BROOKHAVEN BULLETIN
Vol. 36 - No. 36 September 10, 1982
BROOKHAVEN NATIONAL LABORATORY

BNL — World Center For Research Into The Structure Of Matter

NSLS Turns On X-Ray Beam

The last few weeks have seen solid progress at the National Synchrotron Light Source (NSLS). At the X-ray ring, a number of steps towards full operational status were completed on September 4. And at the vacuum ultraviolet (VUV) ring, which has been operational since the early part of this year, full experimental usage by a number of groups has been under way since the beginning of August.

Success at the X-ray ring began late Friday, September 3, when the injection process was optimized, leading to beam survival of about 100 turns. At 1:30 a.m., on Saturday, beam was attained without the use of the radio frequency (rf) acceleration system. When, subsequently, the rf system was turned on, it captured the beam and accelerated it enough to compensate for energy loss due to synchrotron radiation emission.

Further improvement came later that day when beam survival of several minutes was achieved. To cap off these accomplishments, a final step took place at 6:00 p.m. when multiple injection from the booster synchrotron was done successfully. In this process, the X-ray beam increases in intensity as a result of successive beam injections from the booster synchrotron.

Assessing the impact of these accomplishments, Arie van Steenbergen, NSLS Deputy Head, said, "The major hurdles of the X-ray ring are now behind us. On a number of previous occasions we had injected beam in the X-ray ring, but competing pressures for full operational status of the VUV ring kept us from following through on these successes."

Explaining further, van Steenbergen said, "In the history of building accelerators and storage rings, it is essentially unprecedented that one turns on two storage rings plus many experimental beam lines at the same time. Because our main goal was to optimize scientific output at the NSLS at the earliest possible stage, the overriding priority was the full experimental usage of the VUV ring. With the VUV ring now fully in operation, it became possible to shift our full attention again to the X-ray ring."

The next step at the X-ray ring will be to gradually increase the beam energy. "We're rather optimistic," van Steenbergen said. "We expect that within the next two months there will be enough emitted photons from the circulating beam in the X-ray ring to allow alignment of the experimental instruments." Since that is just about the time when many researchers, with their experimental equipment, will be ready to receive beam, he said, "Experimentation is expected to start at the X-ray ring well before the end of the year."

Full experimentation started at the VUV ring earlier this summer. A monochromator at each experiment singles out one wavelength from the broad spectrum of ultraviolet radiation that the VUV ring provides. Three identical monochromators, designed by NSLS physicist Malcolm Howells, are being used for experiments in photoelectron spectroscopy at ports U14 (NSLS), U4 (Bell Laboratories) and U7 (SUNY Stony Brook/BNL Physics & Chemistry).

On port U6, an IBM group will be testing the feasibility of using soft X-ray lithography to fabricate integrated circuits with sub-micron features. Synchrotrons provide for the only continuous source of radiation in the soft X-ray region (8 to 50 angstroms). Experimenters on ports U8 and U15 will focus soft X-rays to sub-micron spots in order to perform X-ray microscopy studies on living cells.

Taken in the NSLS control room at 6 p.m. on Saturday, September 4, this photo shows how the X-ray beam increased in intensity as a result of successive booster injection cycles.

At port U9, mirrors equally divide synchrotron radiation into two beams for use by the BNL Chemistry and Biology Departments. These groups will study fluorescence from gases and liquids, and magnetic circular dichroism of biological specimens.

Reflecting on the current activities at the NSLS, van Steenbergen said, "Reaching this point required many years of dedicated work for which the NSLS staff deserves full credit. However, we are also very appreciative for the help we have received from members of other departments."

HFBR Goes Up To 60 Megawatts

Doug Humphrey

At left, Gerald Kinne, head of the Reactor Division, being congratulated by David Schweller, manager of DOE's Brookhaven Area Office.

"It's probably going to be very anticlimactic. We will very quietly move a control rod. There will to be no external noise. There will be a significant increase in neutron flux on the experimental level that only sophisticated instruments can see. But a lot of us are going to be pleased as hell."

Days before the High Flux Beam Reactor went to a power level of 60 megawatts, an event that was six years in the making, Reactor Division Head Gerald Kinne predicted the scene that finally took place last Friday, September 3, at 2:41 p.m. in the HFBR control room. In the words of Martin Blume, Associate Director for Low Energy and Chemistry, "The HFBR now takes its place as the premier beam reactor in the world, alongside the Institute Laue Langevin reactor in Grenoble, France.

Robert Powell, former head of the division, was in the control room September 3. "Today is my birthday, and this is the best present I could have received," he said, after announcing on the reactor's public address system that the HFBR had successfully gone up in power. In charge of operating BNL's research reactors since 1949 until his retirement in 1980, Powell has watched the HFBR grow from just an idea born in the 1950s to a world-renowned research tool.

The HFBR first went critical on Halloween night, October 31, 1965. Four months later, in February 1966, it went to a power level of 40 megawatts, where it has operated for 16 years.

According to Kinne, the major changes that were required for upgrading were the installation of new heat exchangers, the addition of certain motors, and an increase in the amount of uranium in the fuel elements. "Then the paperwork began," he said, referring to the long approval process that took years to complete.

The safety analysis was redone to reflect the new power level. The general reactor design was reviewed, leading to such changes as re-arranging instrumentation so 60 megawatts did not read off scale. Also, Three Mile Island caused a re-examination of all reactor standards, resulting in new requests and requirements from DOE, many in the areas of safety and training.

Kinne says the HFBR has been examined, re-examined and examined again by the U.S. Department of Energy, which has regulatory control over the reactor. The last DOE appraisal was as recent as August 2. When the go-ahead came through from DOE right after that, Kinne scheduled the long-planned event for the first of the following month.

Actually, reactor power increased in two stages. On August 30, it went to 50 megawatts, then to 60 megawatts on September 3.

