" require her to use a wheelchair, the insight of someone who actually requires crutches, a wheelchair or any other aid is invaluable in understanding what specific accommodations they require and how systems of accommodations, such as a handicapped parking spot, sidewalk lips and a ramp into a building, can best be combined.

Speaking of handicapped parking, if you are able-bodied, "Don't even think of parking there for a minute," commands Pringle, who at times considers herself to be a one-woman "handicapped patrol."

"After hiring a disabled person or if an employee becomes disabled, my recommendation to a supervisor is to ask what they need. Most people won't reveal a handicap at an interview because they are ashamed or afraid they will be discriminated against. But my experience has been that disabled employees work harder because we always think that we have to prove ourselves."

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"As they grow older, lots of people, if not everyone, experience hearing loss, but they may not notice it or want to admit to it," says **Joseph Rubino**, a senior PG&A specialist who works in the darkroom of the Photography & Graphic Arts (P&GA) Group of the Information Services Division.

Due to a progressive sensorineural deficit, he began losing his hearing as a youngster, but compounded the problem in his adolescence by playing bass guitar "up against an amplifier" in a rock band. Now, Rubino has lost 50 percent of his hearing in both ears, has problems distinguishing high and mid tones, is recommended to wear hearing aids in both ears to bring his hearing up to 80 percent, and, in his later years, faces the prospect of becoming deaf.

"When I was in elementary school, the teachers used to accuse me of not paying attention, but, when my mother noticed that I couldn't hear phones, clocks and other noises, the problem was discovered.

"Because I had my hearing, I know how to modulate my voice, so I don't speak in an overly loud fashion as many hard-of-hearing people do. Since I'm a soft-spoken person, many people never guess I'm hard of hearing.

"Since my work is visual, my coworkers didn't realize at first that I had a hearing problem because it is not a factor in my being able to do the job. To accommodate me, they have installed a phone in the darkroom and other people inform me when the audio alarms on any of the machines go off, for instance to replenish the fixer. We've learned to work around it.

"If I claimed to be handicapped, I would become my own worst enemy because I would be labeled and treated as handicapped. People with disabilities want to be treated equally with the same respect given everyone else. We don't need pity, we need understanding of our struggle because what you take for granted, we cannot do.

"If you experience hearing loss, don't be afraid or ashamed — confront it, take it seriously and deal with it. If you have your hearing, appreciate and take care of what you have because, if you lose it, that is when you will appreciate what you had the most, but then it will be too late."

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This year is not only the fifth anniversary of the ADA, but, as **Jack Russell**, a senior contracts specialist in DCP points out, it is also the 40th anniversary of "the vaccine." By that he means Jonas Salk's polio vaccine, which was developed ten years too late for Russell, who, at age five was stricken with the disease while visiting relatives in Patchogue.

Paralyzed from the neck down and given no chance to survive, he spent the first three months of his five-year confinement in an iron lung at St. Charles Hospital in Port Jefferson. After a 3½-year recuperation, he was moved closer to home, to St. Charles in Brooklyn Heights, for three bone and muscle graft surgeries and more rehabilitation. Ultimately, he walked out of the hospital.

"My recovery was almost miraculous," says Russell, "so I relish my good health and I feel that I must give back what was given to me, even if I have to spend ten lifetimes doing it." Attempting to "stay one step ahead of the sheriff," that is, free of post-polio syndrome symptoms, Russell keeps in shape by jogging two miles every other day, refereeing basketball and

Roger Stoutenburgh

Barbara Pringle and Jack Russell

umpiring softball games. And, as a thank-you, he volunteers his time at St. Charles Hospital, as a speaker at schools and fund-raisers and an organizer of their annual health fair.

Though he has not had any long-term or recurring effects of his bout with this disease, Russell is covered under the ADA because he had a life-limiting disability as a result of polio. More important, Russell has insight into the world of the disabled because "those crutches used to belong to me."

Concludes Russell, "Many people who are or have been disabled don't want to tell their story because, in the wrong environment, they could be targeted for negative attention. Since I'm now healthy, I fortunately don't have this fear, so can talk about my experience openly. But also, because I am healthy, people don't realize that I was disabled and have made insensitive comments in my presence. So, I would like everyone to realize before they speak that there are many of us out there who have either concealed their disability or who have survived a disability." — Marsha Belford

Making the ADA Work at the Laboratory

Since the Americans With Disabilities Act (ADA) of 1990 was signed into law five years ago, some 45 employees have identified themselves to BNL's Diversity Office through its annual surveys as having a physical or mental impairment that substantially limits one or more major of their life activities.

