

Working On A Better Solar Cell

Right now, those solar cells you can buy out of catalogues and electronics shops are really only good for proving a point — yes, sunlight *can* be converted into electricity. For practical use, however, they're too expensive.

Commonly made out of crystalline silicon, these cells can range in cost from \$5 to \$10 each. Two or three might be enough to propel a toy truck. But for a cup of coffee, a freshly laundered shirt or a vacuumed rug, several thousand cells would be required. And simple arithmetic tells you the cost would be prohibitive.

That's why a number of scientists, among them a group at BNL, are attacking the problem from another angle. They have turned away from costly crystalline silicon cells and are investigating amorphous silicon cells, which are projected to be about twenty times cheaper.

Amorphous means without regular structure, non-crystalline. The BNL scientists say that characteristic is the key to the price difference. Amorphous silicon can be easily and quickly made from silicon-containing gas. In contrast, crystalline silicon must be grown out of molten silicon, a time-consuming process at temperatures above 2,500° F. Even after the crystals are formed, they must be sliced thinly for use in solar cells, wasting a lot of material in "sawdust."

Interest in using amorphous silicon for semiconductors is relatively new. The first amorphous silicon solar cell was reported in 1976 by researchers at RCA. Soon after, BNL's amorphous semiconductor group was formed in the Division of Metallurgy and Materials Science, DEE. Funded through two DOE sponsors, the Office of Basic Energy Sciences, and the Solar Energy Research Institute, the group is studying basic properties of amorphous silicon, with an eye toward fabricating better solar cells.

The BNL scientists are particularly interested in hydrogenated amorphous silicon. They say this alloy of silicon and hydrogen shows great promise for fabricating thin film solar cells. The films they make are about 90 percent silicon and 10 percent hydrogen, a combination that makes a better solar cell than pure amorphous silicon. Somehow, the small amount of hydrogen patches defects in the silicon, defects which reduce a cell's efficiency. For the same reason, the scientists will soon test the addition of

(Continued on page 2)

Lab Director George Vineyard Resigns

News of Laboratory Director George Vineyard's resignation last week was received with deep regret by Laboratory employees and by many members of the scientific community. Among the expressions of appreciation for his leadership of BNL was a message from Secretary of Energy, James B. Edwards. (See box.)

Dr. Vineyard asked that his resignation take effect as soon as a successor can be found, and says that now, "after a long period of administration, when my own work could only be a sideline, I am looking forward to returning to full time research."

In an interview with the Bulletin, he reflected on the current state of the Laboratory and his optimism for its future:

"The Laboratory has surmounted many problems, and, although others remain, I feel that its future should be bright. The year by year funding for ISABELLE at the necessary level is not yet assured, but we have considerable support in Washington and in the high energy community. The support of the community and the importance of the machine for physics became strongly evident again at the ISABELLE workshop just last month. Dramatic progress has recently been made in overcoming the technical troubles that have dogged the ISABELLE magnets, and I am convinced we have finally turned the corner with that.

"The Laboratory has weathered recent difficulties with the budget. The National Synchrotron Light Source will soon be coming on line, and a large and enthusiastic group of scientists are waiting eagerly to use it.

"It will be easier to turn over the reins now because there is a truly top-notch group of people in the Director's Office and in the Departments to carry on the administration of the Laboratory. My term of administration has been richly rewarding in a personal sense, and I believe it is time now to undertake something new."

Dr. Vineyard has indicated that the chief item on his agenda is a sabbatical leave. It will be the first time he has taken such a leave in his 27 years at Brookhaven, and he says he is anticipating it as a period of "scientific refreshment."

Dr. Robert E. Hughes, President of AUI, announced Dr. Vineyard's resignation in a letter to all BNL employees last week. In it, he expressed the deep regret of the AUI Board of

Trustees and its "profound appreciation for the many important contributions that Dr. Vineyard has made to the Laboratory, to science and to AUI." Besides the development of ISABELLE and the National Synchrotron Light Source in Vineyard's administration, Hughes stated further that "Brookhaven's reputation in fundamental research has flourished and strong ties have been maintained with academic and user communities. In dealing with the myriad programs of a major multidisciplinary national laboratory, Dr. Vineyard has consistently acted with deep personal integrity and unfailing human understanding."

In the search for a new Director, a Trustee's Special Committee is being appointed by Chairman of the AUI Board of Trustees, W. Donald Cooke. The Special Committee will be chaired by Dr. Hughes. In a telephone interview earlier this week, Dr. Hughes said that, in addition, a committee broadly representative of the BNL community will be appointed to advise the Special Committee.

Although he has agreed to stay on until a new director is selected, Dr. Vineyard expressed the hope that he



George H. Vineyard

could be relieved before the end of the year. Dr. Hughes has indicated that because of the time required for a careful national search, it might be necessary to appoint an acting director.



THE SECRETARY OF ENERGY
WASHINGTON, D.C.

August 20, 1981

Dr. George H. Vineyard
Director
Brookhaven National Laboratory
Upton, New York 11973

Dear Dr. Vineyard:

I was just informed of your decision to resign your position as the Director of Brookhaven National Laboratory. I hope that your nine-year term as Director has been as rewarding to you as it has obviously been to Brookhaven. I suspect that few people, including many of your colleagues, appreciate the headaches, heartaches, and rewards associated with being the director of a major national laboratory. For a distinguished scientist such as yourself, it means, among other things, setting aside your own scientific research in favor of helping your colleagues acquire and manage the resources needed to solve scientific problems of national importance.

Under your leadership, the Laboratory has moved forward in a number of exciting areas of science and has continued to make major contributions to advance research. Congratulations on a job well done!

I wish you great success in whatever new activities you decide to pursue, and I look forward to an opportunity to meet you personally sometime when you are in Washington.

Sincerely,

James B. Edwards

Sensing Pollutants With Lasers

The first working laser was built in 1960. It brought to reality the stuff of sci-fi dreams — intense beams of light strong enough to vaporize the hardest and most heat-resistant materials. A myriad of applications have been developed since then which make use of other laser characteristics. Lasers are used to alter connections in microcircuitry, align jigs in producing jet aircraft, even perform microsurgery on parts of a cell. Lasers are also tools of research scientists, and now a BNL scientist is working on a laser technique which will eventually be used to identify and measure pollutants in the atmosphere.

