BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

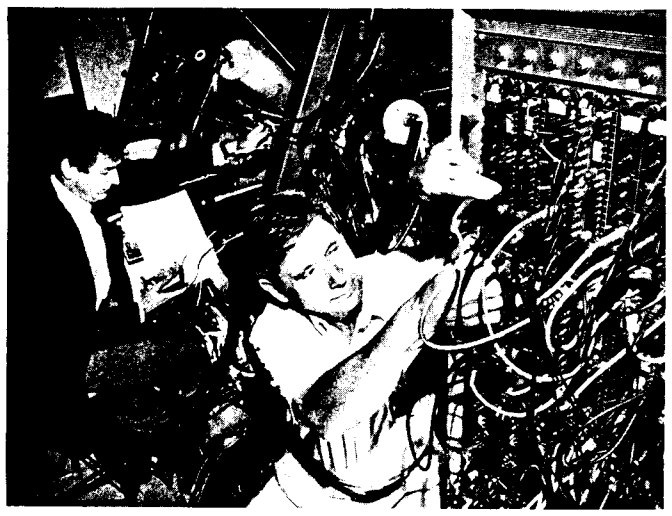
United Kingdom Science's Answer to Miss Marple Detects Gamma Pairs at the High Flux Beam Reactor

Had it been wool, such a complex mass of wiring might well have overcome the disentangling abilities of Agatha Christie's knitting detective Miss Marple. But for TESSA, a modern multi-detector array from the United Kingdom, on loan at BNL's High Flux Beam Reactor (HFBR) from July to mid-September — the wiring is an essential for detection of a different kind.

Experiments with TESSA seek to unravel the structure of the atomic nucleus, helping physicists understand how its constituent protons and neutrons move and interact. Though the nucleus cannot be seen with visible light, the gamma rays it emits illuminate its structure, which is less than 10^{-12} centimeters, or a trillionth of an inch in diameter.

TESSA's wiring winds to and from her array of 21 cylindrical gamma-ray detectors, each made of germanium and surrounded by smaller cylindrical shields that suppress background radiation. These devices form the Total Energy Suppressed Spectrometer Array that gave TESSA its name.

The arrangement is particularly suitable for detecting pairs of gamma rays that are often emitted almost simultanously by a single nucleus when a beam of neutrons hits a target.



William Phillips (center), Manchester University; and Kim Lister, Yale University; adjust TESSA's detector electronics.

Photos by Roger Stoutenburgh

The gamma rays fly out in all directions and are hard to distinguish from each other and from scattered gamma rays from other sources.

"Normally in nuclear physics experiments at reactors, gamma rays have been observed one by one with a single detector, or in pairs with at most two or three detectors," explained Richard Casten, Physics Department. Casten leads the Nuclear Structure Group which operates two HFBR beam lines, one where TESSA was located.

With TESSA's 21 spectrometers, however, there are so many possible combinations available to detect the gamma pairs that, with the suppressive shielding in addition, TESSA effectively has several hundred times higher efficiency than a traditional pair spectrometer. Such a large array of gamma detectors has never before been used with a neutron beam.

"So we were hoping for some exciting results," Casten said. "But, when I saw what was involved in setting up such a complex device, I thought it could take months. When it was installed in a few days and began taking data within a week, we were thrilled."

This sense of anticipation was apparent among all members of the international team of physicists involved in TESSA's pioneering experiments.

Led by William Phillips of Manchester University (MU), U.K., who suggested TESSA's transatlantic trip, this team consists of: Brian Varley, John Durell, and Jim Shannon, MU; Dave Warner, Daresbury Laboratory near Manchester, TESSA's original home; and Kim Lister, Yale University. Working with them from BNL's Physics Department were Casten, Ronald Gill, Dean McDonald and Richard Wall.

Clue Gathering

Phillips explained that the team had been examining fission products from a variety of nuclei. However, to study the fission of uranium requires neutron beams from a reactor. So they came to the HFBR.

When bombarded with neutrons, uranium target nuclei fission in many ways. The prompt gamma rays emitted from the fission products immediately after the break-up give information about a host of nuclei not otherwise accessible in the laboratory.

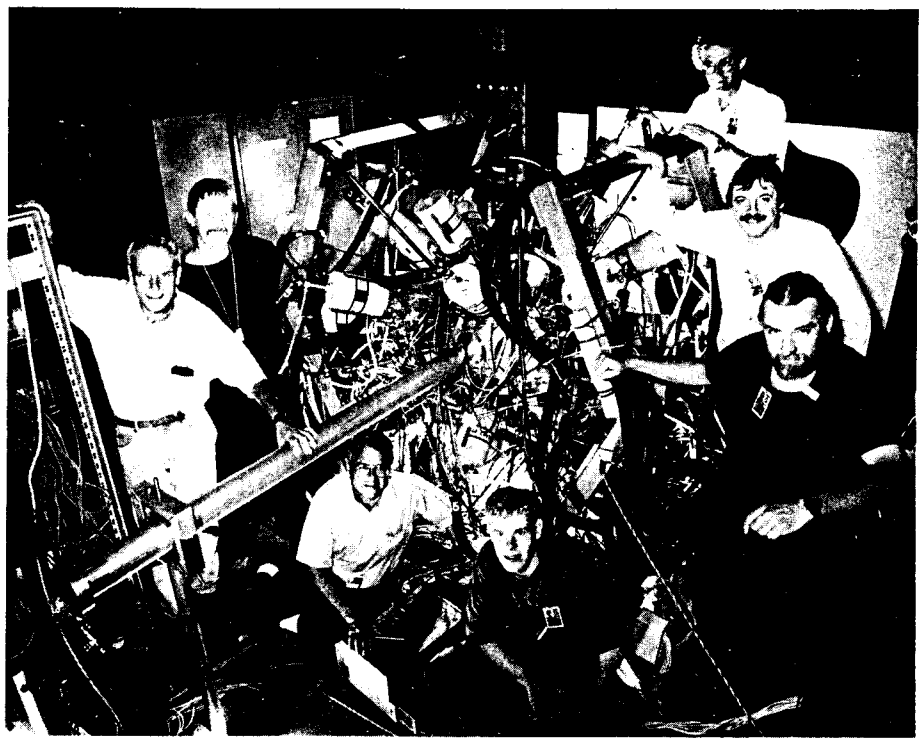
Since the uranuium nucleus has many more neutrons than protons, it splits into fragments that are also neutron rich. These nuclei have not been extensively studied, but are known to change their shapes in remarkable ways. "For example," said Phillips, "normal zirconium nuclei have about 50 neutrons and are spherical, like basketballs. But isotopes of zirconium, when they contain 60 or more neutrons, can develop a shape like an American football.

