

BNL Biologists Discover Photosynthesis-Regulating Plant Enzyme

Using bushels of spinach and a procedure that brings a protein "back from the dead," Brookhaven biologists have found a new enzyme that is thought to regulate photosynthesis in plants.

In a paper in the October 8 issue of the journal *Biochemistry*, Research Associate Louise Race and Senior Biochemist Geoffrey Hind, both of the Biology Department, described their finding, which ends a hunt by groups of scientists from several laboratories around the world.

Plants make their own food using a chemical process called photosynthesis. The reactions that harvest light for photosynthesis occur in structures called photosystems, which are complexes of chlorophyll and protein. Race and Hind believe that their enzyme regulates the plant's overall efficiency in using the light it has absorbed.

"The question at stake is how plants protect themselves from the harmful effects of too much light — light that's



Roger Stoutenburgh

Biology Department Research Associate Louise Race and Senior Biochemist Geoffrey Hind with the electrophoresis image that led them to the discovery of a new photosynthesis enzyme, dubbed PSII-PK.

in excess of what they can possibly absorb for photosynthesis," said Race.

When the light supply exceeds demand, she explained, the newfound enzyme tacks phosphate groups onto proteins within the photosystem. With this chemical change, the photosystem proteins become negatively charged and repel one another. This impedes the transfer of energy to the photosystem and protects it from overload.

This kind of phosphate-adding reaction, or phosphorylation, is important for sending signals in all cells, from humans down to the most simple organisms.

Often, a phosphorylating enzyme, also called a kinase, is counterbalanced by another enzyme that specializes in removing phosphates. But in this case, Race said, "the enzyme gets its cue from the overexcited photosystem itself — and then proceeds to turn that photosystem off."

Scientists have been looking for such kinases in photosynthetic systems since the late 1970s, but past candidates have responded to conditions too slowly to be effective. The newly discovered enzyme's action is much swifter, the BNL scientists say. And, it resides on the membrane near photosystem II — supporting the old maxim "location is everything." The researchers have dubbed their find PSII-PK, for photosystem II protein kinase.

PSII-PK is actually the second pro-
(continued on page 2)

What They Are Saying . . .

Lab Responds to Gould's Study of Baby Teeth

In *Suffolk Life* of November 13, 1996, an article entitled "Why We Are Asking For Baby Teeth in Suffolk County," by Jay Gould, accompanies a "Public Notice" advertising his Radiation and Public Health Project's planned two-year study of "the health effects of radioactivity levels in Suffolk County."

The study, the article explains, will look at "the source and health effects of radioactive strontium in Suffolk County water, fish, soil and humans. It may come from emissions from reactors at the Brookhaven National Laboratory (BNL) or from the three Millstone reactors on the Long Island Sound, or both."

Gary Schroeder, a health physicist in BNL's Safety & Environmental Protection Division, says that Gould can eliminate BNL as a source.

"Strontium is not released by either of BNL's current reactors — the High Flux Beam Reactor or the Brookhaven Medical Research Reactor — and it never has been," Schroeder said. "And, contrary to some claims, strontium has not been detected in off-site drinking water supplies near BNL above levels that would be expected from global fallout sources."

"Due to operations related to the Brookhaven Graphite Research Reactor more than 30 years ago, strontium-90 was released in small quanti-

ties to the Peconic River at levels well below applicable discharge limits," Schroeder continued. "What remains is retained in river sediments close to the BNL site and, with the possible
(continued on page 3)

Steinberg Gets Greenman Award

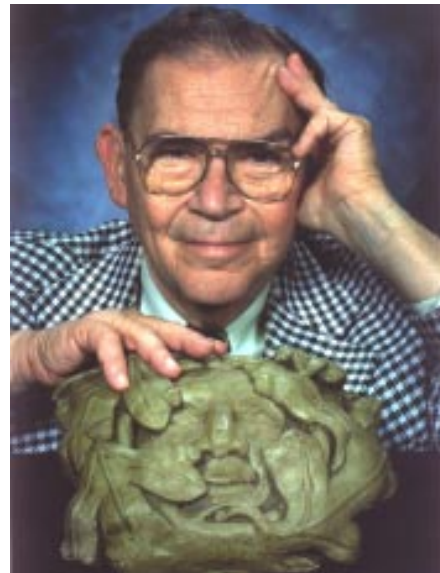
Meyer Steinberg, a senior chemical engineer in the Department of Advanced Technology (DAT), is a recipient of a Greenman Award for his research on atmospheric carbon dioxide (CO₂) mitigation. Steinberg received the award at the International Conference on CO₂ Removal, held at the Massachusetts Institute of Technology (MIT) in September.