At the higher power, the neutron flux is 10^{15}, or one quadrillion neutrons passing through a square centimeter every second. That's a 50 percent increase in neutron flux.

Neutron production is what the HFBR was originally built for. The solid state physicists, chemists and biologists who use the reactor agree that the greater neutron flux will give them a better chance of success with the experiments that were considered only marginal before. And since most experiments are run until the necessary statistical counts are gathered, the higher flux will also reduce experimental time by one third, thus resulting in more beam time available to users.

In reminiscing about the years it took to upgrade the reactor, Bob Powell remarked, "Lots of people ask, 'Since it's running so well as is, why upgrade?' The answer is — reactors that aren't upgraded to serve the experimenters better will start losing their competitive edge. The HFBR has been improved in every way — there's not much over there that's original. Also, the operations and engineering staff is challenged by improvements, which keep them on their toes, besides keeping the machine in top condition."

The entire Reactor Division, numbering 61 persons, has worked long years to make this recent upgrading possible. Mike Brooks and Dan Oldham are in charge of reactor operations, Dave Rorer coordinates research, Paul Tichler and Steve Moss do reactor engineering, Mike Zukas and Gil Pitcher oversee maintenance, Seymour Protter supervises water chemistry, Jack Phillips and Lance Junker handle training and procedures, and Jack Detweiler is responsible for quality assurance.

—Mona S. Rowe

Doug Humphrey

In the control room of the HFBR, Robert Powell, retired head of the Reactor Division, takes the microphone to announce that the reactor has just gone up in power to 60 megawatts, at 2:41 p.m. on September 3. Looking on are, from left, Mike Brooks, operations group leader; Dan Oldham, assistant operations group leader; Dick Adams, shift supervisor; and Gerald Kinne, division head.

Support for University Users At BNL Facilities

Doing scientific research often requires large-scale experimental equipment. A primary function of the national laboratories is to provide a setting where researchers can make use of specialized facilities to complement the research at their home institutions.

At Brookhaven, the High Flux Beam Reactor (HFBR) and the National Synchrotron Light Source (NSLS) are only two such facilities. Under a program begun earlier this summer, they became even more accessible to university users. The DOE-sponsored NSLS-HFBR Faculty and Student Support Program gives members of faculty/student groups the opportunity to either participate in General User experiments at the NSLS or neutron experiments at the HFBR.

The entire program is coordinated by Roger Klaffky, who has worked closely with Glenn Price of the Director's Office. Klaffky explained that the program is "primarily designed to reach out to people with limited funds. We're trying to enlarge our user community."

This past summer, university users came to work at the HFBR with Richard Casten (Physics), Tom Koetzle (Chemistry) and Benno Schoenborn (Biology). At the NSLS, visitors worked with John Axe (Physics), J. Robb Grover (Chemistry), Richard McMullan (Chemistry), John Sutherland (Biology) and Ralph Weston (Chemistry). The following are examples of how the program works at both the HFBR and the NSLS.

At The HFBR

Physicists Richard Casten and Dave Warner have been working on experiments at the HFBR for several years and have made frequent use of the Interacting Boson Approximation (IBA) model to try to interpret the observed behavior of nuclei.

The IBA attempts to treat nearly all heavy nuclei on one footing, avoiding the need for many different models. One of the IBA's key features is that it explicitly takes account of the fact that there are a finite number of valence (active) particles (protons and neutrons) in a nucleus. Normally, to deal with this feature explicitly is extremely complex; the breakthrough in the model is the simplification that results if one considers pairs of these particles as composite entities known as bosons.

Doug Humphrey

Ani Aprahamian (left) and Richard Casten consult on their research project.

What is the role of this finite number? To what extent does an IBA prediction depend on it? These are the questions that Ani Aprahamian set out to answer.

Aprahamian is a graduate student in nuclear chemistry at Clark University. She and her advisor, Daeg Brenner, were part of the HFBR-NSLS program this summer. During this period, Aprahamian assembled data accumulated at the HFBR and elsewhere to compare with a series of IBA calculations in which she separately varied the parameters of the model and the boson number.

Casten said that Aprahamian's work is "a thorough study, providing some of the best evidence to date that the explicit incorporation of a finite number of valence nucleons is, indeed, a key element leading to the success of the IBA model." In addition, he said, she has uncovered important subtleties in the model.

While she has obviously made a contribution to nuclear physics, Aprahamian feels this has been reciprocal. "This has been very much of a learning experience," she said. "I probably learned more about research this summer than ever before. This is the actual research end of it, rather than just book learning, so I feel lucky to have had the opportunity to participate in this program."

At The NSLS

"In prototype form, it was used at the synchrotron of the National Bureau of Standards in Washington," said biophysicist John Sutherland of the circular dichrometer he designed.

Now being used in Sutherland's NSLS experiment at port U9B of the VUV ring, this instrument takes advantage of the fact that certain substances absorb right circularly-polarized light differently than left circularly-polarized light. The dichrometer measures these differences in absorption to probe biological structures.

These were exactly the kinds of measurements needed by a research team from the University of Texas at Dallas. Under the auspices of the NSLS-HFBR program, a two-week collaboration got under way in mid-August when biology professors Donald Gray and Dimitri Lang came to the NSLS accompanied by graduate student Young Yang.

Before leaving Texas, the team prepared samples of the nucleic acids, DNA and RNA, as well as proteins and bacterial viruses, so they could devote their two weeks here primarily to using the equipment. They used it profitably. Just before the team returned home, Lang said, "We have already found a few things we didn't know before."

"We were extremely pleased with the facility, and with the hospitality of our sponsor," said Gray, "but I think this has also been useful to Dr. Sutherland."