"This effect is also predicted in krypton isotopes, which can only be made in this type of fission," Phillips continued, "but some experts disagree. So that's one thing we're looking for."

Casten observed that testing these sorts of predictions can yield new understanding of the forces between protons and neutrons in the nucleus and new ways of modeling nuclear behavior. "This is especially so in neutron-rich nuclei," he added. "Since these nuclei are important in the evolutions of stars, this research has implications for astrophysics and questions on the origins of the elements as well."

The experimenters are also looking for information on a range of other questions, some of practical interest. One example is a good database of all the discrete gamma ray lines for neutrons on uranium-235. "These data may be useful to reactor scientists and fuel rod designers," said Phillips.

Another angle of interest in the fission process is in measuring the spins of the nuclei that emit the pairs of gammas. "We have the sensitivity to look at different products," explained Phillips. "We then calculate the average spin at which a product is made in the fission process. If the average varies with the different nuclei made in fission, it tells you something about the fission process itself."



Clustered around TESSA, the multi-detector array from the U.K. when it was at the HFBR, are: (seated, from left) Richard Casten, BNL; Jim Shannon, Manchester University (MU); (standing, clockwise from left) Richard Wall, Dean McDonald and Ronald Gill, all BNL; Dave Warner, Daresbury Laboratory, U.K.; and Brian Varley, MU.

Structural Proof

Once TESSA had collected the data for these experiments, the detector did not stand idle. "We took the opportunity to use TESSA's extraordinary sensitivity to get otherwise unobtainable data on the structure of stable nuclei," said Casten.

Various models of these structures exist. One whose testing was pioneered by the BNL group is the IBA — the interacting boson approximation model, which looks at nuclei in terms of symmetries. This kind of study requires nearly complete spectroscopic data that are best obtained in reactor experiments, and TESSA is ideally suited for this work.

In addition, Casten's group has developed a phenomenological approach to nuclear structure, replacing complex computer calculations with just two small numbers, multiplied together.

Just as atoms have what are called "closed shells" of electrons, so that any incoming electrons must start or join another layer that is not filled up, or closed — so, too, nuclei have closed shells of protons and neutrons. The remaining "valence" protons and neutrons — those outside the closed shells — largely determine the structure and shape of the nucleus. So, simply counting the numbers of valence protons and neutrons, which are typically less than than 20, then multiplying them, gives a prediction for the structure of the nucleus.

Detection Unlimited

TESSA's stay at BNL ended on September 13. Having come to the HFBR from England with a stop-off for experiments at the State University of New York at Stony Brook, it is now continuing its travels abroad.

For the future, TESSA's capabilities of nuclear detective work will be sought after by scientists around the world. This Miss Marple of the nucleus and still fancier detectors of its type currently being constructed in the U.S. and Europe are among the standard-bearers in the nuclear spectroscopy of the future. — Liz Seubert

BNL's First Healthfest — A Week Of Health, Fitness & Safety

During the week of October 11, BNLers are invited to participate in Healthfest — the Lab's first health, fitness and safety fair.

The four-day festival celebrating health, fitness and safety includes four lunchtime activities: a fitness walk on Monday, October 11; a fitness run on Tuesday, October 12; a lecture and demonstration of back exercises on Wednesday, October 13; and a talk on fats and cholesterol on Thursday, October 14.

Also on Wednesday and Thursday, October 13 and 14, the main attraction of the festivities will be the Health, Fitness and Safety Fair itself. In Berkner Hall from 11 a.m. to 2 p.m. both days, all may peruse the displays, observe the demonstrations and take part in the free health screenings.

For more information and to sign up for the walk, run and/or screenings, look for a mailing to all employees and see next week's Bulletin.

Leaving the Lab — After 35 Years or More

The Bulletin salutes employees who retire with 35 years or more of Laboratory service.

Jean Byrne, Staff Services

While she is officially retiring next Thursday, September 30, Jean Byrne, an assistant staff specialist in the Staff Services Division, was "retired" from the Lab once before, in August 1968 — as many women were.

Jean Byrne

"In those days, women had to leave when they were six months pregnant," recalls Byrne, who had the first of her three boys in November 1968 and returned to work when her youngest was three, in January 1974. "You came in with your due date, and Medical determined your termination date. I didn't mind too much because, when you're pregnant, you can get so big and awkward that you get in your own way. I think maternity leave is a better idea, and I like that fathers, too, can now stay home to take care of the kids."

So, Byrne retires with more than 36 years of service — 16 years and 8 months from her first term at the Lab plus 19 years and 9 months from her second. "My husband Ed [Budget Office] and I agreed that I would stop working once all the boys were educated. So, with the youngest due to graduate next May, I am retiring."

Byrne began her BNL career on January 2, 1952, as a clerk in what was then the Security & Plant Protection Division. "In those days, everyone had to have a clearance, and that division took care of obtaining them for employees," recalls Byrne. "Except, when I started, I was 20 and you had to be 21 to work with classified information. So, I had to wait nine months before I could do any filing."

After eight years of typing and filing clearance requests, Byrne transferred in March 1960 to what was then the Staff Services group in the Plant Maintenance Division, dividing her time between housing services in the morning and travel in the afternoon. Appropriately, she became a travel & housing clerk in January 1962. By June 1964, when she was named a senior clerk, Byrne was exclusively doing travel functions.

Travel at the time included transportation: "We had more drivers, more government vehicles, more AUI cars — even an aircraft owned by AUI," Byrne recalls. Staff Services became a division in January 1966, and Byrne was made a clerk III in July 1967. She met her husband at the Lab in 1963, they married in February 1968, and, pregnant, she left the Lab that August.

Byrne came back to work as an office services assistant in 1973, but, because of a lack of child care, she worked only mornings until July 1979, and then until 3 p.m. In March 1983, Byrne was again full time.

She recalls, "When I left travel, the last person I helped was a gentleman from Instrumentation who was going around the world. When I came back almost six years later, the first person I helped was the same person, who this time was going to China. Small world!"

Since her return, Byrne has largely helped departments and research divisions with logistics for conferences. For the past three years, she has been updating the contracts, maintaining the records and doing other administrative work for the division. She was promoted to her present position in October 1992.