Presented by the conference organizers — the U.S. Department of Energy, the Electric Power Research Institute and MIT — the award consists of a replica of a sculpture known as "Jeep's Leaface" from St. John the Divine Cathedral in Manhattan. A certificate accompanying the award explains that it is given "to honor contributions toward harnessing technology so that the human race can better live in harmony with the environment."

Greenman sculptures can be found in churches, cathedrals and older buildings. The Celtic archetype of a human face peering through foliage symbolizes creativity, compassion, healing, new beginnings and, especially, mankind's connection with nature.

The two other researchers honored with the award were Wim Turkenburg from Utrecht University in the Netherlands and Yoichi Kaya from Keio University in Japan.

Steinberg has been working on technologies for reducing CO₂ emissions into the atmosphere since the early 1980s, when the potential problem of global climate change was first recognized. Global climate change has been attributed largely to atmospheric carbon dioxide. Produced by the burning of fossil fuels, atmospheric carbon dioxide traps infrared radiation, which would otherwise escape from the Earth's atmosphere. This causes a



Roger Stoutenburgh

Meyer Steinberg, shown with his Greenman Award.

warming and an increase in global temperature — an increase in a phenomenon known as the greenhouse effect.

"The U.S. spends over a billion dollars per year on the basic scientific research needed to understand global climate change, but very little has been invested in mitigation technologies to reduce CO₂ emissions to the atmosphere," Steinberg said. "Most mainstream scientists would agree that developing these technologies is an important issue that needs to be addressed."

A chemical engineer specializing in energy and environmental problems, Steinberg joined BNL's Department of Nuclear Energy (now DAT) as a chemical engineer in 1957. He received tenure in 1965 and joined the Department of Applied Science in 1977. He returned to DAT in 1991, with his current title. — Diane Greenberg

AUI Board Enters 52nd Year With 29th New Chairman

The Board of Trustees of Associated Universities, Inc. (AUI) held its 51st annual meeting October 23-24, electing its 29th Chairman: Paul Martin, Harvard University, is now filling a two-year term as Chairman, replacing Ernest Henley, who had served in that position since 1993 and has been on the Board since 1988.

The managing organization for both BNL and the National Radio Astronomy Observatory (NRAO), AUI rotates its Board and Executive Committee meetings among BNL, various NRAO sites, and its Washington, D.C., headquarters.

At this annual meeting, held at BNL, three new Trustees were elected:

- Annelia Sargent, California Institute of Technology, was elected for two years to fill the unexpired term of Vera Rubin, Carnegie Institution of Washington, a four-year Trustee who resigned in September when President Bill Clinton nominated her to the National Science Board.
- Peter Paul, State University of New York at Stony Brook, and Jack Sandweiss, Yale University, were elected for three years to fill the vacancies left by Herman Feshbach, Massachusetts Institute of Technology, and Richard Zdanis, Case-Western Reserve University. Feshbach, who had served on the AUI Board for 19 years; Zdanis, whose service totaled 20 years; and Louis Girifalco, University of Pennsylvania, who retired from the Board in 1995 after 15 years of service, were elected Honorary Trustees.

Relected for three-year terms were: John Armstrong, IBM Corporation, retired; Morton Lippmann, New York University; Paul Martin; Thomas Meyer, University of North Carolina; Andrew Sessler, Lawrence Berkeley National Laboratory; and William Spencer, Semetech Corporation.

In addition, Trustees were elected for one-year terms to the Executive; Audit; Administrative Affairs; Environment, Safety & Health; and Review and Compensation Committees. And all AUI officers were reelected for one-year terms.

Give a Hand to the United Way

Every year, the United Way asks for helping hands — hands to donate funds that help Long Islanders facing personal tragedy or other problems. Cancer, AIDS, domestic violence, a child born mentally or physically disabled, being out of work, being lonely, trying to give up smoking — all can be made easier to bear with the right expert assistance.

And every year, generous BNLers extend helping hands in the BNL United Way fund drive, donating funds that enable dozens of specialized service agencies to continue their vital work.