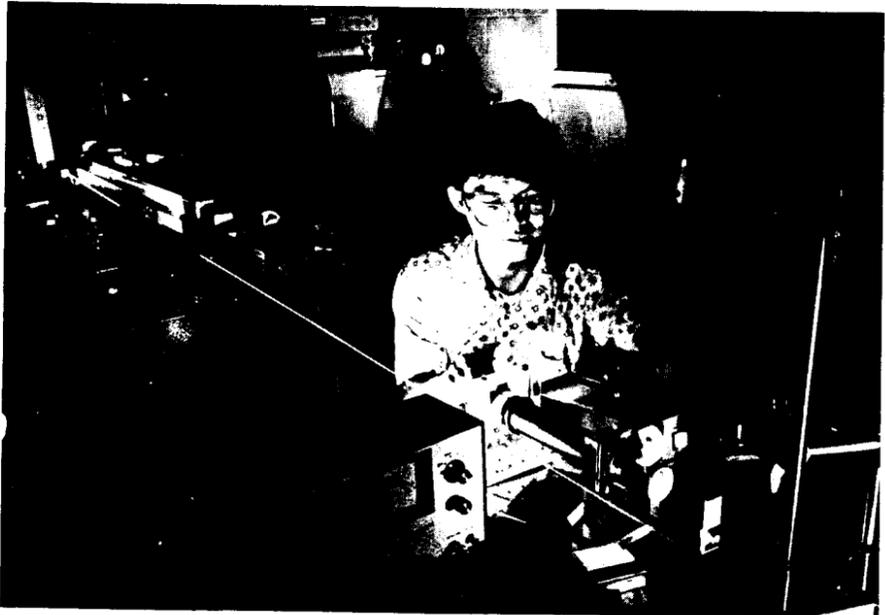
Horn-Bond Lin is a chemist in DEE's Environmental Chemistry Division. The work he does here, which was shared by Tony Campillo who recently left BNL, is only done at one

other location, the University of Maryland, where the idea was first developed about four years ago. It's called phase fluctuation optical heterodyne interferometry, commonly abbreviated to PFLOH.

"In principle, lasers can be used to measure all molecules," says Lin, who spent five years working with lasers at the University of Pennsylvania before coming to BNL two years ago. "In reality, however, there are two constraints," he adds. "You need a laser that can be tuned to best match a particular sample, and you also need detection sensitivity. Since pollutants most often come in trace amounts, degree of sensitivity is critical."

Here is a simplified explanation of the technique: An infrared laser is beamed on a sample that absorbs the

(Continued on page 2)



Mort Rosen

Horn-Bond Lin, chemist, adjusts the optics of his laser system in preparation for testing an air sample with a laser (bright diagonal line).

Sunday Tour Features House

You may have seen the Brookhaven House on the corner of Upton Road and Mitchell Lane, but have you ever been inside it? If you didn't visit this energy-efficient, passive solar home when it first opened last September, your chance is coming up on Sunday, August 30 - the only day this year that the house will be open for public viewing.

Tours will be given from 10 a.m. to 3 p.m. As part of the day's focus on the Brookhaven House, visitors to this last BNL tour of the 1981 season will also see an award-winning film entitled "Building the Brookhaven House," and a BNL researcher will be available to answer technical questions.

All regular tour features will also be provided to make your day at the Lab complete. This includes the "Quest" slide show, a bus trip through the BNL site, and a guided tour of the Exhibit Center.

Stockrooms Closed On September 4

The annual inventory of General Stores will require the closing of all Supply & Materiel stockrooms for one day - Friday, September 4.

Staff should plan their stock withdrawals prior to the scheduled closing of stockrooms Thursday, September 3, at 3 p.m. Emergency requirements are to be processed through P.L. Borzi, extension 2972.

The closing of S & M stockrooms does not affect department stockrooms, receiving, or the delivery of liquid nitrogen, liquid helium, or dry ice.

Solar Cell

(Cont'd)

fluorine to the silicon-hydrogen mixture.

A special emphasis of the group has been the effects of impurities on film properties. While the addition of certain impurities are critical to making a solar cell work, other impurities can reduce its efficiency. The BNL scientists say researchers in the field have various claims about the performance of amorphous silicon as a semiconductor, and reproducibility of data is a problem, perhaps due to lack of a thorough understanding of impurities. The group has developed optical and

Lasers

(Cont'd)

infrared radiation, and the sample gives off heat, which warms the surrounding air. Since heated air has decreased density, an optical device called an interferometer is then used to measure changes in density. A sample can be identified and measured because different species have different absorption strengths and spectra.

Lin says various new techniques are being developed by researchers elsewhere, including photoacoustic spectroscopy. More conventional methods of identifying different molecules in the atmosphere include absorption spectroscopy, fluorescence spectroscopy and Raman spectroscopy. Lin feels that all these are more limited and not nearly as sensitive as PFLOH.

Right now, he is perfecting the optics and proving the sensitivity of the technique. He has tested known concentrations of gaseous samples such as hydrocarbons, alcohol, vinyl chloride and sulfur hexafluoride. PFLOH can also identify particles, so Lin has also begun establishing the technique's capabilities in that area by looking at ammonium sulfate aerosol. He will eventually test such particles as soot, sand and dust.

"So far, the technique looks good because it has tremendous sensitivity and can do measurements *in situ*," says Lin. Ultimately, he would like to develop a portable PFLOH unit which could do field measurements wherever one wanted to sample - downwind from a power stack, along a busy highway, or even in a household kitchen. — Mona S. Rowe

To balance your budget, rotate your creditors.

electrical techniques for detecting them.

At present, the only product on the market that is solar-powered by amorphous silicon cells is a calculator made in Japan. BNL scientists say technology in the U.S. is not quite ready for commercial production on a large scale. Because of the tremendous potential savings in manufacturing costs, however, amorphous silicon is being studied not only for use in solar cells, but for transistors, image processing machines and large area displays.