Byrne plans to take time out of her retirement to be a tutor — under the Literacy Volunteers of America program sponsored by the Lab. "Reading is so important, and I've always wanted to help someone overcome illiteracy," says Byrne, whose first pupil is another retired person in her community. "If I only teach one person, then I'll have accomplished something in my retirement."

— Marsha Belford

Steve Gracia, Central Shops

"The nice thing about retirement is that there's no Monday," said Steve Gracia, his face crinkling into a smile.

But Gracia, a tool and instrument maker in the Central Shops Division, was quick to point out that he did look forward to most Mondays in all his years at BNL. He will be retiring at the end of September, four months shy of 37 years with the Lab.

Gracia started at BNL on January 21, 1957, as a machinist. "When I came here, the only big machine was the Cosmotron," he said. "I've seen tremendous changes."

Pointing to the floor of the heavy machine shop, Bldg. 479, where he works, Gracia said, "Today, we manufacture some intricate, intricate parts for a lot of the big facilities, like RHIC [the Relativistic Heavy Ion Collider]. We make one-of-a-kind pieces — it's R&D work, not production. Without a doubt, if the toolmaker doesn't make the parts right, the whole thing won't work."

Steve Gracia

Gracia's only regret was that he didn't get to see where most of his work went. "The scientists and engineers took the pieces and that's it," he said.

He is most proud of his involvement with the Lab's apprenticeship program. "I was one of the original people who wrote up the rules and regulations," said Gracia. BNL has sponsored a state-approved craft apprenticeship training program since 1969. The program offers on-the-job training and formal instruction in various trades. Graduates of this program are some of the Lab's carpenters, electricians, heavy-equipment mechanic operators, machinists, refrigeration and air-conditioning engineers, etc.

"I must have seen 60 people come through it," he added. "Imagine the cost if these people were to get this education outside. The instructors are right here in the field, and they're very good."

About the Lab, Gracia said, "Brookhaven is a warm, comfortable place to work. You don't have the factory atmosphere. It's more like a campus. If I had a choice to do all over again, yes, I would work here again. I've made all my good friends here at BNL."

Speaking of changes on Long Island, Gracia remembers when Sunrise Highway stopped before Patchogue, and Montauk Highway was the only road east from there. "In those early years, some people thought we were building an atomic bomb at the Lab," he recalled. "Of course, they were wrong, and I told them we were building machines to smash atoms. People said 'what's an atom?' "

He thinks Long Island has gotten too crowded now. So, over the next two years or so, Gracia and his wife Jeannette will travel around the country. They will probably settle somewhere in the Carolinas, in a rural area.

Gracia said he will "absolutely have no problem keeping busy." He has several hobbies, including fishing, photography, and reading and researching different subjects, such as boating, photography and psychology.

— Mona S. Rowe

BWIS Seminar

Under the Surface of Chemistry

Defining the mechanism of reactions important in the fabrication of semiconductor devices or in heterogeneous catalysis may lead to better understanding of these processes. That's the goal of Cynthia Friend, the Morris Kahn Professor of Chemistry at Harvard University.

Friend will discuss her research into complex reactions that occur on solid surfaces in the next Brookhaven Women in Science (BWIS) seminar. Her talk on "Surface Organometallic Chemistry: Mechanisms and Structure," will begin at 1:30 p.m. on Thursday, September 30, in the Hamilton Seminar Room of the Chemistry Department, Bldg. 555.

Toward a full understanding of surface processes on a molecular level, Friend combines a chemical and spectroscopic approach. She also relies on analogy with organometallic chemistry to establish principles governing coordination and bond activation on surfaces.

Friend's repertoire of experimental methods includes: near-edge x-ray absorption fine structure (NEXAFS), quantitative Auger electron spectroscopy, x-ray photoelectron spectroscopy, multiple internal reflection Fourier-transform infrared spectroscopy, and high-resolution electron energy-loss spectroscopy. Some of this work has been done at BNL's National Synchrotron Light Source, where Friend has been a research collaborator since 1983.

Cynthia Friend earned her Ph.D. in chemistry from the University of California, Berkeley, in 1981. She spent the next year at Stanford University before becoming the first and only woman professor in Harvard's Department of Chemistry, in 1982.

Cynthia Friend

Friend's many research honors have included the 1991 Garvan Medical of the American Chemical Society and, in 1985, a National Science Foundation Presidential Young Investigator Award. In addition to her research, she is actively involved in teaching and in encouraging young women to pursue careers in science.

Refreshments will precede Friend's talk. To join her for a luncheon after the seminar, contact Louise Hanson, Ext. 7709.

Note to Employees:

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

IBEW Meeting

Local 2230, IBEW, will hold its regular monthly meeting on Monday, September 27, at 6 p.m. in the Knights of Columbus Hall, Railroad Avenue, Patchogue. On the agenda will be regular business, committee reports and the president's report.

A BERA Christmas At Radio City

BERA has obtained tickets to the 1993 Christmas Show at Radio City Music Hall, for Sunday, November 28. For the price of $88, the day's itinerary includes:

- Round-trip bus transportation, leaving from the Brookhaven Center at 10:30 a.m. and returning by 9 p.m.
- Time to see the Christmas tree at Rockefeller Center; shop or browse on Fifth Avenue; visit such points of interest as Saint Patrick's Cathedral, Trump Plaza, FAO Schwartz, Barnes & Noble, Tiffany's, various museums and Central Park.
- Early full-course dinner at the Cafe 44 Restaurant in the theater district, with choices of steak, seafood, pasta and more.
- Orchestra/front mezzanine seats for the 6 p.m. show.
- All taxes and tips.

Reservations are now being taken at the BERA Sales Office in Berkner Hall, weekdays, 9 a.m. to 1:30 p.m. A $40 deposit is required to hold your seats. For more information, call Andrea Dehler, Ext. 3347, or M. Kay Dellimore, Ext. 2873.

Meetings Next Week On Long-Term Care

As previously announced in the Brookhaven Bulletin, active and retired employees and their spouses can learn more about the upcoming AUI Long-Term Care Plan by attending one of four meetings to be conducted by representatives of the Aetna Life Insurance Company, which is underwriting the plan.

The meetings in Berkner Hall are scheduled for 1:30 p.m. and 6 p.m. on Thursday, September 30, and 10 a.m. and 1:30 p.m. on Friday, October 1. To avoid undue disruption of work activities, employees who wish to attend a meeting during work hours should obtain prior approval from their supervisors.