Forming the living “UW” pictured at right — to remind you to pledge your donation on the form that was mailed to you — are this year’s United Way Chair, Pete Esposito (third from top left of the “W”), Coordinator Ann Emrick (fifth from top right of the “U”) and many of the campaign representatives from each department and division. Even the smallest amount will be welcome to help BNL reach this year’s goal of \$90,000.

Thanks to the generosity of Associated Universities, Inc., the Long Island Guards Union No. 37, Local 8-431 of the Oil, Chemical and Atomic Workers International Union, and Local 2230 of the International Brotherhood of Electrical Workers, every form received by December 20 will be entered in drawings for prizes that include dinners for two at local restaurants, gift certificates for shopping, and a grand prize of a dinner/theater weekend for two in New York City.

For more information, call Esposito, Ext. 2879, or Emrick, Ext. 5756.



Roger Stoutenburgh

Court Limits TFCU Membership

In a move prompted by a civil law suit bought by a group of the nations’ banks, a U.S. District Court last week issued an injunction against all federal credit unions, requiring that they immediately cease expanding their customer bases beyond that permitted in accordance with their individual 1981 charters.

Insofar as the Teachers Federal Credit Union (TFCU), which serves as BNL’s on-site bank, is concerned, this decision:

- **has no effect** on BNL employees and guests who *already* have accounts of any kind with TFCU.

- **limits new memberships** to people who are themselves or whose immediate family members are employees or registered students in any Suffolk County primary, secondary or parochial school, college or university, or who are members of a board of education or volunteer group associated with one of those institutions.

In a November 8 memo, BNL’s Fiscal Officer, Mark Israel, noted, as long as this injunction is in effect, “It is obvious that this will impact current and future members of the Laboratory community who benefit the most from the services of the on-site Credit Union — our cherished visitors and guests, especially those residing on site.

“Please be assured,” Israel continued, “that we are staying in close touch with Teachers Federal Credit Union as they attempt to fight back against this order, and we will keep the Laboratory community informed. The Credit Union and its federal governing body are in the process of requesting a stay of the injunction based on the business hardships it causes, not just at BNL, but throughout the Suffolk County community.”

In the meantime, those who do not meet the credit union’s membership criteria have two options for obtaining cash on site: Having opened accounts at other banking institutions with ATM capabilities, they will still be able to access cash from the credit union’s ATM machine in the lobby of Berkner Hall. Or, visitors and guests may cash personal checks with the BNL Cashier, from 2:30 to 4:30 p.m., daily, in Bldg. 134. Anyone with questions may call Israel, Ext. 2495.

Enzyme Discovery (cont’d.)

tein kinase to be found in photosynthetic membranes at BNL. In 1986, Hind and colleague Sean Coughlan reported finding an enzyme associated with the photosynthetic proteins on such membranes.

Race began work last year to isolate that protein again, but then discovered a surprising effect: Even after she had removed all of the known protein, there was still some phosphorylation occurring in the membrane. But when she and Hind tried to separate the mysterious phosphorylating agent from the membrane, it stopped its activity.

Several attempts to recover the new enzyme in its active form failed, so Race and Hind decided to take a radical approach: Remove the inactivated, or dead, PSII-PK from the membrane, then bring it “back to life.” The method they chose, called renaturation blot assay, or RBA, had never been used in plant biochemistry before.

The first step was to extract the proteins from their membrane. Then, they were sorted and separated by size, using electrophoresis. Next, they were transferred to a thin plastic sheet and exposed to salts that completely unfolded the protein chains, rendering them inactive.

Finally, the plastic sheets were

bathed in a solution that let the proteins refold into their original form. Race was able to see which protein was the phosphorylating enzyme by adding radioactive phosphate to the mix and looking for its signal.

Isolating PSII-PK was no easy feat — half a kilogram (over a pound) of spinach yielded only a few micrograms (millionths of a gram) of protein. The spinach had to be crushed, filtered, spun several times in a centrifuge and then treated — a multi-day process. And the experiment had to be repeated several times to verify the results.

“Discovering a novel kinase in this way is particularly gratifying,” said Hind, “because Sanford Lacks here in Biology provided the first evidence, in 1977, that reactivating an enzyme after electrophoresis was indeed possible. Our department’s history in this area also extends to John Bennett, who in 1988 reported results that are consistent with the functioning of a second protein kinase.”