Sutherland concurs. The Texas team helped prove that the dichrometer can extend the range of circular dichroism measurements to provide new information on the structure of biological molecules. Now he is working with students from the laboratory of another NSLS-HFBR program participant, Thomas Moore of Arizona State University, to determine, he said, "if it is possible to do a completely different type of experiment with this instrument."

Members of Sutherland's group who helped build instruments at port U9B include Peter Keck, Bill Laws and John Trunk. — Anita Cohen

---

Einstein was the first physicist ever to be regarded, even by intellectuals, with the uncomprehending awe once reserved for sorcerers. The discoveries of quantum mechanics and of relativity had, for the first time, put physics beyond the reach of the intelligent layman.

Spencer R. Weart, "The Last Fifty Years — a Revolution?" Physics Today, 11/81

Inside Information

Herbert J. Kouts has been reappointed chairman of the Department of Nuclear Energy, effective October 1 for a term of five years. He has had this post since 1977. In making the announcement last week, Lab Director Nicholas Samios said that "Kouts" success in leading his department to its present importance in the regulatory and safety efforts associated with this nation's nuclear energy programs is a credit to him, to his staff, and to the Laboratory."

Energy Course For H.S. Teachers

BNL will give its 18th course in energy for secondary level teachers of mathematics and science in Nassau and Suffolk Counties, beginning September 20. Classes will run for 30 sessions on Monday evenings from 7 to 10 p.m., and are limited to 35 participants. The course is free and texts and other printed material will be distributed at no charge. Those interested in earning six graduate credits may apply to Southampton College.

The course will consist of lectures and group projects on material ranging from the scientific and engineering principles underlying energy and energy conversion, to advanced concepts of energy technologies. Also included will be discussions of economic, environmental and institutional factors associated with meeting society's energy demands.

The program is being sponsored by the Long Island Lighting Company and the U. S. Department of Energy. Don Metz, head of DEE's Chemical Sciences Division, will once again direct the program, a job he has held since 1974. Faculty for the energy course come from BNL's scientific and professional staff.

Prof. Dorothy Denning

Secret Codes

Professor Dorothy Denning, Department of Computer Sciences at Purdue University, will lecture on "Cryptography Today" at 11 a.m. on Monday, September 20, in the Physics Seminar Room. The lecture, sponsored by the Brookhaven Women in Science, is open to the Laboratory community.

Cryptography, the science of secret writing, has been used throughout history to conceal military and diplomatic communications. As more and more sensitive data is stored in computers and transmitted over computer networks, researchers have begun to study how cryptography can protect this data. This research led to some important discoveries, including public-key cryptography and digital signatures as well as some novel applications, including mental poker and coin flipping by telephone. The talk will give an introduction to cryptography and its role in computer security.

Mori Rosen

Using the experimental equipment around port U9B of the VUV ring are (top to bottom) Dimitri Lang, John Sutherland, Young Yang and Donald Gray.

BROOKHAVEN BULLETIN

Published weekly
for the employees of
BROOKHAVEN NATIONAL LABORATORY

BERNICE PETERSEN, Editor
MONA S. ROWE, Assistant Editor
ANITA COHEN, Reporter

35 BROOKHAVEN AVE., UPTON, N.Y. 11973
Telephone (516)282-2345

Aerobic Dance

The BNL Aerobic Dance Club has added "Stretchercize" to its fall schedule. Unlike aerobic dancing, which emphasizes cardiovascular improvement, this class will concentrate on the stretching and strengthening of various muscle groups through a series of choreographed exercise routines with a touch of yoga. Other than comfortable clothing, the only required equipment is an exercise mat (a thick towel will do). Classes will be held at the Brookhaven Center from 5:15 to 6:15 on Wednesdays beginning September 22 and will run for 10 weeks. The fee is $25. Enrollment is limited. Call Jane Cutt (Ext. 7597), or Pat Carr (Ext. 3565) before September 16 to ensure a space in the class.

The aerobic dance classes will be held at the Center from 5:15 to 6:15 on Tuesdays and Thursdays beginning September 21. Previous participants may delay joining the class until September 28 as the first two sessions are geared toward the beginner. The class will run for 10 weeks and the fee is $50. Aside from comfortable clothing, the only requirement is athletic shoes with heel and arch supports.

Anyone with a health problem should consult a physician before joining either class.

Hospitality News

Mrs. Bernadette Benz, Chairperson of the BERA Quilting Club, will be the guest speaker at the next Hospitality Committee morning get-together on Tuesday, September 14, from 9:30 to 11:30 a.m. in the Brookhaven Center. Mrs. Benz will discuss and demonstrate some of the techniques used in quilting; for example, hand-quilting and "log-cabin piecing" techniques.

All wives of Laboratory employees and guests are welcome. Please come and bring the children. Babysitting will be provided free of charge. Coffee, tea and danish will be served.

Arrivals & Departures

Arrivals

Alfonso J. Borrelli ..... Accelerator
Tony C.T. Chang ..... Chemistry
Kevin L. D'Amico ..... Physics
Angelo L. DeLucia ..... Biology
Puliyur V. Madhavan ..... Chemistry
John A. Muller ..... Mgt. Info. Syst.
Mikko E. Sainio ..... Physics
Morris L. Shapiro ..... Accelerator
George O.K. Stenby, III .. Accelerator
Gary R. Tabasko ..... Accelerator
Wei-Yann Tsai ..... Applied Math.

Departures

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

Raymond Jones ..... Plant Engrg.
Kim M. Tingley ..... Energy & Env.

Concert Reminder

The Tokyo String Quartet will perform at Berkner Hall on Thursday, September 16 at 8:30 p.m. Tickets will be available at the door and are $7 for general admission, $4 for students and senior citizens, and $3 for those under 18. Block tickets are also on sale.