Hospitality News

Jan Rohrer will demonstrate how to make mop-doll wall hangings at the next Hospitality Committee get-together on Tuesday, October 5, at 9:30 a.m., in the lounge of the Recreation Building in the apartment area. Those who wish to make one are asked to bring along a pair of scissors, a needle to use with regular thread, and a ballpoint pen with a cap. Rohrer will provide the other materials.

Spouses of Lab employees and guests are welcome. Bring the children, but please also bring along a toy or two.

J. Robb Grover, Chemistry

"I call it gardening," said J. Robb Grover, Chemistry Department, as he dug through the neat piles of folders that cover most of his office surfaces — and came right up with the necessary reference. "One has to turn things over to find what one wants," he explained.

J. Robb Grover

Grover was uncovering memorabilia of his 36 years in BNL's Chemistry Department, which started on October 1, 1957, and will end when he retires next Thursday, September 30. Most of his interests and remembrance centered on chemistry, but he also produced a hoard of cartoons and irreverently recaptioned Brookhaven Bulletin and Highlights photos of himself and colleagues at work. Some showed where he started, in T-466, the old chemistry building located in what is now an empty lot west of the Teachers Federal Credit Union.

"At that time, the Chemistry Department tended to have a laid-back spirit," remarked Grover. "If your arrival was delayed because you were finishing your thesis, or getting married — or both, as in my case — nobody objected. Also, there was considerable freedom as to how and on what you worked. Coming in as a new research associate, I was simply shown to a lab, and told: 'Begin!' "

Grover began working in his field of experimental nuclear chemistry and continued on to include theoretical work. One piece of research was in observing and understanding the behavior of a nucleus in its lowest excited state at each value of angular momentum.

"As I was the first to explain how these states affect nuclear reactions, I thought I could have the temerity to name them," said Grover. "I asked a friend in the Germanic language field for the shortest possible adjective to describe something spinning as fast as it can. He came up with 'yr,' Scandinavian for 'dizzy.' 'Yrast' could mean 'dizziest.' I liked it, and these highest spin nuclear states are called 'yrast levels' to this day."

After becoming an associate chemist in 1959 and a chemist in 1963, Grover received tenure in 1966 and was named to his present senior chemist title in 1978. "By then, I had also become interested in molecular reactions and was working on chemically reactive scattering in crossed molecular beams. Then the National Synchrotron Light Source [NSLS] started operating, and, by 1981, my major effort was there."

At the NSLS, Grover specialized in photoionization-induced intracluster reactions, with emphasis on kinetic energy release spectra. With a colleague, he has started writing a book on gas-phase clusters, which he will finish in retirement.

One project that Grover regretted not being able to follow up was his work on crossed molecular beams, one labeled with short-lived radioactivity and the other not labeled, As they cross, individual molecule-molecule reactions occur, scattering products whose angular distribution can be measured.

"In a small-scale prototype experiment, done with radioactive sources in the lab, I could get differential cross-sections on reactions whose total cross-section was only one to two square angstroms, comparable to the best sensitivity achievable with other techniques," he said. "But, by using our method with a cyclotron on line as the source of radioactivity, you'd get sensitivity over 1,000 times greater — a technique of tremendous promise. However, it proved impossible to get funding to continue. I hope someone will work on it — but I've got other things to do.

Among the other things Grover has in mind is to relearn the piano, which has played second fiddle to his chemistry all these years. Another is to write fiction. "I've written one novel and most of another, and, also, I have what every novelist needs before success — a rejection slip," he commented. "The rejection was sent to my grandfather for *his* book, but it should give me a head start."

Also on his mind is his forthcoming move to Ashland, Oregon, not far from where he grew up. "Jean, my wife, went there for a few months to oversee the building of our new home. It was finished in June — and we're moving there in mid-November. I have yet to see the place myself, and it's hard to wait!" — Liz Seubet

Paul W. Levy, Physics & DAS

On December 8, 1952, Paul Levy, a young physicist who had worked previously at the University of Chicago on the Manhattan Project and at Oak Ridge National Laboratory, joined BNL's Physics Department to study radiation damage in solids, particularly nonmetals.

More than 40 years later, on the eve of his retirement on September 30, Levy is still pursuing research in radiation damage.

"Over the years, I've gotten many offers to go elsewhere, but I always chose to stay at Brookhaven because I enjoyed research and was able to pursue the work that, for the most part, interested me," Levy said.

Paul W. Levy

In Bldg. 356, Levy performs research with a special facility he designed more than 30 years ago. Called a Solid State Gamma Radiation Facility, it is, according to Levy, the only one of its kind in the world. The materials studied are irradiated with cobalt 60 in a chamber shielded with about 10,000 concrete blocks. Changes in absorption and scintillation (luminescence) produced by gamma radiation are studied with a 13-meter-long optical relay and measurement system.

"The facility was originally designed for basic research, but now is very useful for studying radiation damage in detectors that will be used in the Superconducting Super Collider and Brookhaven's Relativistic Heavy Ion Collider," Levy said.

Starting at BNL in 1952 as an associate physicist, Levy received his Ph.D. from Carnegie Mellon University in 1954, was promoted to physicist in 1958, and received tenure in 1962. In 1985, after starting radiation-damage studies on natural rock salt for waste-disposal applications, he transferred to the Department of Applied Science (DAS). Now he works jointly for DAS and Physics.

According to Levy, when he first came to Brookhaven, employees shared a sense of mission — a common goal to pursue peacetime research in the new field of nuclear science. Over the years, he says, he has seen that sense of mission replaced by a "me generation" mentality.

"The Lab has a product — research," Levy said. "Everyone at the Lab has to understand that the entire staff, even if not directly involved, contributes to that research," Levy said. "This sense of mission has to be renewed. Also, basic research is essential. It is the source of the knowledge that ultimately results in technology transfer."

Levy's retirement plans will be put on hold for a while, since he will stay on as a consultant to finish upgrading the facility in Bldg. 356.

When he does finally get some free time, Levy plans to take up an interest he had to leave behind for physics research — wood carving. Also, he and his wife, Phyllis, a retired mathematics teacher, plan to travel more. The couple live in Sayville, where they raised their four children, each now in a different profession. —Diane Greenberg

Delicious Death Plotted: Dinner-Mystery Theater

Gourmet dinner, dancing and murder are on the menu for the dinner-theater event plotted by the BERA Specal Events Committee and Murder Mystery, Inc., for Friday, November 12, at the Knights of Columbus Hall, Patchogue.