The ADA extends federal civil rights protection to people who had or have a life-limiting physical or mental handicap, or who are regarded as having such an impairment. Before its enactment on July 16, 1990, the Lab complied with the Rehabilitation Act of 1973, which requires federal contractors to take affirmative action to employ and advance qualified disabled individuals. Building upon this act, the ADA made it illegal to discriminate against individuals with disabilities.

"Actually, the ADA was proposed and passed not due to a grass-roots outcry, but because the government championed the rights of handicapped persons to be gainfully employed and have easy access to their place of employment," says Lorraine Merdon, Manager of the Diversity Office in the Human Resources Division.

According to the ADA, employers are required to define what are called the essential functions of each job, that is the activities to be performed by an employee that are the main function of the job. Under the ADA, employers must consider disabled people qualified for a job if they can perform these essential functions with what is called a reasonable accommodation.

Reasonable accommodations include making existing facilities readily accessible and usable, restructuring jobs and/or work schedules to allow for flextime, acquiring or modifying equipment, adjusting materials, and/or providing qualified assistance.

"The Lab is very willing to make reasonable accommodations, but we cannot accommodate people unless they discuss their needs with either their supervisor and/or, if they prefer, with the Diversity Office," says Merdon, who can be reached on Ext. 3318.

In addition to ensuring equal opportunity for all employees regardless of factors including disability, the Diversity Office is responsible for the Lab's compliance with affirmative-action regulations and implementation of programs designed to overcome society's past discrimination against groups of people, including those with disabilities.

To accommodate Lab employees, guests and visitors who also are physically disabled, the Lab is required by the U.S. Department of Energy to improve access to and within buildings as part of renovations, and to design access for all into new construction projects overseen by the Plant Engineering (PE) Division.

"We target areas where we can have the greatest impact on the facilities most used by physically handicapped employees or the public, then we include improvements in our renovation plans," explains Christopher Johnson, Deputy Manager of Operations & Maintenance, PE. "And, anytime we upgrade entrances, bathrooms, sidewalks, parking areas and the like, we are required to bring them into compliance with ADA."

Over the years, for instance, wheelchair lifts were installed in Berkner Hall, the Brookhaven Center and in Human Resources; and access ramps were added to the buildings housing the Public Affairs Office, the Teacher's Federal Credit Union, and the Staff Services Division and the Upton Post Office.

As Robert Aikman, Engineering & Design Supervisor, PE, points out, the Lab's newest buildings, such as the Science Education Center, the Child Development Center and the Magnetic Resonance Imaging facility for the BNL Center for Imaging and Neurosciences, were designed to be accessible to all.

"The design group complies with the requirements of the ADA just as we do with any other code requirement," says Aikman, whose group not only performs compliance reviews of projects designed by PE, but also those done by off-site architectural and engineering firms.

Besides accommodating the physically disabled, PE has been acquiring or modifying emergency equipment. For example, strobe lights have been installed as part of the fire-detection system in Lab apartments and dorms, so those with a hearing impairment can be made aware of the need to evacuate. Now, Johnson's group is investigating the purchase of telephones that accommodate those who have hearing or sight problems for emergency use in on-site elevators.

"We welcome input on adding or improving accommodations," concludes Johnson, who can be reached through Maintenance Management, Ext. 2468, or directly at Ext. 7636. — M.B.

Seven Scary Sights on Site

When all your biggest nightmares joined up to make the rounds at BNL last Halloween, they called themselves "The Unholy Seven." But perhaps you knew who they really were: members of the Department of Advanced Technology carrying on their then eight-year-old tradition of taking vacation time on Halloween in order to dress up to bring fear and cheer to their coworkers all around site. Last year's motley crew consisted of: (from left) a monster (Patty Vangurp), a vampire (Pam Ciufo), the headless horseman (Ann Fort, in front of vampire), a skeleton (Jeanne Madaia), a ghost (Sonja Santos), a mummy (Kathy Nasta) and a witch (Donna Storan). Fort, Madaia and Nasta started this tradition in 1987, when they danced their way into BNLers hearts as the California Raisins. A few years later, they began including others in their annual tableau. What they are planning for this Halloween, they won't tell, but you'll find out if you spot this year's group haunting the site next Tuesday morning.

Roger Stoutenburgh

Coming Up

All are invited to the Brookhaven Women in Science (BWIS) Wine & Cheese Party, on Wednesday, November 1, from 4:30 to 6:30 p.m. in the Recreation Building.

This free, informal get-together is held annually to acquaint prospective BWIS members — women and men — with BWIS members and officers, and with the group's accomplishments, which have benefited the entire Lab community. So come to enjoy a social afternoon and explore what BWIS has to offer.