Vaudeville Is Coming

The Toni Reams Dance Co., a hit at the 35th anniversary picnic, is just one of the many talented acts that will be appearing in the 5th annual BERA Vaudeville Show to be held Friday and Saturday nights, September 17 and 18 at 8 p.m. in the Brookhaven Center Cabaret (the North Room). General admission is $3, and $2 for those over 65 or under 18. A cash bar will be available. Bring your entire family for a delightful evening of comedy, song and dance.

Exhibition Games

Tickets for the New York Islanders pre-season hockey games are now on sale at the BERA Sales Office in Berkner Hall. The Stanley Cup champions will be playing Boston on Tuesday, September 21, the Rangers on Saturday the 25th, Philadephia on Tuesday the 28th, and Buffalo on Thursday the 30th.

BERA has eight tickets for each game and is offering to sell them to on-site employees at a two-for-one price of $16.

The sale of regular season tickets will be announced in the Bulletin before the end of September.

Day Care Center

Kids-R-Us Daycare Learning Center is starting its third year of operation and applications are now being accepted for children ages 18 months — five years, who will be attending either full or part time. The Center is located on Longwood Road and is open from 7:45 a.m. — 5:30 p.m. Monday through Friday. Vacation days have been scheduled to correspond with Lab holidays.

The teachers, all with the Center since its creation, have worked together to provide a loving atmosphere designed to stimulate and encourage preschoolers to view learning as natural and desirable. Activities are as diversified as baking cookies, painting and glueing, handling gerbils, plants and snakes. In addition to the day care staff, the Center has a speech therapist, special education teachers and a psychologist to serve children with special needs.

On September 9 and 10 day care personnel will be at Berkner Hall from noon to 1:30 p.m. to dispense applications and information to interested parents. Information may also be obtained by calling 924-0008 or 924-8021, and a visit to the Center is welcomed.

Doug Humphrey

Doug Humphrey

Motorcycle Club

The Motorcycle Club will meet on Monday, September 13 in the Rec Hall at 5:15 p.m. Topics of discussion will include taking orders for club T-shirts and rides tentatively scheduled for September 18-19, the Monday ride on September 20 and October's "foliage ride".

Softball

Leagues I and II

Makeup games:

Ravens 15 — Six Pax 13

For the Ravens, Ed Taylor was 4 for 4, Harold Bolling was 3 for 4, Bob Rowley was 2 for 3, and Herbie Harris had 2 home runs. For the Six Pax, Frank Gaetan was 4 for 4.

Phoubars 9 — Blue Jays 3

For the Phoubars, Ken Kowalski was 3 for 4 and Dave Jensen had a home run. For the Blue Jays, Dave Hansen was 2 for 2.

Six Pax 20 — Roga 7

For the Six Pax, Frank Gaetan had 3 home runs, E. Meier Jr. and B. Briscoe each had a home run.

Ravens 12 — Moles 0

Mac Thomas and Harold Bolling were 3 for 3, Bob Rowley was 4 for 4, Jim Garrison was 3 for 4, and Greg Mack had a grand slam home run.

Leagues III and IV

Makeup game:

Dirty Sox 6 — Titans 1

Dennis Nordstrom hit a 3-run homer which led the Dirty Sox to Victory.

Play off game:

Electric Co 14 — AMD 12

An excellent playoff game was clinched in the ninth inning by the Electric Co. J. Frezza, J. Niemczyk, D. Fuzie and T. Zuhoski all had triples.

League V

Nads 14 — Turkeys 5

E-Z Riders (won) — No Names (lost)

League VI

Makeup game:

Who Cares 14 — Mudville Sluggers 11

Cafeteria Menu

Week Ending September 17, 1982

Monday, September 13		
Spinach egg drop soup	(cup)	.65
	(bowl)	.75
Home-style meatloaf w/mushroom gravy & 1 veg.		1.85
BBQ fresh ham & 1 veg.		1.90
Hot Deli: Pastrami	(bread)	1.85
	(roll)	1.95
Tuesday, September 14		
Chicken & rice soup	(cup)	.65
	(bowl)	.75
Sweet and sour pork on white rice		1.90
Meatballs à la mode on egg noodles		1.85
Hot Deli: Roast top round of beef	(bread)	1.95
	(roll)	2.05
Wednesday, September 15		
Split pea soup	(cup)	.65
	(bowl)	.75
Ham & broccoli crepes w/1 veg.		1.85
Veal Stew on egg noodles		1.95
Hot Deli: Knockwurst & kraut on rye		1.85
Thursday, September 16		
Minestrone soup	(cup)	.65
	(bowl)	.75
Yankee pot roast & 1 veg.		1.95
Spaghetti Special — All you can eat w/meatsauce & garlic bread		1.85
Hot Deli: Monte Cristo		1.90
Friday, September 17		
Manhattan clam chowder	(cup)	.65
	(bowl)	.75
Shelly's home-style chili on white rice		1.85
Tuna noodle casserole		1.80
Hot Deli: Veal pattie & pepper hero		1.90

On Tour

The Brookhaven House will be open to the public Sunday, September 12, as the feature attraction on the Sunday tour. It is the last time this season that the house will be open for public viewing. An award-winning film called "Building the Brookhaven House" will also be shown and a BNL researcher will be on hand to answer technical questions. Visitors may also stop at the Exhibit Center where numerous displays describe the Lab's research. Tour hours are from 10 a.m. to 3 p.m.

Classified Advertisements

Placement Notices

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

Each week, the Personnel Office lists new personnel placement requisitions. The purpose of these listings is, first, to provide open placement information on all non-scientific staff positions; second, to give employees an opportunity to request consideration for themselves through Personnel; and, finally, for general recruiting purposes. Because of the priority preference policy stated above, each listing does not necessarily represent an opportunity for all candidates. As a guide to readers, the listings are grouped according to the anticipated area of recruitment.

Except when operational needs require otherwise, positions will remain open for one week following publication date.