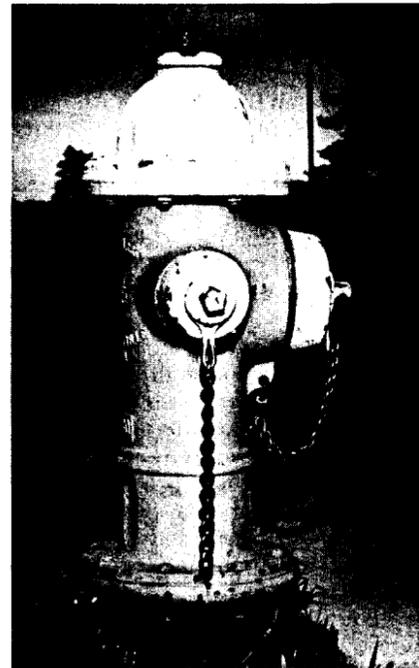
BNL researchers in this project are Reed Corderman, Alan Delahoy, Richard Griffith, Mitchell Hirsch, Frank Kampas and Peter Vanier.

The New Look In Fire Hydrants

For accessibility in an emergency, fire hydrants are generally situated close to a curb. But, because of that location, many fire hydrants are also vulnerable to vehicles that stray off the roadway.

BNL has 235 hydrants and, every once in a while, an unfortunate driver comes into contact with one. When this happened about three years ago at the NSLS construction site, water poured forth at the rate of 500 gallons a minute. To stop the flooding, water service was discontinued in half the buildings on Brookhaven Avenue, until the main valve was located and the hydrant was repaired. On top of this, the truck sustained considerable damage.

According to Al Falango, a general supervisor in Plant Engineering's Mechanical Division (Operations & Maintenance), this scene won't be repeated - at least at that location. The broken



Doug Humphrey

The wide flange at its bottom identifies this hydrant as a "breakaway" model. If a vehicle collides with the plug, the mechanism hidden behind the flange causes the top part of the hydrant to break away from the pipe going into the ground.

hydrant there was replaced with a "breakaway" model, and a shut-off valve was installed at the site. If a truck was to repeat history on the new hydrant, the plug would simply snap off at its flange. Below ground, a closed valve would keep water from gushing out. If damage was such that the entire hydrant had to be replaced, the shut-off valve could be used to turn off water to the area, making it unnecessary to disrupt service anywhere else. And, because a "breakaway" hydrant is more yielding, the truck would be in better shape.

Replacing and repairing broken hydrants is the responsibility of the Mechanical Division's water and sewage engineers. Group leader Tony Ross explained that he and his co-workers - Ted Dahne, Jimmy Hanson, Nick Fanizzi, and Bill Slavinsky - are involved with the Lab's entire underground water distribution system, of which fire plugs are just one part. Underground water levels are monitored continuously, and all the engineers carry radios so they can be on the scene of any break as quickly as possible after it occurs.

Potential hydrant problems are sometimes revealed during regular tests conducted by the BNL Fire Department on all site plugs. Some hydrants have been on the job as long as 45 years, so it is not surprising if one shows signs of wear. When older hydrants go, they are replaced rather than repaired. Replacements have averaged about six a year, so that "breakaways" now account for about 10% of the Lab's plugs. Shut-off valves have been installed at about 40% of the hydrant sites.

The Mechanical Division works

closely with the Fire Department, giving notification when a hydrant will be turned off for repair. While repair efforts are coordinated with the Grounds Division, an "Out of Service" tag is placed on the malfunctioning hydrant. As general supervisor John Scandizzo points out, "It would be a tragedy if the Fire Department wasted precious moments at a broken hydrant."

Fortunately, there have been no accidents involving the "breakaway" hydrants. "But with all their advantages," says Falango, "it's good to know they're there."

—Anita Cohen

PINY Courses

Final registration for the PINY /BNL extension courses in Nuclear Engineering will be held from 6 to 7 p.m., Tuesday, September 8 in the conference room of building 318 (across from the bank.) PINY courses to be offered at BNL this semester are: NU 603, Nuclear Engineering Laboratory (D. Rorer); NU 619, Introduction to Thermonuclear Power (instructor to be announced); NU 715, Heat Transfer (W. Wulff); and NU 928, Energy Conversion Technology (P. Meier). Days and times will be announced later.

Professor R. Aronson will be here to register and advise students. These courses are available to BNL employees under the tuition refund policy. They are also open to guests and collaborators, and to a limited number of persons not affiliated with the Laboratory.

60 +? Audit Free!

During the fall 1981 semester, SUNY at Stony Brook will allow community members over age 60 to audit courses free of charge. At registration on Thursday, September 10, from 9:30 a.m. to 3 p.m., (Rm. N-244, Social & Behavioral Sciences Bldg.) people from the Mid-Life Assessment Program will offer assistance and explain which courses are available for auditing.

Academic credit will not be given for audited courses, but registrants will have the same privileges as regularly matriculated students. This includes receiving an I.D. card and a vehicle registration sticker, as well as having use of the library, gym, Stony Brook Union, and other facilities.

For further information, contact Dr. Alan Entine, director of the program, at 246-3305.

Arrivals & Departures

Arrivals

Lawrence A. Beck Biology
Susan E. Batchelor App. Math.
Denise M. Miesell Nuclear Energy
Peter N. Palamidis Plant Engrg.
Daniel A. Schiappa Accelerator
Stanley D. Sodansky Accelerator
John G. Trunk Accelerator
Peter Wikstrom Biology
Paul J. Zahra Safety & Env. Prot.

Departures

This list includes all employees who have terminated from the Laboratory, including retirees:
Stephen P.A. Brown Energy & Env.
Michael A. Chambers Accelerator
Emmanuel A. Paschos Physics
Robert W. Wehner Medical

Selected Reading

Saturday Review 8 (8) August 1981
The Making of a Blockbuster Exhibit.
Peter Andrews. 18-21.

Long Island Forum 44 (8) August 1981
The way it used to be on Sound Avenue.
Elma Terry Helms. 156-161.

High School Students In BNL Classroom



Doug Humphrey

For eight weeks this summer, BNL was a giant classroom for 30 minority ninth and tenth graders from all over Suffolk County who were participating in the DOE-funded Summer Research Apprenticeship Program. The students studied physics, biology, chemistry and engineering, taught by three local high school science teachers. As part of their curriculum, the students saw sophisticated scientific tools and spoke to a number of BNL scientists about their research. Here, Clayton Hudson (center), a teacher at Central Islip High School who handled the chemistry classes, does an experiment with the students in a lab at the Chemistry Department. Directed by Renee Flack, Affirmative Action Office, the program ends today.