Imagine sipping a cocktail from the open bar, when someone drops dead — murdered! The scene is set by the talented stage company of Murder Mystery, Inc., for a thrilling "whodunit?" — allowing mystery-loving dinner guests to experience their fantasies as suspects, sleuths, victims — or even the murderer, as the entertainment builds up with baffling clues to a spine-chilling solution.

While tracking the criminal, you'll enjoy your choice of prime ribs or chicken cordon bleu, followed by a selection from the dessert table. The bar will be open for five hours, and, to celebrate the solution of the mystery, deejay Ed Taylor will playe dance music until 1 a.m.

At $45 each, tickets are on sale at the BERA Sales Office in Berkner Hall, Ext. 3347, on weekdays from 9 a.m. to 1:30 p.m. Don't delay — if 100 tickets are not sold by October, the evening must be canceled.

And you may go for free! All tickets paid for or reserved with a $10 nonrefundable down payment by October 4 will be entered in a drawing for four free tickets!

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ANITA COHEN, Editor
MARSHA BELFORD, Assistant Editor

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

Examinations Coming Up

Participants in the Adult Fluoride Study are reminded that dental examinations will be conducted during the week of October 4-8 in the Brookhaven Center's North Room, as per the schedules they have received by mail.

Anyone with questions may call Robin Johnson, 632-8970, or Mary Wood, Ext. 5923.

Adult Swim Lessons

BERA will offer beginner and intermediate swimming lessons for adults on Wednesday nights at the BNL pool for eight weeks beginning Monday, October 4, from 5:15 to 6:15 p.m.

Open to all BNL employees and family members 18 years or older, the eight lessons will cost $40, plus $2 entrance fee or current season pass for each lesson.

Sign up at the pool prior to lessons or on the first night. For more information, call Susan Juzwak, Ext. 3147, after 4 p.m.

Arrivals & Departures

Arrivals

Hui Cao ..... Adv. Technology
Yian Biao Zhang ..... Biology

Departures

None

New Group Forming For AIX Users

Since there are many IBM rs/6000 workstations on site, an AIX Local Users Group is being formed to facilitate the exchange of information among users of these machines.

The first meeting will be held on Tuesday, September 28, at 2 p.m., in the CCD Seminar Room, Bldg. 515. For more information, contact Ronnie Evans, Ext. 2851.

New Pool Season

A new three-month pool season will begin on Friday, October 1, and run through Monday, December 31.

Tickets may be purchased at the pool during open hours:

Monday through Friday

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

Saturday and Sunday

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

Daily Admissions

Employees or family member	$2.00
Guests*	$3.00

Season Tickets (fees not prorated)

Individual membership	$40.00
Family membership	$50.00

**Guest ruling for all recreation facilities: One guest per employee permitted. Advance arrangement for additional guests, a maximum of five at any one time, must be made at the Recreation Office, Personnel Division, Bldg. 185. Guests must be accompanied by the sponsoring employee.*

The pool is closed on all Lab holidays.

Volleyball

A Volleyball League captains' meeting will be held on Wednesday, September 29, at noon, in Berkner Hall, Room A. Captains or team representatives must attend.

Anyone interested in playing but not already on a roster may contact Terry Sullivan, Ext. 2840, or Susan Pepper, Ext. 2184.

Attn: Retirees

In November — just in time for card writing during the holiday season — the Bulletin will publish its annual Special Edition updating retirees names and addresses.

We'll also have room to include some greetings, brief reminiscences and photos that you may wish to share with the BNL community.

Send them — along with your name, life number and phone number — to the Brookhaven Bulletin, BNL, Bldg. 134, P.O. Box 5000, Upton, NY 11973-5000.

To consider your submittal for publication, we must receive it by Friday, October 29. It may be edited and will be published as space permits.

Art and Leaves: Bus Trip up Hudson

On Saturday, October 30, the BERA Art Society bus will voyage up the Hudson Valley. Leave BNL at 7:30 a.m. for Purchase, to see American, European and African art at the Neuberger Museum and a fine sculpture garden funded by Pepsico.

After driving up the river to lunch, great views and falling leaves (if any!), return to explore the antique and gift shops at picturesque Nyack, perched on the Hudson. There, visit Edward Hopper House, then have a snack supper before the bus leaves to get back to BNL by about 8:30 p.m.

The bus will cost $18; the Neuberger Museum $4 ($2 for seniors). Call Liz Seubert, Ext. 2346 or 286-8563, for tickets or information.

Bridge Club

The next meeting of the BERA Bridge Club will be on Tuesday, September 28, at 7:30 p.m., in the Brookhaven Center. All those interested may call Willem van Asselt, Ext. 7778, or Jean McAlary, 929-4741.

Bowling

Red/Green League

J. Goode bowled a 245, R. Mulderig 243/210/640 scratch series, R. Larsen 235/212/207/654 scratch, E. Beadle 235/209/633 scratch, C. Bohnenblusch 232, K. Asselta 230/613 scratch, E. Sperry IV 212, T. Prach 210, M. Guacci 209, B. Erickson 205/200, R. Wiseman 205, S. DiMaiuta 204, R, Raynis 202.

Purple League

Norman Fewell bowled a 215, Manny Dador 203/189, Maria Yanez 184/180, Maryanne Reynolds 184, Irene Sperry 179, Linda Farmer 173.

White League

Sharon Smith 200, Bob Geib 186/211, Ann Wynkoop 197, Pete Wynkoop 197.

Cafeteria Menu

Monday, September 27	
Soup: Minestrone	.80/1.10
A la carte: Flank steak w/mushrooms	3.65
Fitness Fare: Broccoli quiche	3.35
Metro Deli: Pastrami sandwich	2.95
Grill: Reuben platter	2.95
Fitness Salad: Tuna flake bowl	
Tuesday, September 28	
Soup: Chicken rice	.80/1.10
A la carte: Omelet display cooking	
Fitness Fare: Baked sole w/red onion	3.75
Metro Deli: Roast beef sandwich au jus	2.95
Grill: BBQ pork sandwich	2.95
Fitness Salad: Chef's bowl	
Wednesday, September 29	
Soup: Tomato bouillon	.80/1.10
A la carte: Manicotti w/veg	3.35
Fitness Fare: Dijon chicken	3.45
Metro Deli: Virginia ham sandwich	2.95
Grill: Monte Cristo platter	2.95
Fitness Salad: Fresh fruit	
Thursday, September 30	
Soup: Cream of celery	.80/1.10
A la carte: Chicken Kiev w/rice	3.65
Fitness Fare: Flounder Florentine	3.75
Metro Deli: Corned beef sandwich	2.95
Grill: Chicken breast w/Swiss, croissant	3.15
Fitness Salad: Oriental chicken	
Friday, October 1	
Soup: New England clam chowder	.80/1.10
A la carte: Chicken piccata w/rice pilaf	3.60
Fitness Fare: Exhibition cooking	
Metro Deli: Turkey sandwich w/gravy	2.95
Grill: Pacific mahimahi	3.85
Fitness Salad: Cantaloupe bowl	

Burger, & Taster's Bar & other specials daily

Classified Advertisements

Placement Notices

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

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

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

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

LABORATORY RECRUITMENT - Opportunities for Laboratory employees.