Hind added that further work in his laboratory will attempt to isolate even larger amounts of PSII-PK, as a first step in determining the partial sequence of its amino acids. This would in turn allow for the preparation of specific antibodies for PSII-PK, and eventually a complete description of its structure by cloning methods.

— Kara Villamil

STEM Workshop Goes for the Gold

An intense, hands-on laboratory workshop in the Biology Department, September 18-21, not only taught 11 visiting scientists how to use gold clusters to label biological specimens for examination under BNL’s Scanning Transmission Electron Microscope (STEM), but, in the process, added several new users to STEM’s user community and new projects to STEM’s roster.

One of BNL’s user facilities, STEM is one of only three microscopes in the world that can easily image a single heavy atom. Since 1987, STEM’s effectiveness has been enhanced by the use of a cluster of gold atoms attached to the active part of an antibody. Pioneered by BNL’s James Hainfeld, the gold complex can be covalently linked to molecules and then used to label specific sites on the biological molecules at a resolution of approximately 1 nanometer.

Entitled “Gold-Cluster Labeling and STEM Microscopy,” the four-day workshop drew participants from Japan, the Netherlands, Switzerland and around the United States. They had learned about the workshop through Internet listservers for the electron microscopy and cell biology communities.

As a result of space limitations, another 30 scientists were placed on a waiting list, but, given the success of the first workshop, a second will be offered within six months.

During the workshop, participants

were introduced to STEM microscopy by Joseph Wall and to gold-cluster labeling by Hainfeld. After Martha Simon and Frank Kito toured the participants around the STEM facility in Bldg. 463, the 11 learned about labeling specimens with the gold clusters.

Then, attendees gold-labeled an antibody fragment provided to them as a sample by Beth Lin, Biology, by working with Inan Feng, Biology, and Fred Furuya, Carol Halsey and Richard Powell of Nanoprobes, Inc., who donated their time.

The participants’ competency was proven when they attached the gold-atom labels to their own specimens, which included HIV Rev protein, nucleosomes, T4 bacteriophage components and muscle proteins. The labeled specimens were then observed by Simon using STEM.

Guest lecturers were Louisa Gregory of the State University of New York at Stony Brook and David Spector of Cold Spring Harbor Laboratory. Ann Emrick and Simon coordinated the workshop details.

“Three of the 11 participants have already initiated STEM projects, and several of the other eight are at their home institutions working to ready samples for STEM,” comments Hainfeld. “So the proof of this workshop’s success is in the interest that we have stimulated in this technique and STEM, and the quality of the scientific projects that have been brought to STEM as a result.” — Marsha Belford

Tuesday: Learn About Low-Dose Radiation

On Tuesday, November 26, at 3:30 p.m. in the Physics Seminar Room, Bldg. 510, Charles Meinhold, Department of Advanced Technology, will present a Physics Colloquium titled “Radiation Risk at Low Doses, Fact or Fancy?”

Meinhold, who is a former head of BNL’s Safety & Environmental Protection Division, now serves as President of the National Council on Radiation Protection & Measurement. He will discuss the scientific debate on low-dose radiation and its potential risks.

Volunteers Needed

Women and men who are 20 years and older and in good health are needed to participate in brain-imaging studies. Subjects will be paid for their participation, and supervisory approval is required. For more information, call Naomi Pappas, Ext. 2694.

Deadlines Near

Flexible Spending Accounts

Wednesday, November 27, is the deadline for establishing a flexible spending account for health care and/or dependent care for 1997. Obtain enrollment forms for the Health Care Reimbursement Account and the Dependent Care Reimbursement Account from the Benefits Office, Human Resources Division, Bldg. 185.

Direct Deposit Month

November is almost over — and so will be the Fiscal Group’s Direct Deposit Month drive to encourage BNLers to deposit their entire salaries directly into the bank. If you sign up for direct deposit of your net pay during November, or if you have already done so, then you will be eligible for one of two drawings for \$100 American Express gift certificates. If you haven’t already signed up, then complete the back of the Direct Deposit Month memo recently sent to employees still receiving paychecks and return it to Payroll, Bldg. 134J, before December gets here.