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

Service Awards

The following employees received service awards during the month of August.

Thirty Years

John E. Plonski Physics

Twenty Five Years

Lois C. Arns Energy & Env.

Richard W. Rothe Physics

Eugene V. Weinstock N. Energy

Twenty Years

Allen N. Goland Physics

Thomas S. Malinowski S. & E. Prot.

David Morris, Jr. Energy & Env.

Seymour R. Protter Reactor

Louis P. Remsberg, Jr. Chemistry

Joan Taylor Energy & Env.

Ten Years

Frances C. Brown Biology

James T. Garrison Physics

Nursery School

The Upton Nursery School will begin its 17th year on September 14. Located on site, the school offers classes for three and four-year-olds, two or three mornings a week. Each class is taught by an experienced, certified teacher who is assisted by a "cooperating" parent.

On Wednesday, September 2, from 11:30 a.m. to 12:45 p.m., a teacher and nursery school parent will be available at Berkner Hall to discuss the program with parents who wish to enroll their children. For more information, call Karen Brunshwig, 924-0030, or Janice Thern, 929-3550.

Hospitality News

The morning coffee get-together scheduled for September 1, has been rescheduled for Tuesday, September 15, from 9:30 to 11:30 a.m. in the Brookhaven Center.

All wives of Laboratory employees are welcome. Please come and bring the children. Babysitting will be provided free of charge. It is suggested that you bring along a toy or two for your child to play with.

Coffee, tea and danish will be served.

Football

The BNL Touch Football League Committee announces that play will begin early in September and extend to the end of October. Games will be played at the BERA Recreation Park on Monday and Thursday evenings at 5:20.

All teams interested may pick up entry blanks and game rules at the BERA Film Service Office any weekday between 9 a.m. and 1 p.m. New teams will be welcome. A Players' Pool will accommodate those individuals who would like to play but are not included on an organized team's roster. Since no blocking and limited body contact are part of game rules, players of all ages can take part with little fear of being injured.

Contact Ed Taylor, League Chairman, on Ext. 7589 for further information.

Golf Tournament

On Monday, September 14, there will be a scramble tournament at Indian Island Riverhead Golf Course. To enter, contact John Usher, bldg. 820M, by September 4. He will make up teams so that combined handicaps will be as nearly equivalent as possible.

Afro-American Club

If you wish to order prints of the soul food picnic photos, you may examine proofs and place orders at the BERA Film Service Office in Berkner Hall during the next two weeks. Also, you may wish to have prints of photos taken by Rippie Bowman, Ext. 4672.

T-shirts with the AACC logo may be ordered through Renee Flack, Ext. 3316.

Softball

Scores for week of August 17:

League I

All games were double headers.

First Game:

Six Pax 13 — Source I 12

Phoubars 9 — Blue Jays 5

Home runs by Mike Buckmann for the Phoubars and G. Oldham for the Blue Jays.

Second Game:

Six Pax 13 — Source I 10

R. Sheetz had a home run for the Six Pax. John Usher of the Six Pax finished the season with a .778 batting average.

Blue Jays 5 — Phoubars 4

League II

Roga 18 — Moles 8

Despite stops at first and third for much needed oxygen, Tom "The Flash" Holmquist of Roga made it to home plate to notch his first home run of the season.

AMD Bombers 21 — Big Sticks 7

Cardinals 15 — DEGenerates 14

League III

The Forties 26 — Binary Bombers 12

Electric Co. 23 — Lights Out 11

Nuke Powers 17 — Medical 11

Ice Pops 24 — Dirty Sox 15

Magnuts — bye

Makeup Game:

Ice Pops (won) — Nuke Powers (forfeit)

League IV

Survivors 24 — Random Sample 0

TNT 19 — E-Z Riders 10

Turkeys 18 — Nads 16

Balls & Strikes 13 — Thrids 12

Makeup Games:

Survivors 10 — Random Sample 4

Turkeys 17 — Thrids 6

E-Z Riders 19 — Nads 6

TNT 12 — E-Z Riders 11

Survivors (won) — Balls & Strikes (forfeit)

All outstanding makeup games do not have to be made up as they will have no effect on the standings. This does not mean you cannot play these games if you wish.

League V

No Names 19 — Mudville Sluggers 8

Underalls 19 — Who Cares 7

Source III 21 — No Feedback 6

Mole-Esters 15 — Who's On First 11

Home runs by George Holmes and Connie Koehler; great fielding plays by Charles Wilkens.

Metropolitan Opera Tickets

Tickets for the 1981-82 Metropolitan Opera season will go on sale at the BERA Film Service Office in Berkner Hall starting at 8 a.m. on Wednesday, September 2.

An employee may purchase as many pairs of tickets as desired. Ticket prices (including 50¢/ticket service charge) are as follows: Monday through Thursday performances, \$10.50; Friday and Saturday performances, \$11.50.

All sales will be final — no tickets will be accepted for refunds or exchanges after a purchase is made.

Copies of the schedule, including a listing of the Family Circle seat numbers available for each performance, are now ready for distribution at the Film Service Office.

Schedule (All Evening Performances)		January	
September		Sat. 2	La Boheme
Tue. 22	Das Rheingold	Fri. 8	Tannhauser
Fri. 25	Norma	Tue. 12	Tannhauser
Tue. 29	Siegfried	Sat. 16	Tannhauser
October		Sat. 23	Il Travatore
Fri. 2	Siegfried	Sat. 30	Luisa Miller
Sat. 3	Das Rheingold	February	
Sat. 10	La Traviata	Sat. 6	Così Fan Tutte
Mon. 12	Die Frau ohne Schatten	Tue. 9	Così Fan Tutte
Tue. 27	La Traviata	Sat. 13	La Boheme
Sat. 31	Tosca	Tue. 23	Così Fan Tutte
November		Fri. 26	Il Travatore
Sat. 7	Rigoletto	Sat. 27	Il Barbieri di Siviglia
Tue. 10	Magic Flute	March	
Fri. 13	Magic Flute	Tue. 2	Il Travatore
December		Sat. 6	Il Barbieri di Siviglia
Sat. 5	Puccini Trittico	Fri. 19	Il Barbieri di Siviglia
Tue. 8	Puccini Trittico	Thu. 25	Il Barbieri di Siviglia
Fri. 18	La Boheme	Sat. 27	I Vespri Siciliani
Sat. 19	Rossigno/Sacre/Oedipus Rex	April	
Wed. 23	Rossigno/Sacre/Oedipus Rex	Fri. 2	Fidelio
Tue. 29	La Boheme	Sat. 3	Les Contes d'Hoffmann
		Tue. 13	Parsifal

Swimming Pool

Summer season tickets are valid through Sunday, September 6.