DD 2821. CLERICAL POSITION - Requires previous relevant work experience and a working knowledge of office procedures. Must have good communication and telephone skills and a knowledge of word processing; WordPerfect experience highly desirable. Duties will include preparation of memos and letters, facsimile distribution, photocopying, file maintenance, mail distribution and telephone coverage as needed for the Chairman's Office and the Department's Administrative Group. Department of Advanced Technology.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside candidates.

DD 8184. PROGRAMMING POSITION - (term appointment) Requires a bachelor's degree or equivalent experience, and substantial experience maintaining database systems and structural programming methodologies. Progress and Foxpro database experience desirable. Will be responsible for performing network and database administration in a Banyan Vines/Sun UNIX environment. Safety and Environmental Protection Division.

Motor Vehicles & Supplies

91 MERCURY TRACER LTS - 12k mi., 4-dr., a/t, ac, *1991 Road & Track* 10 best, excel. cond., $8,775. Eric, Ext. 5875.

91 HARLEY SPORTSTER DELUXE 883 MOTORCYCLE - candy red, w/$1,000 in extras, 3k orig. mi., mint cond. Lloyd, Ext. 5225.

90 TOYOTA TERCEL - 48k mi., 2-dr., 4-cyl., a/t, ac, p/s, p/b, radio cass., alarm, new exhaust, $5,500. Ext. 4388 or 582-2553 after 6 p.m.

90 CHEVY BLAZER - 6-cyl., 2-dr., p/b, p/w, 4wd, 58k mi., v.g. cond.; '86 Firebird, 6-cyl., a/t, p/b, p/w, ac, high mi., v.g. cond., $4,000. A. Lopez, Ext. 5768.

90 SUZUKI RM80 DIRT BIKE - comp. new top end, runs well, well maint., mint cond., $1,000. Todd, 924-3704.

89 TOYOTA SUPRA - turbo, white, 5-spd., abs, brakes, elec. roof, ext. warr., alarm, excel. cond. 473-3852.

89 HONDA ELITE 50E - 3k mi., runs like new, helmet incl., $350. Michael, 281-8306.

88 MERCURY TRACER - a/t, ac, p/s, p/b, cass., 40k mi., $4,000; '86 Mazda 626LX, lux. ed., silver/blue, 100k mi., $3,000, both excel. cond. Mark, Ext. 2043 or 821-3169.

87 MERCURY SABLE - 55k mi., a/t, ac, loaded, white, blue int., asking $4,500. Mike, 399-3046.

87 VW SCIROCCO - 16V, red, fully loaded, am/fm cass., sunroof, low mi., 5-spd., orig. owner, must see, $5,900. Steve, 289-9002.

87 VW GOLF - 5-spd., 2-dr., 60k mi., $2,600. Bob, Ext. 4002 or 924-9662.

86 TRANS AM - black, T-top, fully loaded, excel. cond., 305 eng., asking $5,800. Gina, 563-4468.

86 LE BARON GTS - h/b, 4-dr. Turbo Sport Premium, all options, int. leather, new tires & brakes, low mi., excel. cond., $5,500. Ann, Ext. 5740 or 744-8386.

85 PORSCHE 91 - conv., Carrera, Cabiolet, white, leath. int., new 16" Yoko-ZR16 tires, brakes, sensors, ac, p/s, p/w, 35k mi., $27,000. Jim, 289-0876.

84 HONDA - 5-spd. h/b, new clutch, brakes, tires, exhaust, recently tuned, great gas mi., must sell, $1,200 neg. Tammy, Ext. 7258.

84 OLDS CUTLASS CIERA - ac, p/b, p/s, white, blue velour int., reliable, asking $750. Phil, 286-1348.

84 FORD TEMPO - 4-dr., 5-spd., ac, p/s, p/b, am/fm cass., cruise, new tires, orig. owner, excel. cond., $1,500. Al, Ext. 5128.

84 VOLVO WAGON - diesel, 5k mi. on new motor, tires, brakes, ac, radiator, more, all receipts, $6,900. Tony, 281-2513.

84 TOYOTA SUPRA - 5-spd., 130k mi., $2,000 neg. Pierrot, Ext. 3749.

83 HONDA CB1100F MOTORCYCLE - Sport Touring, red, white, black, low mi., excel. Ronnie, 732-6712.

83 PLYMOUTH RELIANT - good body, runs, must go, $500 or best offer. Andrei, Ext. 3831 or 341-1076

82 RABBIT - 5-spd., new clutch, battery, tires, struts, $500. 874-2838.

82 HONDA CIVIC WAGON - 5-spd., ac, excel. gas mi., $1,200. Gary, Ext. 3751.

81 CADILLAC SEDAN DE VILLE - full power, excel. running cond., good cond., $1,650. 475-8242.

77 FORD LTD - a/t, p/s, p/b, ac, 2-dr., 136k mi., $400 neg. Dannie, Ext. 4581.

75 COLEMAN POP-UP TRAILER - sleeps 6, w/screen house, $475. David, Ext. 5460.

TRAILER HITCH - class III, bolt on w/head & ball, $50. Ed, Ext. 4561.

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

72 PONTIAC VENTURA NOVA - 2-dr., 307-V8 rebuilt, new racing tires & paint, air shocks, $1,800 or best offer. (718) 429-2192.

71 CHEVY NOVA - heavy-duty battery, good brakes, insp., 4-dr. sedan, 6-cyl., runs well, good cond., $600. B. Fitzgerald, Ext. 3437.

62 BUICK ELECTRA 445 WILDCAT - runs, body/int. good cond.; tires, 3, Pirelli 185HR14 Lo-Profile, low mi., v.g. cond. Charles, Ext. 5211 or 321-6674 eves.

62 STUDEBAKER LARK - 6-cyl., 2-dr., v.g. cond., $1,300; '65 Chevy carryall, 4wd, V-8, 4-spd., $200. Frank D., Ext. 2022 or 399-4480.