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Sponsored by BERA's Indo-American Association, one of India's leading singers, Shrimate Shanti Hiranand, will give a recital of semi-classical vocal music on Saturday, November 4, at 7 p.m. in the Physics Department auditorium. Tickets cost $10 for adults, $5 for children age 12 and under, and may be purchased at the door.

For more information, call Vinod Mubayi, Ext. 2056, or Anand Saxena, Ext. 4844.

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On Thursday, November 9, a Department of Advanced Technology Seminar of Lab-wide interest will be given by E. Gail de Planque, who was U.S. Department of Energy Director of the Environmental Measurements Laboratory, 1987-91, and a member of the Nuclear Regulatory Commission, 1991-95. Her talk, entitled "Risk-Based Decision Making — What to Do When Science, Politics and Values Collide," will begin at 4 p.m. in the Hamilton Seminar Room of the Chemistry Department, Bldg. 555.

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New Perspective on Eating Disorders

"Beyond Food: Psychoanalytical and Nutritional Perspectives on Eating Problems" will be discussed during the next Outreach workshop from the Employee Assitance Program. To be presented by registered dietitian Sondra Kronberg and certified social worker Meg Maginn, this workshop will take place on Tuesday, October 31, in Berkner Hall. All are invited; the talk will be available afterwards on audiotape in the Research Library.

After discussing eating disorders from over- to undereating, the presenters will explore the origins of personal eating problems in society's concepts about food, weight and body image. They will examine why people have problems starting diets, staying on them, maintaining weight loss, and/or are anorexic, bulimic or eat compulsively. Experimental techniques that have helped those with eating problems reestablish a normal relationship with food will be demonstrated.

Sondra Kronberg, M.S., R.D., is Director of Nutritional Services for the Renfrew Center of Long Island and President of the Eating Disorder Council of Long Island (EDCLI). She has a private practice in Floral Park and Bellmore.

Meg Maginn, C.S.W., is a Renfrew consultant and Treasurer of the EDCLI. Specializing in the treatment of eating disorders, she practices in Commack and Selden.

To register for this workshop, return the completed bottom portion of the Outreach flyer recently sent to all employees to Dianne Polowczyk, Bldg. 490, by Monday, October 30.

Healthline & Outreach Schedule

In addition to next week's talk, four more presentations on health and mental-health topics have been planned through the end of December, for the Healthline lecture series of the Health Promotion Program (HPP) and the Outreach workshop series of the Employee Assistance Program (EAP).

Under the auspices of the Occupational Medicine Clinic, the Healthline series presents talks on topics related to healthy living, while Outreach offers discussions of psychological issues and social problems.

See future issues of the Bulletin for details on each presentation, or, for general information, call Ext. 5923 about Healthline lectures or the HPP, or Ext. 4567 about Outreach workshops or the EAP.

Date	Series &Topics	Speaker
*Nov. 13	***Healthline:*** Weight Management, Hypnosis & Behavior Modification	Stuart Green
Nov. 28	***Healthline:*** Update: Money Matters in Catastrophic Illness	George Roach, Esq.
Dec. 5	***Outreach:*** Balance — Preventive Medicine for Burnout	Carol Noble, Ph.D.
Dec. 12	***Outreach:*** When the Workplace Is in Pain — Surviving Downsizing	Robert Carrere, Ph.D.

**Note:* *All talks are Tuesdays at noon, except the one on Monday, November 13, which will be held 4:30-6:30 p.m.*

Join the Celebration: Festival of Light

Diwali, the festival of light, will be celebrated by the BERA Indo-American Association (IAA) on Saturday, November 11, from 3 p.m. to 9 p.m. in Berkner Hall. The function will include dancing and instrumental and vocal music by local performers, followed by an authentic Indian dinner.

Advance tickets for this event cost $10 for adults and $5 for children, and may be purchased before November 7 from: Anand Saxena, Ext. 4844 or 689-9771; Piyush Joshi, Ext. 3847 or 281-1077; or Animesh Jain, Ext. 7329 or 474-0056. There is a 20 percent discount for IAA members. If available, tickets bought at the door will cost an additional $1 per person.

Equipment Demo

On Wednesday, November 1, from 11 a.m. to 1:30 p.m., U.S. Filter of Ridgefield, N.J., will display a new line of laboratory water systems and high-quality, low-cost replacement cartridges for Millipore and Barnstead water-purification systems, which are point-of-use systems for analytical, life science and clinical applications. For more information, call 800-466-PURE.

Arrivals & Departures

Arrivals

Andrew N. Gifford.....Medical

Departures

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

Matjaz Kaluza.....Chemistry
Walter R. Powell.....Cent. Shops
Zhengyu Zhang.....App. Science

HFBR Science History (cont'd.)

research at the HFBR. For example, the structure of the "protein factory" of the cell, the 16-part ribosome, was first discerned at the HFBR, as was the structure of myelin, the protein that coats nerve cells. Studies of conformational changes in the blood-clotting factor plasminogen, and histone structures within chromosomal DNA, have also been done here using neutron scattering.