During the week of August 31 through September 6, only, the pool will be open as follows:

Monday through Friday

(Employees only)

11 a.m. to 1:30 p.m.

(Employees/Families/Guests)

1:30 p.m. to 9:30 p.m.

Saturday and Sunday

(Employees/Families/Guests)

1 p.m. to 6 p.m.

The pool will be closed on Monday, September 7 (Labor Day).

New Season

A new three-month season will begin on Tuesday, September 8. Season tickets may be bought at the pool starting on that day during scheduled open hours.

Fees:

Season Tickets (fees not prorated)

Individual Membership \$15.00

Family Membership \$20.00

Daily Admissions

Employee/Family Member \$1.25

Guest \$1.75

Schedule:

Monday through Friday

(Employees Only)

11 a.m. to 1:30 p.m.

(Employees/Families/Guests)

5 p.m. to 9:30 p.m.

Saturday and Sunday

(Employees/Families/Guests)

1 p.m. to 6 p.m.

Note: The swimming pool is closed on all Laboratory holidays.

Guest Ruling (Applies to all recreation facilities)

One Guest — An employee is allowed to bring one guest per visit without special permission or prior arrangement. The guest must be accompanied by the employee.

Two to Five Guests — Advance arrangements for two to five guests may be made at the Recreation Office. (No more than five guests per employee is ever permitted.) When such an arrangement is made, the Recreation Office issues an admission card stating the sponsor's name and life number, the number of guests permitted, the date of visit, and the facility to be visited. Guests must be accompanied by the employee, who will be requested to show the admission card at the main gate and at the swimming pool ticket desk.

Sponsoring employees are responsible for their guests during the entire time they are on site.

Camping Club

Join us at the Lab campsite for a big weekend, Sept 4-7. There will be a chicken barbecue with corn on Sunday, September 6. Just bring ingredients for salad and some dessert.

All weekend, there will be sports and games for young and old including swimming at the pool. Please call Chuck Watson, Ext. 5317, for more information.

Cast Call

Crooks, detectives, New England character types, several bodies, and assorted good guys (men and women) are needed to fill the cast of "Exit the Body," the fall production of the BERA Theater Group. Five men and five women are required, no experience necessary — we'll all learn together. Two auditions are left; 7:30 to 9 p.m., on Wednesday, September 9 in the North Room of the Center, and on Friday, September 11 in Berkner Hall. For additional information, call Liz Russell, Ext. 3940.

Cafeteria Menu

Week Ending September 4, 1981

Monday, August 31		
Lentil soup	(cup)	.55
	(bowl)	.65
Meatballs a la mode over noodles		1.60
Western omelet & fries		1.55
Hot Deli — Knockwurst	(on bread)	1.60
	(on roll)	1.70
Tuesday, September 1		
Pork & cabbage soup	(cup)	.55
	(bowl)	.65
Beef liver & onions w/1 veg.		1.55
Turkey a la king		1.60
Hot Deli — Roast beef	(on bread)	1.65
	(on roll)	1.75
Wednesday, September 2		
Turkey gumbo soup	(cup)	.55
	(bowl)	.65
Macaroni & cheese		1.55
Roasted chicken & 1 veg.		1.55
Hot Deli — Meatball hero		1.70
Thursday, September 3		
Cream of celery soup	(cup)	.55
	(bowl)	.65
Salisbury steak & 1 veg.		1.60
Chinese pepper steak over rice		1.65
Hot Deli — Corned beef	(on bread)	1.65
	(on roll)	1.75
Friday, September 4		
New England clam chowder	(cup)	.60
	(bowl)	.70
Fish filet & 1 veg.		1.55
Chicken cacciatore w/spaghetti		1.55
Hot Deli — Barbequed beef	(on bread)	1.65
	(on roll)	1.75



"... sex and violence everywhere!"

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.

The determination of the best-qualified candidate for available positions will be based upon education, experience and other job-related criteria. Such factors will be evaluated and measured against the demonstrable requirements of the available vacancy, as well as the Laboratory's Affirmative Action objectives.

The Laboratory is committed to a policy of Equal Opportunity in its selection and placement of personnel. Its objective is equality of opportunity in employment, training, and promotion without regard to race, color, religion, national origin, sex or handicap.

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, as indicated below. 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.

LABORATORY RECRUITMENT: Opportunities for present Laboratory employees.

1618. SECRETARIAL POSITION (re-posting of job #1596) - Requires AAS or equivalent experience to perform general secretarial duties, including typing of technical reports, travel arrangements, preparation of travel vouchers, purchase requisitions, and other BNL forms. Must possess good communication skills and be able to work with moderate supervision. Familiarity with word processing equipment or willingness to learn desirable. Department of Nuclear Energy.

1619. FIRE SERGEANT (3 openings) - Safety and Environmental Protection Division.

1620. STORESKEEPER (2 openings) - Supply and Materiel Division.

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

1621. GUARD (2 positions) - Requires previous security experience and availability to work days and evenings, including weekends. Will patrol the ISABELLE construction site for trespassers and report suspicious activities. Safety and Environmental Protection Division.