For further information regarding a placement listing, contact the Personnel Placement Supervisor, Ext. 2882.

The vacancies listed below have been exempted by the Director's Office from the current freeze on open requisitions.

LABORATORY RECRUITMENT: Opportunities for present Laboratory employees.

1747. SECRETARIAL POSITION - Requires AAS degree in secretarial science or equivalent experience. Candidate must have knowledge of general office procedures and the ability to take shorthand. Contracts and Procurement Division.

1748. HELPER A - (two openings) - Central Shops Division.

OPEN RECRUITMENT: Opportunities for present Laboratory employees and outside applicants.

1749. MACHINE MAINTENANCE MECHANIC B - Responsible for maintenance of machine tools and similar equipment. Central Shops Division.

1750. EXPERIMENTAL METAL WORKER - Requires experience in all phases of shop work. Candidates must be skilled in the use of sheet metal fabrication, tooling and machining. Ability to work to close tolerances from blueprints on sheet metal, tubing and structural shapes required. Central Shops Division.

1751. EXPERIMENTAL MACHINIST - (3 positions) - Requires experience in job print interpretation, layout, and machine set-up. Candidates must demonstrate ability and imagination in all phases of machine work. Will function as all-round machinist for non-production work in research and development shop. Project assignments range from raw material work in research to final assembly. Central Shops Division.

1752. MASTER WELDER - Requires demonstrated ability to set up and weld, cut braze, pour lead, metal sprays, and perform similar operations with minimal amount of supervision. Must have capability to pass welder qualification tests on aluminum and stainless steel within ninety days of employment. Central Shops Division.

Autos & Auto Supplies

RIMS - (2) 14", 5 lug with worn G78x14 tires, $10 ea. Jim, 744-3792.

79 HONDA - dirt bike, model Z50R, 50cc, excel. cond., hardly used, $325. Ext. 3604 or 878-0516.

71 DUSTER - running, needs work, $150. Ext. 3672 or 928-4069.

75 HONDA CIVIC - Joe, 744-4086.

72 CAMPER TRAILER - pop-up, Steury, new tires, sleeps 8, many extras, like new cond., $1,500. 734-7342.

69 BUICK SPORTS WAGON - with glass top, new brakes & master cyl., water pump, & batt., 4 new tires, 2 radials, $600. Avail. end of Sept. Ext. 2964.

74 OPEL WAGON - good cond. throughout, 110K mi. Ray, Ext. 7509 or 924-0569.

73 SUPER BEETLE - 4 spd., radial tires, very good running cond., clean interior, no problems, orig. owner, $1,800. 929-8204.

55 CHEVY BELAIRE WAGON - '58, 6 cyl., std. trans., restorable. $500. Carl, Ext. 7504.

69 TRAMA CAMPER - pop-up, sleeps 6, $400. 289-1665 after 6 p.m.

76 MUSTANG II - 4 cyl., 4 spd., 69,000 mi., 2 new tires, $1,500. Lori, 286-8407.

79 MERCURY CAPRI RS - 302, 4 spd., p/s, p/b, sunroof, TRX pkg., black with green racing stripes, 20K mi., $4,500. 473-7919.

78 VIKING POP-UP CAMPER - sink, stove, heater, awning, and other extras, immaculate cond., garaged, $2,500. 728-0338.

80 MAZDA SPORT PICKUP - immaculate, stereo with tape, 23,000 mi., 40 mpg hwy., $5,100. 727-7741 after 6.

77 CHEVROLET PICKUP - p/s, p/b, ½ ton, 54,000 mi., $3,000. Bill, 331-4641.

80 TRIUMPH TR7 - 5 spd., white convertible, 17,000 mi., $5,900. J. Klein, Ext. 2294 or 298-8805.

POP-UP CAMPER - needs work, best offer. Harry, Ext. 2923 or 744-2715.

78 HONDA HAWK - excel. cond., low miles, some extras, must sell, $800. Ext. 2926.

79 HONDA - CM400T, 2,000 mi., garaged, must sell, $1,000. Ext. 7125.

80 KAWASAKI - KL250, good cond., asking $750. Ken, 924-4398 after 6 p.m.

70 VW BUG - rebuilt eng., exceptional performance, mag wheels, 5 extra tires, needs body work, $675. Laura M., 472-1806 (days only).

78 DODGE MONACO - 2 dr., V8, new radial tires, 72,000 mi., good mpg, good cond., $3,200. 286-8517 after 5:45 p.m.

79 HONDA HAWK - 400cc, like new, $995. 588-0805 eves.

79 HONDA DIRT BIKE - model Z50R, 50cc, excel. cond., hardly used, $300. Ext. 3604 or 878-0516.

78 T-BIRD - low mi., p/s, p/b, p/w, am/fm, cassette stereo, good mpg, $4,300. 878-9456.

66 VW BUG - rebuilt engine, runs great, recently inspected, $500 or best offer. Paul, Ext. 7644 or 744-2733.

71 TRIUMPH TROPHY - very good, all stock classic British machine, 500cc, $1,000. 567-8811.

79 PLYMOUTH HORIZON - a/c, a/t, radio, excel. cond., $3,990. Ext. 4169 or 981-5696.

76 CAPRI II - 4 cyl., 4 spd., p/b, a/c, am/fm cassette, blue, hatchback, very good cond., $1,695. 751-2149.

65 CHEVY CAPRICE - 4 dr., 283 V8, a/t, good running cond., good station car, poor body, $150. 751-2149.

MOTORCYCLE SHIELD - no brackets, $15. Carl, Ext. 5329.

OPEL RIMS - w/tires 13", $3 ea. Carl, Ext. 5329.