Getting even more advantage out of this technique, HFBR biologists were some of the first to substitute deuterium, hydrogen's heavy cousin, into their molecules for easier detection of atomic positions. In a pioneering use of low-angle scattering, studies were carried out on the water molecules that are loosely bound to such molecules as the respiratory protein myoglobin.

• **Condensed Matter Physics** — The same cold neutrons that the biologists used gave physicists and chemists a close view of magnetism in action.

The understanding of one-, two- and three-dimensional magnets near their critical temperatures that was gained at the HFBR helped theorists formulate and test Nobel prize-winning theories of cooperative ordering in large collections of atoms. Random magnets, charge density waves and ferroelectric-like behavior in solids have also been studied here.

High-temperature superconductors have fascinated and puzzled scientists for nearly a decade and continue to do so today. Scientists working at the HFBR have worked to solve the riddle of superconductivity's mechanism at temperatures above 90 kelvins, and studied the relationship between this phenomenon and magnetism.

Physicists using the reactor's neutrons have also looked at quantum liquids and solids, materials whose kinetic energy nearly equals their binding energy even at low temperatures, and studied their unusual behavior, such as superfluidity.

• **Nuclear Physics** — Because neutrons can penetrate the electron cloud that surrounds every atom, they allow a glimpse into the life of the nucleus. Nuclear physicists at the HFBR have looked for regularities in the often complex structural organization of protons and neutrons in nuclei.

Other experiments have studied the lifetimes and decays of many unstable, neutron-rich nuclei. Among these is zinc-80, an isotope important to astrophysicists in the study of supernovas.

Neutrons also serve nuclear physics in another way: Using the HFBR's irradiation thimbles, BNL scientists create many useful nuclear isotopes. One of them is the isotope copper-64, which has been used for years in the Physics Department to create positrons and positronium beams. These probes can in turn be used to examine surfaces and find trace impurities in the semiconducting materials used in the electronics industry.

• **Chemistry** — The HFBR allows chemists to study the basic nature of chemical structures, including the hydrogen bond that holds much of nature together. Investigations of hydrogen bonding between organic molecules and metals have been one focus at the reactor; other species studied include monolayers and zeolites.

In the 1960s, scientists in the Chemistry Department used the HFBR to determine the structures of the 23 amino acids, which make up every protein in every cell in every living thing. More recently, they have studied fast-ion conductors, which conduct electricity through the movement of ions rather than electrons and hold promise as solid electrolytes for batteries.

— Kara Villamil

Start a lifesaving habit on Sunday, October 29: When you change your clock from daylight saving time, change the batteries in your smoke detector too.

ReportSmith Training

The Computing & Communications Division will offer a ReportSmith class from 9 a.m. to 4 p.m., on Wednesday & Thursday, November 15 & 16, in the PC Training Room, Bldg. 515. The training fee for this course is $500, and seating will be limited.

To register, send an ILR for $500 to Pam Mansfield by Wednesday, November 3. For more information or to receive a course outline, call Mansfield, Ext. 7286.

Camera Club

The BERA Camera Club is looking for photos to display on its board in Berkner Hall over the next month, so club members and nonmembers are invited to submit their work for consideration for this exhibit.

The next Camera Club meeting will be at noon on Wednesday, November 1, Room D, Berkner Hall. The upcoming field trip to photograph the holiday displays at Rockefeller Center will be discussed.

Besides meetings and field trips, the Camera Club offers instruction, studio shoots and darkroom use, and it is open to all interested BNL employees and their families. For information, call club president Ripp Bowman, Ext. 4672.

Volleyball

Standings as of October 24

Open League		League 1	
Pass, Set & Crush	6-0	Bikers 'n Spikers	3-0
Monday Maulers	6-3	Rude Dogs	3-0
Spikers	2-4	Scared Hitless	2-1
Far Side	3-6	Underdogs	1-5
Bud Hitters	1-5	No Names	0-3
League II		**League III**	
Safe Sets	6-0	Joy of Sets	3-0
Jolly Vollies	5-1	Harlem Knights	2-1
Spiked Jello	4-2	High Volley'em	2-1
Monday Nite Live!	3-3	Silver Bullets	2-1
Nuts & Bolts	3-3	New Comers	1-2
Fossils	2-4	OER	1-2
Night Court	1-5	Upton Ups	1-2
Volley Folly	0-6	Just 4 Fun	0-3