Next BERA Concert Features 'Classical Cabaret'

To experience cabaret as it was originally conceived in Europe over a century ago, as well as the way it has been interpreted by modern composers, such as George and Ira Gershwin, come to the BERA-sponsored "Classical Cabaret" featuring soprano Jody Karin Applebaum and pianist Marc-André Hamelin, on Sunday, December 8, at 2 p.m. in Berkner Hall.

Applebaum and Hamelin are a husband-and-wife duo who have delighted audiences in the U.S. and Canada with their innovative programming and impeccable musicianship.

Applebaum uses her powerful, operatic voice in an unusual repertoire, as demonstrated in her debut recording, *Masterpieces of Cabaret*. Last year, she first performed at the Newport Music Festival.

First-prize winner of the 1985 Carnegie Hall International American Music Competition, Hamelin has



Jody Karin Applebaum and Marc-André Hamelin

Book Fair Today

If you haven't been to the BERA Book Fair in Berkner Hall, drop by for its last day, today, Friday, November 22, from 10 a.m. to 3 p.m.

With books ranging from children's stories to cookbooks to *New York Times* best-sellers, there is something for every reader on your holiday list.

IBEW Meeting

Local 2230, IBEW, will hold its regular monthly meeting on Monday, November 25, at 6 p.m., in the Knights of Columbus Hall, Railroad Avenue, Patchogue. The agenda includes regular business, committee reports and the president's report. There will be a meeting for shift workers at 3 p.m. at the union office.

mum detection limit for strontium-90. Thus, if any strontium-90 is present — which, Schroeder said, is not likely — it is well below the drinking water standard of 8 picocuries per liter.

So, why is Gould undertaking this study? According to Schroeder, that's not at all clear.

"Before conducting a search for strontium in baby teeth," Schroeder said, "a responsible researcher would first establish that a population has been exposed to it. Since there is no credible scenario under which Suffolk County residents could have been exposed to strontium-90 beyond the exposure that people throughout the U.S. have received from fallout resulting from aboveground nuclear weapons testing conducted years ago, it is not at all clear why Gould is pursuing it."

Nonetheless, Gould is "urging families living at various distances from BNL to save their baby teeth for our analysis of its strontium-90 content."

There's no need for Gould to spend his grant money from the Methodist Church and some East End family foundations to find out. "Publicly available historic data show that release of radioactivity from BNL operations has been measured for decades," said Schroeder.

"The methods for calculating doses to the public are well-established," Schroeder continued. "It is clear from the *real* data measured both here and at control areas off site that the doses resulting from the operating of the reactors are tiny fractions of natural background exposure."

Given all the data, which have been independently verified by such outside agencies as the Environmental Protection Agency, the New York State Department of Environmental Conservation and the SCWA, Schroeder concluded, "There is no accepted theory that supports Gould's claims regarding BNL or strontium-90 in baby teeth. This is not good science."

recorded more than 25 compact discs. His recording of Charles-Valentin Alkan's *Concerto for Solo Piano* received 1994 nominations for both the Grammy and Gramophone Record of the Year.

The program for the "Classical Cabaret" includes late 19th and early 20th century French cabaret songs, such as Aristide Bruant's "*Ballade du Chat Noir*," as well as German cabaret songs, like Arnold Schoenberg and Hugo Salus's "*Der genügsame Liebhaber*." Cabaret songs from modern American composers will also be included, such as Ira Gershwin's "Sing Me Not a Ballad," and Stephen Sondheim's "I Never Do Anything Twice."

Purchase tickets in advance from the BERA Sales Office, from 9 a.m. to 1:30 p.m. on weekdays, or at the door. No seats are reserved, so arrive early for the best seats. Tickets cost \$14 general admission, \$9 for seniors, and \$5 for students and youths under 18.

For more information on the concert, including weather updates, call Ext. 3550 for a recorded message.

After Giving Thanks, Plan to Give Blood

BNL's 25th year of hosting blood drives will include the annual winter Blood Drive on Tuesday and Wednesday, December 3 & 4, from 10 a.m. to 3 p.m., at the Brookhaven Center. At that time, BNLers may also become part of the National Marrow Donor Program, a nationwide registry to help people with fatal blood diseases.

To sign up, complete and return the pledge card recently sent to all employees. If you have any questions, call BNL Blood Drive Coordinator Susan Foster, Human Resources Division, Ext. 2888, or your department or division's Blood Drive captain (call Foster if you do not know who this is).