Boats & Marine Supplies

22' MARSHALL CATBOAT - freshwater-cooled Yanmar diesel, VHF radio, depth sounder, Danforth compass, head. Gordon, 477-2269.

22' MACGREGOR SLOOP - 1978, 150 jib, 7.5-h.p. Merc., VHF, swing keel, sink, sleeps 4, trailer, good cond., $2,900. Jon, 363-3661.

18' DIXIE MOTORBOAT - 50-h.p. Mercury, new canvas top, blue & white, immac., must see, complete w/ Caravan trailer, bargain, $1,300. Ann, Ext. 2114.

Audio, Video & Computers

COMPUTER GAMES - orig. boxes, Space Quest I-IV, King's Quest V & VI, Ultima VII, more, $5-$20 ea., or make deal. Bernie, Ext. 4842.

COMPUTER SCANNER - AT&T, overview, full page, $125 neg. i486 SX33 computer, 2 meg RAM, 3½ & 5¼ floppy drives, more, $650. Vinny, 582-6241.

MICROPHONE - professional, w/desk stand, full boom, wires, all set to plug in, $30. 878-8294.

TV - Toshiba, 20", stereo, 1 yr. old, $200. Jean-Michel, Ext. 3069.

TV - Panasonic, 13", color, remote, $70. Geir, Ext. 2211.

COLOR TV - 19". RCA, excel. cond., $50 neg. Alan, Ext. 2928 or 929-0461.

TV/VCR CABINET - $30; dining room table, $50; TV, $20; suitcase. Tim Dwyer, 744-2203.

VIDEO CAMERA - JVC GF-S 550, waist battery pack, wide angle lens, light, wireless, microphones. Puleston, 286-1674.

Miscellaneous

BRICK - 400, Nassau, used, great for fill-ins, patios, etc., $70/all. Marlene, 744-5801.

CAR SEAT - Century, like new, $25. Pat, Ext. 4638.

CAR SEAT - Evenflo Joyride, $25; Fisher Price bathtub, $8; Sesame Street playgym, $8. Chris, 744-6874.

MAGAZINES - old *Relix, Golden Road* (music of San Francisco and Grateful Dead), also numerous guitar magazines, best offer. Tim, 924-5282.

OPERA TICKETS - Metropolitan, 2 orchestra seats, for *Madame Butterfly*, Sat., Oct. 16, matinee, $65/ea. Ext. 4747 or 765-1075.

STROLLER - Aprica, $75; Century car seat, $40. Al, Ext. 4442 or 929-8411.

Free

CATS - two 1½-year-old, calico and b/w male, all shots & neutered, can be relocated immediately, will deliver. Les, Ext. 4107.

CEDAR SHAKES - old, untreated, good for kindling, you haul, Mattituck area. Jim, Ext. 4026 or 298-9748.

RABBIT - w/cage, book, etc. Ext. 4331.

WINDOW - 8'6 x 4'6, double-hung center picture w/ storms. 874-2838.

Yard & Garage Sales

WADING RIVER - multifamily, 9/25, 9-4 p.m., furniture, baby items, household items, toys, 26 Long Bow.

WADING RIVER - 2 family, 9/25, Randall Rd., 8:30 a.m.-2:30 p.m. R.A. Lutz.

Lost & Found

LOST - beeper, Bravo brand. Carol Bell, Ext. 7725.

BRACELET - thin gold, 9/13, vicinity of parking lot on Brookhaven Ave. across from Staff Services and Bldg. 179B. Joan, Ext. 2549.

Real Estate

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

For Rent

BELLPORT VILLAGE - 1-bdrm. studio, eik, single nonsmoker, no pets, $700/mo. all. Al, Ext. 2175.

BLUE POINT - house to share, lovely, quiet home, 20 min. to Lab, own bdrm., close to a beach, nonsmoker, single, $500/mo. 363-2557.

CENTER MORICHES - upstairs apt., 2 rooms, full bath, single preferred, priv. ent., close to transportation, w/w, no pets, $550/mo. includes all. Ext. 3315.

CORAM - furn. 1-bdrm. apt., avail. immediately, lg. master + l/r-d/r, full bath, close to stores, 12 min. to Lab, $710/mo. incl. heating, cooking. 736-9453.

CORAM - 3-bdrm. house w/cathedral ceiling, bath, d/r, bsmt. apt. Lynette, 924-2213.

FARMINGVILLE - brand-new apt., upstairs, priv. ent. deck, skylights, w/w, cable, $550/all. Nick, 732-7499.

MASTIC - studio apt., priv. ent., single preferred, $485/mo. includes util., 1 mo. sec. 399-0167 after 4 p.m. or leave message.

MASTIC BEACH - lg. furn. room, share bath, kit., laundry, cable, quiet street, 10 min. to Lab, walk to Bay and marina, $95/wk., single, nonsmoker. 399-4480.

PORT JEFFERSON STATION - lg. 3-bdrm. ranch, l/r, d/r, den, eik, 2 baths, w/d, dbl. gar., 3VSD, $1,200/mo. Jim, Ext. 4368 or 928-3371 eves.

RIDGE - 2-bdrm. condo, 1½ baths, kit., d/r, l/r, w/d, 5 min. from BNL, $675/mo. Kathy, Ext. 2267.

RIDGE - furn. studio apt., kit., bath, priv. fenced yard, 3 mi. from Lab, $475/mo. Ext. 2673 or 744-8632.

RIDGE - large 1-bdrm. apt., full bath, modern kit., w/w, priv. ent., no pets, 5 min. to Lab, avail. immediately, $650/all + security. Ext. 5076 or 744-4615

.SHIRLEY - 1-bdrm. waterfront property, eik, l/r, full bath, fp, priv. ent. & parking, furn., 1 mo. sec., $650/mo. Matthew, 399-2989.

SHOREHAM - new, partially furn. 1-rm. apt., full bath, kit., priv. ent., immediate occupancy. 821-4318.

ROCKY POINT - new, furn., l/r-bdrm. combo, eik, full bath, free cable, priv. ent., walk to beach, $500/all. Ext. 3122 or 744-2259.

ROCKY POINT - furn. 2-bdrm. ranch, bsmt., all appl., immaculate, overlooking Sound, $800/mo. +, ready Oct. 1st. Marlene, 744-5801 after 5 p.m.

HILTON HEAD, SC - 2-bdrm. condo, sleeps 6, fully furn., 2 baths, pool, beach, golf nearby, now $450/wk. Guy, Ext. 3147 or 689-5378.