Cafeteria Menu

Monday, October 30	
Soup: Roasted corn chowder	.90/1.20
A la Carte: Arroz con pollo	3.85
Lite: Manicotti & cheese straws	3.65
Deli: Corned beef & cabbage	3.20
Grill: Filet of fish	3.30
Tuesday, October 31	
Soup: Oriental vegetable soup	.90/1.20
A la Carte: Fried chicken	3.95
Lite: Meat lasagna w/focaccia	3.95
Deli: Turkey w/stuffing	3.20
Grill: Hot pastrami melt	3.30
Wednesday, November 1	
Soup: Sausage-tortellini minestrone	.90/1.20
Display Cooking: Pasta	4.75
Deli: Pork loin	3.20
Grill: Monte Cristo	3.30
Thursday, November 2	
Soup: Summer squash	.90/1.20
A la Carte: Macaroni & cheese	2.95
Lite: Veal Parmesan	3.65
Deli: BBQ brisket of beef	3.20
Grill: Turkey chili in a tortilla	3.30
Friday, November 3	
Soup: Seafood bisque	.90/1.20
A la Carte: Grilled Salisbury steak	3.85
Lite: Baked fish	3.65
Deli: Leg of lamb rosemary	3.20
Grill: Philly cheesesteak	3.30

Note to Employees:

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

Wanted: BNL Art

Attention, BNL artists and sculptors: Show your finest fine art at the Fall Festival of Art, to be held by the BERA Art Society at Berkner Hall from Monday to Wednesday, November 20-22, daily from 11:30 a.m. to 1:30 p.m., with an evening reception from 5 to 7:30 p.m. that Monday.

Prizes will be awarded for the most popular entry and for the most popular of a new category: art specifically inspired by BNL science or BNL site.

Lab employees, their family members 15 years and older, retirees and guests of BNL may contribute. Exhibitors may enter more than one piece, to be shown as space permits. All pictures must be ready to hang.

Bring exhibits to Berkner Hall, Room B, the afternoon of Friday, November 17. For the catalog, please complete two forms — available from the BERA Store, Berkner Hall, the Brookhaven Bulletin of October 13, 1995, or Liz Seubert, Ext. 2346 — for each work to be entered. Return them by Friday, November 10, to Robert Chrien, Bldg. 510A.

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 Human Resources Division lists new placement notices. The purpose of these listings is, first, to give employees an opportunity to request consideration for themselves through Human Resources, 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.

Current job openings can also be accessed via the BNL Home Page on the World Wide Web. Outside users should open "http://www.bnl.gov/bnl.html", then select "Scientific Personnel Office " for scientific staff openings or "Employment Opportunities" or "BNL Human Resources Division" for all other vacancies.

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

POSTDOCTORAL RESEARCH ASSOCIATE - Trained in organic chemistry or geochemistry to conduct research focusing on understanding the early diagenetic processes involving organically bound sulfur and nitrogen. Previous experience with studies in sulfur and nitrogen geochemistry is highly desirable. Knowledge of new and existing instrumentation in a variety of spectroscopic and chromatographic techniques, including x-ray absorption spectroscopy, FTIR, NMR, GC and HPLC, is desirable. Contact: A. Vairavamurthy, Department of Applied Science.

POSTDOCTORAL RESEARCH ASSOCIATE - Trained in condensed matter physics, with experience in spin-polarized photoemission and soft x-ray emission. The research program will explore the possibility of coincidence experiments in photoemission and soft x-ray emission. Thin-film ferromagnetic alloys may also be studied. Contact: Peter Johnson, Physics Department.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees.

DD 3504. SPECIAL SERVICES ATTENDANT - Performs various service duties in connection with conferences, meetings and special events. Directs and coordinates work of other employees as assigned. Works as Laboratory custodian when not on special service assignment. Staff Services Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside candidates.

NS 3350. HEAVY EQUIPMENT MECHANIC-OPERATOR - (temporary opening) Under minimum supervision, maintains, operates and repairs 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. Plant Engineering Division.

DD 0473. MASTER WELDERS - (term appointments) Works on various materials from prints, sketches or verbal instructions. Sets up and welds, cuts, brazes, pours lead, metal sprays and performs similar or related operations on jobs that require the application of individual ingenuity in solving problems of method or results required, where previous standards of operation have not been established. Performs layout, preparation, setup and measurement as required. Central Shops Division.

Motor Vehicles & Supplies

94 HONDA CBR - black/purple/red, w/2 helmets, excel. cond., $5,600. John, 588-0910.

93 CHEVY S-10 PICKUP - 5-spd., 2.8 liter V-6, Tahoe pkg., 7k mi., $8,500. Joe, Ext. 2898 or 728-1859.

91 OLDS CUTLASS SUPREME - red, p/moonroof, p/l, p/w, 6-cyl., 54k mi., excel. cond., $8,400. George, 472-1479.

90 FORD TAURUS - airbag, V-6, p/s, p/b, ac, 100k mi., runs well, $3,500; '89 Toyota 4x4 truck, extra cap, match camper top, 50k mi., $8,500. 689-3146.