Arrivals & Departures

Arrivals

Michael S. Benedetto.....Central Shops
Stanley W. Doskoez.....Central Shops
Robert W. Eifert.....Central Shops
Salvatore C. Scarpitta..Saf. & Env. Prot.

Departures

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

James D. Happell.....App. Science
Hungyuan B. Liu.....Medical

Service Awards

The following employees celebrated service anniversaries in November:

40 Years

Orazio Barone.....Plant Engineering
Edward F. Meier.....NSLS

35 Years

Carl B. Eld.....AGS
Edward G. Gill.....AGS
Manfred G. Thomas.....NSLS

30 Years

Lawrence Musso.....Safeguards & Sec.
Siegfried Naase.....AGS

25 Years

Marion T. Blennau.....Adv. Technology
Linwood E. Johnson.....Adm. Support
Claire A. Lamberti.....App. Science
David D. McChesney.....RHIC
Gisella C. Murphy.....Adm. Support
Joseph F. Skelly.....AGS

20 Years

John J. Barry.....AGS
Howard W. Bell.....Plant Engineering
Joseph F. DePace.....Comp. & Comm.
Arup K. Ghosh.....RHIC
Joe H. Jo.....Adv. Technology
Leon Lawrence.....Info. Services
Anthony J. Salvo.....Contracts & Proc.
Robert F. Wieser.....App. Science

10 Years

Gerald A. Griffin.....Safeguards & Sec.
Zheng Li.....Instrumentation
Steven J. McCune.....Safeguards & Sec.
Joann Palumbo.....Safeguards & Sec.
Richard J. Thorp.....Safeguards & Sec.

Outreach Workshop Dealing With Difficult People

If your life is free of hostile, complaining, unresponsive, over-agreeable-but-underachieving, negativistic, know-it-all, and/or indecisive bosses, subordinates, coworkers, customers, significant others, relatives and/or friends, then you have a wonderful life and this workshop is not for you.

If, on the other hand, you have such impossible people in your life and would like to learn how to cope with them better, then attend the next Outreach workshop, "Dealing With Difficult People." Sponsored by the Employee Assistance Program (EAP) of the Occupational Medicine Clinic, this workshop will take place on Friday, December 6, from noon to 1 p.m. in Berkner Hall. The talk will be available afterward on audiocassette in the Research Library, Bldg. 477.

To be presented by psychotherapist Linda Costanza, C.S.W., the workshop will present constructive strategies for dealing specifically with the different types of difficult people you encounter in life, regardless of the situation.

To register, return completed the bottom portion of the Outreach flyer recently sent to all employees to EAP Staff Psychologist Dianne Polowczyk, Bldg. 490, by Thursday, December 5. For more information about the EAP, call Ext. 4567.

BNL Crafts-96 Show

Berkner Hall Room B

Monday - Wednesday, November 25-27 11:30 a.m.-1:30 p.m.

Monday evening, 5:30-7:30 p.m. Opening reception with refreshments.

All are cordially invited.



Holiday Notes

In observance of Thanksgiving, the Lab will be closed on Thursday and Friday, November 28 & 29. As a result, the following schedules will be in effect:

• **Brookhaven Bulletin** — There will be no Bulletin next Friday; the next issue will be published December 6. The classified ad deadline for that issue is noon on Wednesday, November 27.

• **Credit Union** — The Teachers Federal Credit Union on site will be closed on November 28, but open on November 29. The automatic teller machine in the foyer of Berkner Hall will be open throughout the holiday.

• **Food Service** — The Cafeteria will offer snack-bar service from 9 a.m. to 2 p.m. Thursday through Sunday, November 28-December 1. The Brookhaven Center Club will be closed Thursday through Saturday, November 28-30; it will reopen on Sunday, December 1, 5-9 p.m. The vended-food service in Bldg. 912 will be in operation during the holiday weekend.

• **Gym & Pool** — Both will be closed from Thursday, November 28, through Sunday, December 1. These facilities' usual schedules will resume on Monday, December 2.

• **Omega Leisure Travel Office** — The Omega Leisure Travel Office in Berkner Hall will be closed November 28 & 29.

• **U.S. Post Office** — The Upton Branch of the U.S. Postal Service will be closed on November 28. On Friday, November 29, the mail will be delivered to post office boxes, and window service will be available from 8 a.m. to noon.