S. WOODSTOCK, VT. - 4-bdrm. Col., lg. kit., d/r, l/r, fp, year-round resort area, near lakes, skiing, equestrian village, historical, cultural events, $850/mo. Sept.-June. 475-5894.

For Sale

BAYPORT - 3-bdrm. 2-story Col. on 1.2 acres, OHWH, d/r, 2 baths, lg. country kit., BPBPSD, near schools, $130,000. 472-3332.

BELLPORT VILLAGE - S. Howell's Pt. Rd., 2 bdrm., 2 baths, lots of decks, skylights, French doors, secluded, steps to golf & tennis, $229,000. 286-1474 after 6 p.m.

BROOKHAVEN HAMLET - 3-bdrm. ranch, l/r w/fp, d/r, fam. rm., solar rm., full bsmt., ac, scr. porch, town water, sec. syst., hot tub, 20'x40' gunite pool, 2 storage bldgs., 3+ acres, fenced. Marty, Ext. 4860.

CALVERTON - 2-bdrm. townhouse, 5 appl., carpted, cac, fp, patio, upper deck, assume mort. Ext. 3558.

CENTER MORICHES - 3-bdrm. ranch, recently renovated, minutes from village, full bsmt., gar., new bath, new kit., ⅓ acre, quiet area, $117,000 neg. 878-4825 after 6 p.m.

EAST MARION - 1 acre building lot, adjacent to greenbelt, walk to Sound. 325-0447.

E. SETAUKET - 4-bdrm. split, 2½ baths, den, fin. bsmt., deck, fully landscaped, igp/igs, 3VSD, reduced to $169,900. 473-5376.

HOLBROOK - Woodgate Village, 2-bdrm. townhouse, new windows, appl., HWH, cac, wood stove, attic, pool, clubhouse, tennis, low taxes, 15 min. to Lab, immac., ask. $107,000. Joann, 472-6742.

HOLTSVILLE - 2-bdrm. ranch, fp, l/r, d/r, lg. kit., partial bsmt., w/d, fenced backyard, taxes under $1,800, Sachem schools, $92,000 neg. 289-1732 eves. & wknds.

MANORVILLE - 2¼ wooded acres w/pond, good investment, $45,000. 345-3490 after 6 p.m.

MASTIC BEACH - 3-bdrm. ranch, 1 bath, den, eik, 50'x225' yard, lg. shed, 5 yrs. old, nice area, 15 min. to Lab, fin. bsmt, $104,900. Tony, 281-2513.

MEDFORD - 2-bdrm. golf-dominium, in low $90s, includes golf, tennis, billiards, in/outdoor pools, sauna, whirlpool, clubhouse & restaurant. 736-8742.

MIDDLE ISLAND - 3-bdrm. ranch, l/r, d/r, eik, gar., full bsmt., new appl., new boiler, refinished oak floors, lg. fenced yard, custom swing set, pool, deck, dead end, move-in cond. Mary, 924-6235.

MIDDLE ISLAND - mint 1-bdrm. condo, 1 bath, cac, gas heat/cooking included in low maint. fee, owner occupy or rental. Liz, 924-0138 after 5 p.m.

RIDGE - Leisure Knoll, 2 bdrm., 1 bath, gar., l/r, d/r, eik, 6 appl., rec. facil., upgraded flooring, cac, igs, taxes $2,100, ask. $95,000. Diana, Ext. 3379.

RIDGE - 3-bdrm. townhouse, 1½ baths, lg. d/r, cac, 5 min. to Lab, $79,900. Sharon, 924-4734.

RIDGE - 4-bdrm. Cape, Ridgehaven Estates, 150'x85' corner property, avail. immed., $79,990, rent w/option and financing possible. 744-4611.

ROCKY POINT - 4-bdrm. Col., 2½ baths, gas heat, cac, l/r, d/r, eik, den, fin. bsmt., gar., low taxes, ask. $127,990. Don, Ext. 7237 or 744-2921 after 5:30 p.m.

SHIRLEY - 3-bdrm. ranch, full bsmt. & gar., central vacuum, alarm system, all appl., wall ac, oak floors and much more. Terri, Ext. 2112.

S. SETAUKET - 4-bdrm. Eaton Col., fl/r, fd/r, den, eik, 2½ bath, fp, 3VSD, $162,500. Ext. 2344 or 751-4254.

DELAWARE COUNTY, NY - wooded 62 acres, rural, hunting, fishing, swimming, $55,000. 878-5836.

Wanted

AIR COMPRESSOR - medium duty w/tank for spray work. Mike, Ext. 5030 or 821-4083.

BASSINET - car seat/carrier and nursery monitor for newborn, in v.g. cond. Ext. 1020.

BICYCLE - adult 3-wheel, good cond. 589-6803.

CUCKOO CLOCKS - any cond., for student clock fixer, reasonable. 698-4882, leave message.

ELECTRIC TYPEWRITER - w/memory correction function preferred. Ext. 4331.

HIGH CHAIR - child's Babee-Tenda-type, also wood playpen, good cond. only. 286-8664.

HOUSEMATE - female to share new house, priv. ent., full bath, bdrm., washer, d/w, walk to beach, clean quiet. 395-0584 eves.

KITCHEN/DINETTE TABLE - wooden, used, to cut down and use for train track set. Pam, Ext. 5752 or 286-8380

PERSON TO WATCH MY 10-YR-OLD DOG - a sweet Laborador retriever, while we are away for one week in Oct., will watch your pet or pay well. 289-9533.

PICKUP TRUCK TIRES - 4 h/d P235-75R15, load range-c, good cond. only. Mark Beacon, 924-5533.

ROOMMATE - to share 2-bdrm. apt., Middle Island, 5 min. to Lab, $350/mo. + ½ util., single, nonsmoker. Yang, Ext,. 2341.

SOFTWARE - Upton Nursery School needs educational and children's software for an Apple II and/or an IBM PC. Sue, 929-3732.

TICKETS - in need of 2 Billy Joel tickets, any date. Jim, 473-3852.

TOY BOX - or equivalent, bookcases, board games, nintendo. 325-5546.

VACATION RENTAL - 1-2 bdrm., near warm saltwater, Feb. or Mar., access to tennis, retired couple. Bill, 286-7583.

In Appreciation

I thank all my friends and coworkers in the Biology Department who offered their sympathy and support upon the death of my brother Roy.

— Sydell Lamb & Family

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