90 BMW 525I - black, 65k mi., orig. owner, maint. by BMW, mint cond., ask. $16,000. Michelle, 289-1726.

89 CHEVY CORSICA - 4-dr., 4-cyl., ac, a/t, cruise, tilt, high mi., excel. cond. Gabriel, Ext. 2707 or 341-1087.

89 FORD ESCORT LX - h/b, 5-spd., excel. cond. Bob, 821-0695.

89 HONDA CRX - 5-spd., silver, ac, 2-seater, excel., $4,200. John, Ext. 7671 or 765-1299.

89 TOYOTA COROLLA DX - 5-spd., ac, orig. owner, excel. cond., $4,000. Ext. 2145.

89 COLEMAN POP-UP CAMPER - sleeps 6, sink, stove, port-a-potty, spare tire, awning, extras. Tom, Ext. 7287 or 744-4535.

88 MUSTANG LX - a/t, ac, loaded, sunroof, 2.3 eng., runs well, looks good, $2,100. Pam, 474-2792.

87 TOYOTA COROLLA SR5 - 5-spd., ac, am/fm cass., 98k mi., good cond., avail Nov. 9, $2,800 neg. Alison, Ext. 4410.

87 OLDS CUTLASS CIERRA - 2-dr., fwd, p/s, p/w, tilt, a/t, am/fm cass., 70k mi., $2,200. Glenn, 821-5165.

87 SABLE LS - s/w, 98k mi., excel. cond., ask. $4,500. Austin, Ext. 5329 or 363-2796.

87 TOYOTA CAMRY - ac, a/t, am/fm cass., cruise, 144k mi., gar., excel. cond., $3,900. Bill, 878-4356.

86 TOYOTA SR -5 - 2dr., a/t, am/fm, 2-yr. old ac, 47k mi., excel. cond., $3,750. 765-1075.

85 TOYOTA MINI VAN - cargo/conv., 7-seater, a/t, p/s, p/b, od windowed, gar., one owner, $2,550. 261-2719.

85 VW JETTA - sunroof, tan, p/w, Benzi box, stereo, v.g. cond., asking $2,400; '81 Civic, 5-spd., runs well, ask. $500. Marc, 924-0960.

85 NISSAN 4x4 PICKUP - many extras, excel. cond., must sell. Ext. 5329 or 422-7415.

85 GRAND AM - 4-cyl., 5-spd., sunroof, tint, needs exhaust, dent in trunk, runs well, passes inspection, $650. Heidi, 281-7873.

84 PONTIAC TRANS AM - black w/gold trim, 5-spd., 5.0 liter eng., $1,900 neg. Rich, 744-4816.

83 HONDA PRELUDE - a/t, 2-drs., sunroof, blue, 100k mi.; '82 Honda Civic, 5-spd., 2-dr. h/b, 136k mi., must sell, best offer. Ren, Ext. 2045.

83 TOYOTA TERCEL - gold, 2-dr. h/b, 4-spd., excel. running cond., $900 neg. Steve, Ext. 7862.

80 VOLVO DL WAGON - 4-spd., good cond., $600. Ext. 7225.

79 HARLEY F.L.H. 1200 - red, many extras, $8,500 or best offer. 727-0141 days, or 727-7115.

78 BLAZER 4x4 - a/t, V-8, excel. on beach & snow, needs muffler, $1,450. 924-7477.

78 CHEVY SUBURBAN - a/t, 8-cyl., runs, needs work, $350. 734-2593 eves.

PARTS - '82 302 motor, '91 Mustang rear, new drums, rotors, gauges, etc. for Mustang/Capri; rollbar for light truck, $25. Bill, Ext. 7136.

PARTS - '86 Camaro 2.8; '84 & '86 S10 Blazer. Rob, Ext. 7668.

BRAKES - new, rear bonded for Chrysler, $5; air filters, new, AFL-52 Sears & Lee brand for Chrysler cars, $9/4. Susan, Ext. 7647.

POP-UP CAMPER - Rockwood, sleeps 6, stove, beddings, $650. 689-3146.

REPAIR MANUALS - '84 Subaru, $6; '76 Isuzu Trooper shop manual, $15. John, Ext. 3292.

TIRES - 2 Goodyear P225/75R14, like new, $40 ea.; 1 Firestone P215/70R14, $20. 698-9274.