• **Weekly Calendar** — The deadline for the calendar for the week of December 2 is 5 p.m. on Monday, November 25.

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Camera Club

Light is essential to photography, and, at the next meeting of the BNL Camera Club, on Wednesday, December 4, at noon, in Room D, Berkner Hall, club treasurer Richard Witkover will give a talk on the different types of light. Witkover will explain how film and the human eye interpret light differently and that good photographic results depend on your being aware of the type of light you are using.

For more information, call Ripp Bowman, Ext. 4672, or Witkover, Ext. 4607.

Volleyball

Standings as of November 14

Open League		League I	
Shank, Carry & Throw	14-1	Bikers 'n Spikers	15-3
Pass, Set & Crush	8-7	Rude Dogs	14-4
Far Side	7-8	Scared Hitless	8-10
Death Volley	5-7	Set to Kill	5-13
Spikers	2-13	Net(e)scapers	3-15

League II		League III	
Spiked Jello	12-0	Silver Bullets	15-0
Safe Sets	9-0	Upton Ups	14-1
Jao-About-That	8-4	Just 4 Fun	10-5
Nuts & Bolts	6-6	Group Sets	9-6
Fossils	4-5	New Comers	6-9
Monday Nite Live!	3-6	Court Hogs	3-12
Lift, Carry, Throw	4-8	OER	3-12
Jolly Vollyies	1-8	Over-in-Three	0-15
Night Court	1-11		

Classified Advertisements

Placement Notices

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

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

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

For more information, contact the Employment Manager, Ext. 2882, or call the JOBLINE, Ext. 7744 (344-7744), for a complete listing of all openings.

Current job openings can also be accessed via the BNL Home Page on the World Wide Web. Outside users should open "http://www.bnl.gov/bnl.html", then, under "Information," select "Jobs." For scientific staff openings, select "Scientific Personnel Openings"; for all other vacancies, select "General Personnel Openings."

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

SCIENTIST - With several years' experience in relativistic heavy-ion physics, and proficiency in programming of FORTRAN and C++ code for AIX, Solaris and SGI platforms. Experience in the design, development and implementation of software for large modern physics detectors infrastructure is essential. Responsibilities will include the design, development and implementation of software infrastructure for the STAR Project. Contact: Timothy Hallman, Physics Department.

POSTDOCTORAL RESEARCH ASSOCIATE - Trained in physics, to join the medical research group at the NSLS. Experience with the design and utilization of perfect crystal x-ray optics is required. Active programs include bronchography, mammography, computed tomography and radiation therapy. Contact: William Thomlinson, National Synchrotron Light Source Department.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside candidates.

DD 4533. PROGRAMMING/ANALYST - Requires a BS in computer science or equivalent experience, and familiarity with real-time programming, C and UNIX. Knowledge of electronics, control system hardware, VME hardware, VME standards, VME I/O modules and peripheral I/O boards is needed, as is a knowledge of a commercial real-time operating system, preferably VXworks. Experience implementing, testing and debugging real-time systems is required; knowledge and experience with network communications, Ethernet protocols, network programming and network debugging highly desired. National Synchrotron Light Source Department.

DD 4859. OFFICE SERVICES POSITION - (part-time) Requires previous travel office experience, including several years' SABRE computer experience. Will assist Laboratory staff in all aspects of travel, such as airline, railroad, bus and ferry reservations, limousine or car rentals, and obtaining accommodations. Administrative Support Division.

DD 6193. TECHNICAL POSITION - (term appointment) Requires experience in both mechanical and electrical systems. Work will involve the operation and maintenance of large-capacity process water-cooling systems. Familiarity with computers, programmable logic controllers and electrical wiring desired; skill in the use of hand tools and knowledge of basic machine-shop practices required. Will be required to respond to unscheduled call-ins. Alternating Gradient Synchrotron Department.

DD 6194. TECHNICAL POSITION - (term appoint-

ment) Requires experience in the operation and maintenance of large-capacity process water-cooling systems. This includes pumps, cooling towers, heat exchangers, mixed-bed demineralizers, pneumatic systems and electric controls. Skill in the use of hand tools and knowledge of basic machine-shop practices, soldering and brazing required. Will be required to respond to unscheduled call-ins. Alternating Gradient Synchrotron Department.