Autos & Auto Supplies

72 DODGE DART - 4 dr, 20 mpg, a/t, a/c, p/b, p/s, radio, 78,000 mi, good cond. \$895. Sandy, Ext. 3369 or 286-1022.

70 VOLVO 164 - 6 cyl, a/c, am/fm stereo cassette, Jensen Triaxial speakers \$1,000. Dave, 475-5543.

78 FAIRMONT - sta wgn, 6 cyl, a/t, roofrack, 30,000 mi. \$3,500. 698-3150

77 HONDA - Super Sport 750cc, runs well, clean, many extras, 10,000 mi. Ext. 4095.

66 BSA MOTORCYCLE - 441 cc, good rubber, runs great, looks good. \$400. 475-2657 before 2 p.m.

CLASSIC 1967 VOLVO - sta wgn, for parts or restoration. 286-0008 after 6 p.m.

76 FORD TORINO - sta wgn, clean in and out, needs engine work. \$600. Ext. 4867 or 325-1967.

80 PONTIAC - Phoenix, manual trans, many extras, low mi. \$4,500. Ext. 4891 nights or Ext. 4763.

70 SKYLARK - wagon, Chevy 396, blueprinted, 4 spd Muncie, 3.31 bolt posi, sunroof, L60 radials, much more, mech perfect. Sacrifice, \$1,800. Randy, Ext. 4636 or 277-3451.

60 BUGEYE SPRITE - 1963 Midget, many extras, entire package \$2,500. Augie, Ext. 2419 or 325-0594.

68 MUSTANG - conv, use as parts or restoration \$250; 1969 Ford Van, 6 cyl. \$450. 928-5684 eves.

75 CADILLAC - Coup de Ville, \$1,300; also 1973 Toyota, 2 dr, 4 spd, 28 mpg. \$1,350. Ext. 7957.

80 EAGLE - 4 w/d wgn, excel, 13,000 mi, loaded. Asking \$7,500. 475-4792 after 5 p.m.

76 MAVERICK - has front end damage, eng trans, glass doors, interior, tires good. Best offer. Gerry, Ext. 4460/4471.

75 FIAT 128 - 4 dr, 3 spd. \$1,200. 369-1624.

76 CORDOBA - immac. new padded roof and tires, a/c, p/s, p/b, p/w. cruise control. \$2,800. 924-4260 after 6 p.m.

70 CHEVY - sta wgn, 96,000 mi, very good cond. Ext. 3701 or 751-8128 eves.

80 AMC CONCORD - DL, 4 dr, a/t, a/c, stereo, cruise control, tilt steering, p/s, p/b, plus more, mint cond. 924-6348.

TIRES - D78-14 bias-ply, like new, w/o rims, set of 4 \$100. Pat, Ext. 5385.

79 BLAZER - 4x4 Cheyenne, every option, excel, 21,000 mi, chrome rims, maxi track tires. \$8,500. Lou, 732-6634.

TIRES - (2) E78-14 Sears Superguard, belted w/w, balanced, on Plymouth wheels, almost new. Ext. 2431.

78 SUBARU WAGON - 4 w/d std, 4 spd, rear hatch door, full carpet, radio, rear defog. 929-6148 eves.

77 HONDA - 750K Plexifaring, 8,000 mi, extras, excel cond. \$1,500. Rich, Ext. 4482 or 277-1129.

72 CHEVY VAN - custom int, mach excel, no rust, must go two weeks. \$1,700. Jack, Ext. 4100.

65 JEEP - w/plow and cap. Bud, 281-2289 after 5 p.m.

78 OLDS CUTLASS - Supreme, p/s, p/b, a/c, am/fm stereo radio, excel cond. David, Ext. 3145.

RIMS - set of 4 chrome spoke rims for GM car, 15". Asking \$100. 475-0037.

67 CAMARO - 6 cyl, std, good running cond. Ext. 3507 or 286-8794.

72 CHEVY - C10 pickup truck, stereo, Tonnnveau cover, no rust, mint cond. \$2,100. 265-5218 eves.

78 MERCURY - Zephyr, purchased new 1979, excel cond. \$3,500. Toni, 928-6562 between 5-7 p.m.

77 PLYMOUTH - Volare, excel cond, low mileage, 4 dr, available Sept. 20th. \$2,500. Sato, Ext. 3927.

79 KZ400 - rack, sissy bar, case guards, excel cond, 64 mpg. \$1,250. Mike, Ext. 5206.

60 THUNDERBIRD - good cond. \$850. 732-5696.

78 MOTORCYCLE - GL1000 Gold Wing Honda, 4,000 mi, like new. \$2,600. 473-8763.

AIR COND - auto add-on GM small block, can be adapted to others. \$150. Bob, Ext. 4547 or 473-3987.

76 BROUGHAM VAN - sleeps 4, fully equipped, galley, toilet, furnace, excel cond, many extras. AT-6-1192.

HARLEY DAVIDSON - '70 FLH Police Special, rebuilt heads, custom seat, saddlebags, many new parts. Ext. 3533 or 654-2076.

73 SUPERJEEP - for parts, Ford motor parts. Rich, 585-0025 after 6 p.m.

72 MAVERICK - 4 dr, good cond. Asking \$700. JP, Ext. 3403 or 929-8809.

71 PONTIAC LEMANS - good cond. Call Yona, Ext. 3403 daytime or Ext. 3245 eves and wkends.

CUSTOM PARTS - and accessories for your auto, truck, van, huge savings, quality items. Hans, 281-5563.

MOTORCYCLE CARRIER - for car or truck. \$30. Dee, Ext. 3675.

72 HARLEY DAVIDSON - FLH Police Special. \$3,400. John, Ext. 4973 or 798-3766.

69 HONDA 350 - motor good, needs battery, gear shift sticking. Asking \$350. 924-6996.

76 BOBCAT - 4 spd, good cond, excel gas mileage, a/c, am/fm cassette. \$2,000. 736-3049 after 6 p.m.

HONDA CB 125 - clean, excel cond, 85+ mpg, windshield, luggage rack. \$500. Jack, Ext. 4411 or 929-8287.

75 FIAT - 128 Coupe, 77,000 mi, high mpg, excel cond, am/fm, leaving country, must sell. \$1,500. Helen, Ext. 3673/4912.

75 CHEVY WINDOW VAN - 6 cyl, a/t, p/s, p/b, buckets, sunroof, partially customized. \$1,800. 289-9074.

75 FORD - Custom 500, 4 dr, p/s, p/b, a/c, new spare tire, new distributor, excel cond in/out. \$1,450. Katsuo, Ext. 2432/3136.