FORD PARTS - 302 alum. intake manifolds, headers, Mallory electronic distributor '88 stock 5.0 roller motor, fuel inj., low mi. Wayne, Ext. 7238.

TIRE - new, P195/70R14, steel-belted radial, $30. Al, Ext. 7859.

Boats & Marine Supplies

31' BAHA-CRUISERS SPORT FISHERMAN - 1987, twin 454's, 225 hrs., sleeps 4, full canvas, electronics, loaded, must sell, $33,500. Dan, 474-9102.

23' SAILBOAT - fg, sleeps 4, galley, fixed keel, mooring, dinghy, jack stands, 6-h.p. motor, sails, excel. cond., $1,500. Mike, Ext. 7861 or 698-3967.

22' SPORTCRAFT - 1981, cuddy cabin, 180-h.p. Merc., Loran, compass, VHF radio, DF, FF, $4,500. Joe, 689-0415.

16' STAR CRAFT - alum., new navy top, 50-h.p. Evinrude w/elec. start, trailer w/new elec. winch, asking $1,600. 924-6751.

16' HOBIE CAT - galv. trailer, trampoline, $1,200. George, 475-0818.

Tools, House & Garden

CHAIN-LINK FENCE - black vinyl, 75', $250; freestanding fireplace, $45; patio chair, cushions w/matching 8½' umbrella, $20. 751-7023.

COAL STOVE - Surdiac, black textured, brass trim, glass front, like new, $350. 744-1706.

COAL/WOOD STOVE - Golden Flame, airtight, excel. cond., w/many extras, $385. 689-9234.

ENGINE - 8 h.p., Briggs & Stratton, elec. & recoil start, vertical shaft for riding mower, new, $135. Bart, Ext. 2005 or 924-6761.

KEROSENE HEATER - $25.50; row machine, $25; girl's bike, pink, $10; ceiling fan & light, $15. Dave, 395-3484.

LEAF BLOWER - IDC, gas-powered, $35. Chris, 399-7493.

Miscellaneous

BOOKS - 30 hardcover, good cond., educational, novels, travel, classics, $10. Mott, Ext. 7108.

COPYING MACHINE - Mita CC30, w/stack loader, single feed, extra cartridge, new cond., moving, $400. Albert, 727-4884.

DIAMOND RING - blue, VSE2 grade, 1.564 ct., 14k gold, 4-point setting, papers, $3,000. Chris, Ext. 4216.

FUR COAT - black Persian lamb, size 16, good cond., $100. G. Betz, 924-3236.

TICKETS - to Mexico, 7 nights at the Hotel Dorado Pacifico in Ixtapa, must use by 12/15/95, $500 or best offer. Jan, 289-0967.

Free

MATTRESS - 60"x80", queen size, very clean, will deliver to Lab. Bourquin, Ext. 4284.

PATIO DOORS - two, 10', used. 744-5096.

TEETER-TOTTER - playground grade, you take it away. Bart, Ext. 2005 or 924-6761.

Car Pools

LIE EXIT 36 - fourth person needed. John, Ext. 5181.

Lost & Found

LOST - black Lab, male, missing on site since Sat., 10/14, has mild seizures. Don, 744-2662 or 924-4770.

Real Estate

Real Estate advertised for sale or rent is available without regard for the race, color, religion, sex, age, national origin, disability or veteran status of the applicant.

For Rent

BROOKHAVEN - 3-bdrm. house, country lane, 2 baths, lg. eik, $900/mo. + util. & sec. Jeb, 286-0204.

CENTEREACH - 1-bdrm. apt., eik, full bath, l/r, priv. ent., w/w, no pets, $650/mo. all. Debbie, 736-9182.

CENTER MORICHES - 1-bdrm. apt., full bath, walk-in closet, kit.-l/r combo, very lg, deck, priv. ent., parking, no smoking or pets, 10 min. to Lab, $700/mo. all. Pete, Ext. 4028.

E. SETAUKET - 5-bdrm. 3-level house, 3 baths, M/D, sliding door, wraparound deck, scenic view, 2½-car gar., hardwood floors, 3VSD, $1,650/mo. Ext. 4360 or 689-6495.

MIDDLE ISLAND - lg. 1-bdrm. co-op, upper unit, eik, full bath, w/d, d/w, cac, w/w, terrace, cable, igp, tennis, 10 min. from Lab, $725/mo. 924-9664.

PORT JEFF. VILLAGE - small house, fully furn. w/all appl., suitable for 1-2 adults, avail. Oct./Nov–Apr./May, date neg., $1,500/mo. incl. util. Harriet, Ext. 3484 or 331-7917.

ROCKY POINT - 3 bdrms., l/r, kit., bath, good for mature and quiet people, $900/mo. + ½ elec., free heating, cable, no pets, no smoking, 1 mo. sec., Bichoneau, 744-7996.