73 DODGE DART - p/s, good cond.. Shmid, Ext. 7602 or 4407.

75 PONTIAC ASTRE - 3 spd., 4 cyl., good gas mileage, good cond., asking $1,050. 543-8153.

72 MERCURY - p/s, p/b, a/t, 106K, runs well, asking $500. 473-7739.

65 PLYMOUTH FURY I - radials, good battery, $125 for quick sale. Rob, 929-8443.

71 FORD MERCURY COMET - 6 cyl., 95,000 mi., 22 mpg, very good cond., $800. Ext. 4789.

70 RIVIERA CLASSIC - excel. cond. in/out, rebuilt engine, new exhaust, new brakes all around, and new front end parts, p/b, p/s, p/w, a/c, tilt steering, power seats and new plush carpet, asking $2,200. 878-1688 eves.

76 HONDA CIVIC - manual, excel. mpg, many new parts, running excel., leaving, $1,550. 282-7997 or 282-3004.

72 DODGE COLT PARTS - body parts, trans., rear, drive shaft. 732-3338.

TOW CHAIN - 50 ft., tow cable, double hooks, never used, $50. 732-3338.

73 YAMAHA MC - 250RD, new tires, runs good, $250. Ext. 4725.

74 CAPRI - 4 cyl., 4 spd., new exhaust, hi mi., 25 mpg, $750. John, Ext. 4520.

TIRES - E78-14 polyglass (2), orig. cost $100, asking $75, only 1,500 mi. on each. 727-7741 after 6 p.m.

71 PONTIAC T37 - good cond., good mpg. Ext. 3798 or 929-8462.

74 HONDA CIVIC - good cond., engine excel., 30 mpg, new muffler, new brakes, $1,200. 878-9571.

69 VW BUG - meltdown sale, 6 good tires, good body, no engine, roll it away, $220. John, Ext. 3675.

65 VW - Own a car that just won't quit, good parts, $160. Bill, Ext. 2378/351, or 286-0243.

72 BUICK ELECTRA LIMITED - all power, excel. cond. in/out, $875. Jack, Ext. 3040.

78 MAZDA GLC - 4 cyl., a/t, am/fm, great mileage, excel. cond.. 928-6819 after 6 p.m.

76 AMC PACER - a/c, p/s, 82,000 mi., good cond.. Kim, Ext. 7679 or 3183.

75 TRIUMPH - TR-6, good cond., $3,700. 472-1735 after 6 p.m.

Boats & Marine Supplies

21' RENKEN - 1980 cuddy, Volvo 120, I/O full canvas, compass, many extras, excel., $7,800. John, 981-0989 after 5 p.m.

16' FIBERGLASS BOAT - 65 HP Mercury, needs water pump, all access. incl., $650. Jack Dunn, Ext. 4613.

18' CANOE - fiberglass, very good, $250. 681-4890.

FISHING RIG - alum. boat, motor, trailer, never used. 369-2005 after 6 p.m.

Yard Sales

GARAGE SALE - Sat., Sept. 11, 10-4, 1253 Boston Ave., Bayshore, many household items, large selection horse books.

Free

TWIN MATTRESS - and boxspring, boxspring good, mattress soft. 689-8605.

Miscellaneous

CAMERA - Vivitar, 35EE, practically new, $50. Janet, Ext. 2345 or 929-8152.

ARCHERY BOW - 60 lb., left hand, recurve for the purest, like new, $140. Bob Mele, Ext. 2514 or 757-3178.

ATARI GAME - with cartridges, Pac Man, Adventure, Asteroids, Grand Prix, etc., incl. cart, holder, complete pkg., $250, excel. buy. Ext. 3604 or 878-0516.

TENT - 6 person; amplifier; guitar, $100; thermos cooler, $20. 681-4890.

LADIES BIKE - Raleigh, 3 spd., Sturmey archer shift, excel. cond., less than ½ price, $90 firm. 727-3608.

G.E. AIR CONDITIONER - 7500 BTU, $130. Jim, 744-3792.

RANGE HOOD - 30", stainless steel, Sears Kenmore Ductless, $25. Ruth, 667-7314.

SOFA - dinette, 4 chairs; mirror; lamps; appliances, very reasonable. 821-9261.

CEMENT MIXER - 2-½ cu. ft. capacity, with ¼ HP elec. motor, like new, $200. Joe, Ext. 2575 or 281-2767 eves.

AIR CONDITIONER - G.E., 14,000 BTU, 12 amps., 115V, plugs into any wall outlet; bedroom set, 2 single beds, chest of drawers, 2 night tables, new cond. Ext. 3392 or 475-8330.

WOMAN'S DIAMOND SET - large size, $350; sterling silver silverware, set of 8, $1,250. 475-0144 eves.

POOL FILTER - Haywood-Perflex, 40 GPM, with ¾ HP motor and pump, excel., $90 or best offer. Scotto, Ext. 2050.

STEREO CASSETTE DECK - Sony TC186SD, with Dolby NR, excel. cond., $125. Saha, Ext. 4339 or 924-6139.

ORGAN - Yamaha D-80, solid walnut console, has everything, $2,500. George, Ext. 7749 or 727-3921 eves.

PINE HUTCH - Molly Pitcher, buffet, oblong table, 1 leaf, 6 chairs, mint cond., $725. Art N., Ext. 2434.

KODAK CAROUSEL 140 - slide trays (6), $2 ea., all 6 for $10; sectional love seat, $50. Harry, Ext. 2923.

BEDROOM SUITE - double bed, dresser, chest, table, mirror, boxspring, mattress, $275. 475-0632 after 5 p.m.

BRAIDED RUG - red/yellow, 9x12, oval. Ray, Ext. 7509 or 924-0569.

OUTDOOR TABLE - with fringe umbrella, $45; chaise lounge, plus 2 alum. chairs, with padded cushions, $40; inner spring chaise lounge, $35. Josephine, Ext. 4144.