71 KINGWOOD CHEVY WAGON - good trans. \$350. 727-0082.

79 FORD FAIRMONT - 6 cyl, 4 dr, a/t, a/c, p/s, p/b, good mpg. \$3,600. Terry, 499-8377.

79 HONDA MOTORCYCLE - XR80, clean, good cond. John, 929-8287.

TIRES - (2) LR70-15 Firestone radial steel 7-ply mounted on Chevy C-10 rims. Both \$40; C-10 tailgate, \$40. Ext. 4040.

HONDA HAWK - motorcycle, 400cc, low miles, excel cond. \$1,200. 585-7094 eves.

RIMS - (4) 15x8 white spoke factory rims, chrome center for Blazer 6 lug. \$125. Lou, 732-6634.

Boats & Marine Supplies

23' SAILBOAT - in-water, outboard, swing-keel, new sails, rigging, cushions, custom-extras, cutter rig. Joe, Ext. 7961 or 277-2470.

16' BOAT - F.G., trailer, 65 hp Merc all good cond. \$750. Jack, Ext. 4100.

1972 4 HP MERCURY - outboard, short shaft, excel cond. \$200. Jim, 265-5218.

12' FIBERGLASS BOAT - 10 hp outboard, tank, trailer. \$850. Brian, Ext. 2059 or 744-2169.

1976 CLAM BOAT - 21' semi-v, fully glassed, 50 hp Merc. \$1,500 firm. 289-3593 after 5 p.m.

17' THOMPSON LAPSTREAK - 55 hp Evinrude and trailer, boat in good cond, motor very good. \$650. Ext. 7772.

20' LAPSTREAK CRUISERS - Johnson 80 hp, camper equipped. \$500 or best offer. 286-0880.

SEA SHARK SAILBOAT - good cond. \$75. 265-7696.

19' RENKEN - 120 hp i/o, low hrs, full covers, all equipment, galvanized trailer, excel cond. Ron, Ext. 3887 or 286-0353.

PROPELLER - 22x22, 3 blade, left hand, excel cond. \$125. 878-8847.

1973 MERCURY - 4 hp outboard motor, 12' aluminum boat. \$375. Ext. 4098 or 281-8318.

16' LARSON - 65 hp, trailer, new top, steering, fuel tank, prop. Mainly lake used. Asking \$1,900. 475-3648.

16' ALUM FISHING OPEN CRAFT - w/40 hp elec start Evinrude outboard, mfg trailer to fit. \$1,100. 585-7094 eves.

Free

KITTEN - adorable black male, 6 wks old. 924-4054.

CABIN CRUISER - 26' Ulrichsen, Lapstrake. No motor, hull sound. 581-7656.

Yard Sales

COMMUNITY YARD SALE - Lewin Hills Association, Lewin Dr., Wading River. 9 a.m. to 4 p.m. August 29th.

YARD SALE - Aug. 29 & 30th, 56 Champlain, Terryville - off Jayne Blvd. vicinity Old Town Rd. - Kitchen cabinets, desk, Bldg. supplies.

YARD SALE - Aug. 29th, 51 Munson Lane, West Sayville. Clothing, pool table, pressure canner, electric fireplace, etc. 589-0996.

MOVING SALE - nice household items, couch, stereo, vacuum cleaner, clothes and much much more! Toni, 928-6562.

Miscellaneous

ORGANIC HONEY - local wild flowers. \$1.75/lb; \$1.50/lb, 3 lbs. or more. 744-3289 after 6 p.m.

AIR COND - Philco 5000 BTU, old but works well. \$45. 286-2718 after 6 p.m.

PING PONG: TABLE - mint cond, w/net-paddles, \$40. Bill, Ext. 7698 or 732-9102 after 6 p.m.

ARTLEY FLUTE - closed hole type w/case, excel cond. \$70. 732-5829.

DINETTE SET - new Stonville 4 chrome chairs, smoked glass, 48" table, won on TV game show. \$350. Ext. 2238.

MINOLTA - 35mm semi auto range finder w/flash, \$70; suede coat, boot length, fleece lined, size 9. \$60. 698-4451.

SPEED TUFTING LOOM - & machine, similar to latch loom; paid \$35. now \$20. Ext. 3431 or 744-9677.

DINING TABLE - round oak, modified claw feet, good cond; Wood burning Franklin stove, good cond. Best offer. 878-4268 after 5 p.m.

DINING ROOM - 4' dia. glass table w/6 contemporary chairs. \$400. 331-9349.

DINING ROOM SET - 7 piece, table opens to seat 12, over 50 yrs. old. 286-9453.

WASHING MACHINE - GE, good operation, needs transmission seal. \$35. Morris, Ext. 2040.

SCHWINN BICYCLE - w/mirror & basket, fair cond. \$15. 472-1397.

BOOK - advanced Real Calculus by Miller. \$5. David, Ext. 3145.

BOOTS - women's leather hiking boots (Ronni Mfg. Made in Italy) Vibram sole, brand new still in box. Size 8. \$50. Frank, Ext. 3898.

ORIENTAL RUGS - 10x16 plus (2) matching 3x5 black background, beige gold & green design. 929-6148 eves.

ELECTRONIC FLASH - attachment for Instamatic camera, \$12; am car radio, \$5; hair dryer 1200 watts. David, Ext. 3145.

POPULAR MECHANICS MAGAZINE - 1957 to 1974, complete. Dennis, Ext. 4259 or 736-2534 eves.

SURF BOARD - Bunker 6 ft very good cond. \$50. Rich Ext. 4482 or 277-1129.

TABLE LAMP - Eary American, wood look w/eagle. \$10. Karen, Ext. 5228.

STOVE PIPE - (new) for 6" stove. Bud, 281-2289 after 5 p.m.

BOWLING BALL - men's w/case, almost new. \$15. Ext. 2605.

ROUND OAK - veneer table, 4 swivel chairs, \$20; GMAC infant love car seat, \$20; Gerry adjustable front or back infant carrier, \$8; framed toddler back/pack carrier, \$8. Mike, Ext. 7594 or 325-1711.

AUTOMATIC FLUE DAMPER - fits 7" flue from oil/hot water boiler. \$100. Bob, Ext. 2104 or 928-3863.