WESTHAMPTON BEACH - cottage for single person, avail. until May '96, $400/mo. John, Ext. 4214.

CATSKILLS - 3-bdrm. chalet w/sleeping loft, fully furn., near Hunter and Windham Mts., great for skiing. Kay, Ext. 4501 or Bea, Ext. 3642.

HILTON HEAD, SC - 2-bdrm. condo, 2 baths, fully furn., sleeps 6, tennis, beach, golf nearby, Oct.-Dec., $350/wk. Guy, Ext. 3147 or 689-5378.

For Sale

BROOKHAVEN HAMLET - 2-bdrm. cottage, l/r w/fp, huge eik, renovated bath, screened-in porch, dead-end lane off Beaver Dam Rd , $103,000. Jeb, Ext. 7607 or 286-0204.

E. PATCHOGUE - 4-bdrm. Cape, 2 full baths, eik, d/r, l/r, den, mudroom, bsmt., gar., alarm, igs, vinyl-sided, extras, $138,000. Mike, Ext. 3800.

E. PATCHOGUE - 2-bdrm. M/D, 2 baths, cedar-sided, view of Great South Bay, l/r w/fp + sep. l/r, bdrm., bath & loft, $235,000. Bumstead, 286-3209.

E. PATCHOGUE - South Country Shores, 3-bdrm. ranch, eik, d/r, l/r w/fp, bi-level cedar deck, shed, 135'x100', walk to bay and marina, $147,000. Fran, 289-0526.

FLANDERS - new subdivision, wooded, priv. 1+/- acre lots, greenbelted country lane w/cul-de-sac near water, golf, county park, trails, all major roads, starting at $39,900. 369-2889.

MIDDLE ISLAND - 4-bdrm. Colonial, eik, l/r, d/r, den, oak floors, $129,900. Diana, Ext. 4262 or 924-6002.

N. SHIRLEY - 3-bdrm. ranch, 2 baths, lg. l/r, & kit., fenced ½ acre, pool, 2 lg. decks. John, Ext. 7313.

ROCKY POINT - 2-story chalet, 1.23 acres, private, 22 Prince Rd., west end, $169,000. Ruth Ann Lutz, Ext. 7774 or 929-6235.

SHOREHAM - 3-bdrm. ranch, l/r, d/r, eik, 1½ baths, den w/fp, 2½-car gar., 23'x32' SWRSD, 100'x150', n. of 25A. 821-9547.

SOUTHAMPTON - wooded 1-acre bldg. lot on priv cul-de-sac. 325-0447 after 5 p.m.

WADING RIVER - 4-bdrm. Clarendon Col., 2½ baths, hardwood floors, encl. porch, 2-car gar., extras, mint, 1 acre, SWRSD, $295,000. Benon, 929-6984.

WADING RIVER - 3-bdrm. Colonial, 2½ baths, 2-car gar., custom kit., Jennair, gazebo, shed, igs, igp, deck, steam bath, satellite dish, SWRSD, 1.1 cre, $189,000. 929-8323.

PORT CHARLOTTE - ¼-acre bldg. lot, developed neighborhood, ready to build, $9,000. 929-8323.

WASHINGTON, NC - 1.13 wooded acres, waterfront commuity, pool, clubhouse, marina, 35' boat slip on the Pamlico River off the InterCoastal Waterway, $36,000. Ken, 281-5565.

Wanted

CURLERS - Lock-n-Roll stylers w/heating base by Clairol, size BT-1 or larger, will pay $15 for BT-1, $10 for others. 727-7227.

JUNK CARS/TRUCKS - free removal, money paid for running, late model vehicles. Steve, 924-8741.

MOTORCYCLES - mini-bikes, go carts. Bill, 467-1343.-

RESTORER - grandfather floor clock, cabinet broken, needs care & love. Vasilis, Ext. 2830.

ROTOTILLER - gas-powered, mini-size. Harriet, Ext. 2800.

SAIL - for Sunfish/Sailfish-type sailboat. Joe, Ext. 3966.

TRUCK - med. or small Mazda, Chevy, Toyota, Dodge, Ford, must run well, $1,000-$1,500. Chris, 399-7493.

VOLLEYBALL PLAYERS - beginners, for a team. Nanu, Ext. 3202.

In Appreciation

Thanks to all my friends at BNL for the memories, and thanks to all who attended my farewell party.

— Lew Jacobson

Farewell Gatherings

RETIREMENT PARTY - for Ray Archbold, Randy Philips, Bob Mosley, Thurs., Nov. 9, 6:00 p.m., $20 per person, Bldg. 599, Firehouse. RSVP, Ext. 2351.

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