WEIGHT LIFT SET - aquarium stand; snowmobile suit, large; old Zenith radio with cabinet. Ext. 3954.

CRIB - excel cond., $20. Ext. 3319 or 751-7140.

OLD TOBACCO JARS - clear glass, $5 ea. Fred, Ext. 4988.

ANTIQUE CAMERAS - Kodak Box no. 2A Hawkeye, no. 2A folding autographic Brownie, leather case, no. 1A autographic Jr., leather case, $50; metal folding bed with mattress, $25 firm. Jim, 744-3792.

DOG PEN - chain link, 6x6x6, excel. cond., $165. 473-7919.

BAND SAW - 36", 5 HP, 220V, 1 phase motor, old but good, $500. Carl, Ext. 7504.

METAL LATHE - 15" turret with gap, Gallin model #1250. Doug Pope, Ext. 7521.

BASKETBALL NET & RING - very good shape, $8. Mike Tesla, Ext. 3287.

COAL GRATE - for comforter stove, used 1 mo., plus spare part for same, $60. 475-4196.

GOLDEN RETREIVER PUPS - AKC registered, wormed & shots, championship bloodline, whelped on 7/21/82, dame on premises, $250 ea. 928-4177.

NIKONOS IV A - w/35mm, F 2.5 lens, still new, $250. 744-1081 after 3 p.m.

ATARI GAME - plus 8 cart. & case, (Pac man, Adventure, Asteriods, Air & Sea Battle, etc.) complete, $250, excel. buy. Ext. 3604 or 878-0516.

ELECTRIC DRYER - Frigidaire, large capacity, free delivery, $90. Phil, Ext. 3913 or 475-8099.

MAGAZINES - complete sets from 1930's-40's to present (Life, Esquire, Look, Readers Digest, Newsweek, Coronet, etc.); also old textbooks & comics. For sale or tax donation. 487-5796.

TAPE RECORDER - Pioneer, reel to reel #RT-909, 3-motor, 4-head, auto reverse, auto repeat, 4-digit tape counter, takes up to 10-½ in. reel, speeds, 3-¾ and 7-½, new $900, asking $575. Al, Ext. 3992 or 331-1003.

RAINBOW BOA - 2 ft., bred in captivity, healthy, hearty appetite, $40. 289-8182 eves.

CHANDELIERS - several beautiful crystal and others, Danish modern buffet or dresser 5'x18"x36" walnut. Jake, Ext. 4532.

FULL BED & TWO CHAIRS - Ext. 3798 or 929-8462.

SOFA - Danish modern, black vinyl, $50; couch, brown, bolsters, $20; bookcase, grate, $10 ea. Olson, 289-8629

SIAMESE KITTENS - beautiful, 8 weeks old. 744-5096.

DINING ROOM SET - trestle table, two leaves, eight chairs, good cond., $350. Ext. 4237 or 581-7656.

PENN COAL STOVE - 60,000 BTU, also burns wood, 1 season old, must sell, $500; 24 cement blocks (8x8x16), $15, ideal for coal bin. Ext. 3890.

LADIES BIKE - Ross Gran Tour II, light weight, 10 spd., new w/rack and generator, $190. Ext. 3890 or 924-4250.

TENNIS RACQUETS (2) - Head professional, 4-⅜" grip, need restringing, very good frame, $40. Bob Mele, Ext. 2514.

STEREO - turntable, w/speakers, $30; Oster kitchen center, almost new, reg. price $176, asking $120. Joseph, Ext. 4789.

LENS - Canon camera, Soligor wide angle 28mm, 2.8, $25; Soligor 2X Telextender, $10. Don, Ext. 7611.

STORAGE SHED - 14'x6'x6' high alum.; truck body with side windows & 3 doors, $325; new quarry tiles, 6"x6"x½", 22 sq. ft. w/mortar bag, $45. Tom, Ext. 4084 or 878-1060.

GRIND STONE - antique, treadle type, very old, works great, $65 firm; 1901 wood burning stove, mint. cond., $200 or best offer. 732-3338.

KITCHEN CABINETS - all wood, take all or part. 924-4054 after 6 p.m.

ROSS SPINET PIANO - w/bench plus dehumidifier, $550. 878-8458.

ROTOTILLER - 36" wide, for yard tractor, never used, was $350, asking $200; rotary spreader, ½ bu. with PTO shaft for tractor use, used 2 hrs., $50; Wright 19" reciprocating saw, very good cond., needs carb. adj., orig. $319, asking $75. 929-4522 after 5 p.m.

STANDARD OIL BURNER GUN - one year old, $35. Ext. 3284.

STEREO SYSTEM - 200 watt Sansui receiver, with two 400 watt output base speakers & technics quartz direct drive, S11600MK2. 924-4054 after 6 p.m.

CONVERTIBLE COUCH - (double bed) never used. 924-4054, after 6 p.m.

POOL COVER - 20x40, 1 yr. old, ½ price. Jim, Ext. 3372.

OPERA TICKETS (2) - Met, Der Rosenkavalier, Sept. 29, rear orch., $27.50 ea. A. Romano, Ext. 4024.

FISH TANK - 50 gal., 49"x13-½"x20" deep, $20. John, Ext. 3675 or 924-3528.

ELECTRIC BLANKET - queen sz., dual controls, $50. Rick, 472-9789 after 4 p.m.

DOUBLE OVEN + RANGE TOP - G.E., sensi-temp burner, pink, $40. Sue, Ext. 3675.

DOUBLE BED - $75; 2 unfinished dressers & door core desk top, $100; portable Maytag dryer, $100; Maytag washer, $25; contemporary lightweight sofa, $25; woman's hiking boots, sz. 4, $25. Julie, Ext. 3393 or 744-0224.

Real Estate

Real Estate advertised for sale or rent is available without regard for the race, color, creed or national origin of the applicant.