FREEZER - 23 cu. ft. mint cond, used one season. \$400. G. Ince, Ext. 3786 or 286-2889.

POOL FILTER - sand, s.s. tank, 22 dia. x 22 ht. plus 1 1/2" Hayward multiport valve, excel. \$125. Ext. 2416 or 265-5218.

TWIN SIZE BED - complete, \$25; Mixmaster, \$15; Toaster, \$4. Irv Meyer, Ext. 3038 or 929-4326.

LABRADOR RETRIEVER PUPPIES - Grandsire 1981 Champ born 7/28/81, black, 5 male, 3 female, excel bloodlines. 379-7981.

COUCH - white, three seat pillows, good cond. \$40. Ask for Toni, 928-6562.

QUARTZ HEATER - Thermo-tech, new, excel, half price. Ext. 4881.

GRANDFATHER CLOCK - all wood Westminster chimes, excel. \$600, firm. Router Rockwell Model 4672 (208) type 1 no bits. \$50. 924-6354.

ROUND BED - 84" yellow satin sheets. \$150. Bob, Ext. 4547 or 473-3987.

TIMBERLINE - wood or coal stove, 1 yr. old. Heats 2400 sq. ft. 929-6066 after 4:30.

ROTARY ANTENNA - w/20' pole & tri-pod, stand, all for \$15. Joe, Ext. 2022.

CHILDS ROCKING HORSE - very good cond. \$20. 286-0422.

GARAGE DOORS - 2 ea., 8'x7', good cond. Bob, Ext. 4490.

DEEWAN BED - \$80; kitchenette table w/2 chairs, \$60; square table, \$20; exercycle, \$40. 331-9349.

LUCILLE ROBERTS HEALTH SPA MEMBERSHIP - Gold card, good til July 25, 1982. Pool/equip/Aerobic/Exercise classes, etc. \$55. Ext. 7927 or 878-2891.

BEDROOM - dining room, furniture, sofa. 265-7696.

BABY ITEMS - small sofa, \$30; smoker. 924-4054.

PUNCHING BAG - heavy bag, hardware incl, 1 yr. old, very good cond. \$50. 475-5920.

CABINET - for radio, phono, records. Bleached Mahogany, 36w x 18 deep x 33 1/2 high, heavy wood. \$25. 744-3069.

TABLE - w/6 chairs, chrome legs 35"x46" plus 12" leaf, good cond. \$50. Irene, 589-6468 after 5 p.m. & wkends.

CRAFTSMAN - (3) Gang reel mower attachments for Garden tractor, excel cond. \$100. 654-0769 after 5 p.m.

SINGER - Slant needle straight stitch sewing machine, desk cabinet, attachments, good cond. \$200. Frank, 584-5933.

SEARS - fiberglass bathtub, never used, in orig. carton, light avocado, right hand drain. \$95. Ext. 4289.

PING PONG TABLE - mint cond w/net & paddles, \$35; girl's 20" bike. \$20. 732-9102.

MAYTAG WASHER - GE dryer, \$100. the pair. Karen, Ext. 3626 or 286-0428 after 6 p.m.

BICYCLE - 1981 Miyata Model 610, 15 spd, 23" frame. used 1 month. 744-3849 eves.

SOFA - Loveseat, 2 yrs. old, excel cond. \$200. Ext. 7744.

MICROWAVE OVEN - 1981 United Commercial w/all features, seldom used, new \$699. Sacrifice \$450. 399-0773.

PIANO - Spinnet, w/bench, excel tone \$800. or best offer. Becky, Ext. 4386 or 924-0493.

GENERATOR - gas run, good cond. \$200. 286-8554.

POTTERS KICK WHEEL - oak frame, accessories incl. \$150. Takes it. Carol, 698-5555 or 289-3917 eves.

STOVE - Westinghouse electric, 42" wide, 2 ovens, side by side, excel cond. \$125. 281-6026 after 4 p.m.

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

WADING RIVER - 4 bdrm Colonial, 2 baths, eik, den, l/r, d/r with coal stove, fin. bsmt, deck & brick patio, 3/4 wooded acre, landscaped, beach rights, low taxes. \$82,000. 929-8113.

SHOREHAM - 2 story, 4 bdrm Clarendon Colonial, 2 baths, l/r with fp, d/r, dinette, kitchen & mudroom w/2 stall garage on .45 acre corner lot. Deeded beach rights. 744-2766.

RIVERHEAD AREA - mobile home 10x50, 1 bdrm, stove/refrig. washer/dryer, tool shed, covered patio. Air conditioner. Ext. 3138.

SHOREHAM VILLAGE - custom ranch, 3 bdrms, 2 baths, fam. rm w/tp, d/r, l/r, gourmet kit., 2 car o/s garage, 0.8 acre, w/w throughout, new oil burner, good financing, walk to priv. beach, tennis, club. Ext. 3064 or 821-0890 after 5:30 p.m.

MIDDLE ISLAND - 3 bdrm ranch, 2 full baths, l/r, eik, den, bsmt, many extras. \$55,000. 924-6354.

MANORVILLE - 3 bdrm ranch, 1 acre, country kit., full bsmt, 1 1/2 baths, garage, all appliances, s/s, w/w. \$43,000. Pete, Ext. 3868/4574 or 878-1225.

HOLBROOK - 2 bdrm house, garage, lg. fenced property, low taxes. \$26,500. 585-4741.

For Rent

MIDDLE ISLAND - sublet 1 bdrm apt. available Sept. 1. \$325/mo. Ext. 7664/4990.

BROOKHAVEN HAMLET - 2 room apt. 10 min. from Lab, priv. entr. \$325. all utilities. 286-0641.

STONY BROOK - 3 bdrms, 2 baths, 2 car garage, unfurnished ranch, all appliances, immediate occupancy. \$575/mo. + util. 751-4868.

POCONOS - Chalet in priv. community, indoor pool, tennis, game room, Labor Day wkend Special \$125. Fall wkends \$75. Bob, Ext. 4551 or 289-2159.

CORAM - lovely 1 bdrm apt. w/w carpet, terrace, central a/c, dishwasher, pool, tennis courts, 7 mi from Lab. Available 8/30 to 6/30. \$375/mo. Ann, 736-0210.