For Sale

MIDDLE ISLAND - 3 bdrms., colonial on 2-¾ wooded acres, l/r, d/r with f/p, 2 baths, w/w carpet, new appl., apt. in basement, assum. mortgage, reduced price. Ext. 4660 or 924-4054 after 6 p.m.

WADING RIVER - custom built, 4 bdrm. colonial, 2 baths, d/r, den, f/p, 2 car garage, full basement, private beach. Ext. 7727 or 929-4631.

EAST SETAUKET - Storybook Ranch, 4-5 bdrms., 2-½ bath, den, 2-car garage, almost ¾ acre, walk to Univ., mint cond. Assum. 9-½% mort. (wraparound also avail.), $89,500. Ext. 7111 or 751-7268 eves.

MIDDLE ISLAND - 2-3 bdrms., 1-½ bath, kitchen, l/r, garage, ½ acre landscaped, north of Rte. 25, $35,500. Joann, 744-2821.

MEDFORD - condominium, Birchwood at Blue Ridge, 15 min. from Lab, 3 bdrms., many extras, facing golf course, $50's. 698-7213.

For Rent

YAPHANK - condo townhouse at Colonial Woods, 1-½ mi. from Lab, 2 bdrms., 1-½ baths, finished basement, garage, pool & tennis courts, $450/mo.

924-3434.

WADING RIVER - 3 rm. apt., all utilities incl., walk to beach, furnished or unfurnished, $350/mo. 929-8772 after 1 p.m.

MASTIC BEACH - furn., 3 bdrm. ranch, lovely location near bay, well insulated, prefer Sept.-June, will consider longer term, $450 + util. Ext. 3761 or 399-3609.

MILLER PLACE - 1 bdrm. apt., full kit., nice l/r, bath w/shower, $375/mo. + gas for cooking. SH4-2536 after 6 p.m.

BAYPORT - 1-½ acres, 3 bdrm., bath, l/r, kit., tennis court w/lights, 2 car garage, oil hot water. Oct. 2-June, $1000/mo. Ext. 3420, 472-9159 after 6.

Carpools

SOUTH PATCHOGUE - on time carpool in operation 10 yrs., opening for 1 paying rider now, add'l in Oct. Alyce, Ext. 2902.

EAST ISLIP - 3 man pool desires other riders/drivers. Jake, Ext. 4532.

Wanted

MOTORCYCLES - bent or broken, any age or cond. Kevin, 281-8031.

ATARI - reasonable. Jim, Ext. 3372.

HOUSE - 3 bdrm. with basement and garage, Wading River and vicinity, 40's. 878-8085.

CLAM RAKE - 24 tooth or 26 tooth, good cond., reasonable. Sharon, Ext. 3359.

AMBITIOUS PERSON - $200-$300/mo., 6-8 hrs/wk., flexible. 698-5861 after 7:30 p.m.

TRAINS - Lionel, any "O" gauge or "027" gauge cars, track and equip. Frank, Ext. 3120.

ARTS & CRAFTS - wish to display your crafts for sale? We will help you at an organization meeting. S. Zuhoski, Ext. 3359 or B.J. Carreras, Ext. 7918.

BABYSITTER - W. Hampton area, 9 a.m. to 6:30 p.m., mature person w/own trans. prefer., needed immed. 288-6367.

SUBLET - house or apt., any period (1 wk. to 6 mo.), no children, no pets, references. Vasil, Ext. 2830.

FOLLOW SPOT - used, incandescent or quartz, 1000W does not have to be working. Roy, Ext. 4664 or 744-8779.

SCHEMATIC - for Atari Video Game System. Ext. 4261.

VIOLIN - for student, good cond., w/bow and case, reasonable. Judy Mills, Ext. 3496 or 281-4472.

VENDORS WANTED - old car show, Sept. 19, $10/table donation. Judy, Ext. 3496 or 281-4472.

WOMAN TO SHARE HOUSE - 10 minutes from Lab, $300/mo. + security. 878-9147.

HOUSEMATE - share 3 bdrm. house in Port Jeff. Vill., $138/mo. + utilities. Jack, Ext. 3433 or 331-3959.

Services

Services are listed as a courtesy to BNL employees. They are neither screened nor recommended by the ***Bulletin.***

DOG BOARDING - private kennel, individual attention, inside pens, outside runs, $5 per day. Betty, 924-6981.

BASEMENT/ATTIC FANS - and all elec. work, reasonable/reliable. Joe, 399-0864.

LAWN MOWER REPAIRS - chain saws and small engine repairs. Jeff, 878-1847.

PROOFREADING - manuscripts checked for copy, accuracy, grammar, etc. 929-6961.

EXPERIENCED BABYSITTER - your home, have refs. 744-2715.

PROFESSIONAL DISC JOCKEY - avail. for weddings, private parties, schools, fire depts., etc., all styles music, cont. light show. 286-8862

BABYSITTING - mother of 3 will watch your children in her home, reasonable. Penny, 399-4590

OIL BURNER SERVICE - 15 yrs. exp., 24 hr. service, complete vacuuming, new filter, new nozzle. 286-8622.

SECRETARIAL SERVICES - business and personal correspondence, forms, manuscripts, word processing, IBM exec. typewriter, accurate. Colette, 744-2816.

CHILD CARE - Wading River area, refs. avail. 929-3590.

CARPETS INSTALLED - quick, dependable service, repairs, free estimates. Jim, 821-0187 after 5 p.m.

GENERAL CONTRACTOR/CARPENTER - extensions, dormers, garage conversions, basements, decks, kitchens, licensed. Jim, 698-2501.

BABYSITTER - Mastic/Shirley area, experienced, good with kids. Ext. 3158 or 281-2396.

Ads left out of this issue due to lack of space need not be re-submitted to appear in next week's issue.

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