

## Medical Conference Focuses on Chernobyl

"Short-Term Health Effects of Reactor Accidents: Chernobyl" was the subject of an international conference held in the Medical Department last Friday and Saturday, August 8-9, and sponsored by the Office of Health and Environmental Research (OHER), Department of Energy.

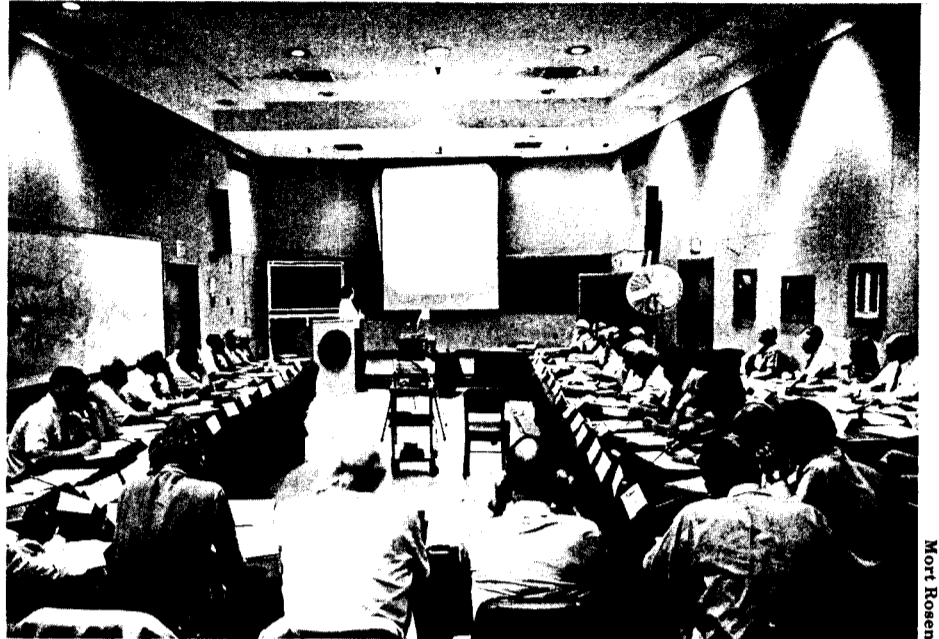
BNL Senior Scientist Victor Bond organized the conference, along with Senior Scientist Eugene Cronkite of BNL and William Burr, Oak Ridge Associated Universities. Bond explained that the idea for the meeting arose from an early July conversation with Jacob Thiessen, Deputy Associate Director of OHER. They discussed the extent to which the Chernobyl accident might help fill in serious gaps in the existing body of knowledge about early effects of large doses of external radiation delivered to the

explosion and fire at the Soviet Union's number 4 nuclear power plant at Chernobyl, Gale and his associates flew to the U.S.S.R. to treat radiation victims. Since his initial stay, during which he assisted the Soviets in performing 13 bone marrow transplants, Gale has twice returned to the Moscow hospital for follow-up on his patients and to discuss long-range plans to deal with the exposed population of approximately 100,000 individuals. In his conference talk, Gale described the situation he encountered upon his arrival.

"When we arrived," he said, "It was my intention to reconstruct the dosimetry [the radiation doses received]; this was impossible. Their film badges were completely off scale and were not useful."

Dose calculation was further complicated by the fact that the patients had injuries from multiple sources. In addition to burns from radioactivity, they had been burned by fire. They had also inhaled fumes of burning plastic. Though these agents could often cause similar symptoms, Gale and the Soviet doctors had to use the degree of skin involvement and the time of first onset of nausea and vomiting to estimate dose. They also relied on the patients' blood lymphocyte counts (lymphocytes are a type of white blood cell), as well as cytogenetic analyses, to determine the extent of chromosome aberrations.

These data were used to select those patients who probably had lost all bone marrow function and would die without a transplant. Some of the marrow for the 13 transplants came from the patients' parents, but most came from siblings, who were called to Moscow from all corners of the Soviet Union. Gale suggested that data regarding siblings might be included in records for all power plants worldwide.



Theodor Fliedner, University of Ulm, West Germany, leads a discussion at the Medical conference on "Short-Term Health Effects of Reactor Accidents: Chernobyl."

Of the 13 transplant patients, Gale expects ultimately only about three to five to survive. Because there are so many complicating factors, he said, "your expectation should not be very high." To date, a total of 30 of the 500 people exposed to substantial doses of radiation have died as a result of the accident. Given the circumstances, Gale feels the Soviets "did a very good job."

While Gale points out that final analyses of the accident and treatment will help in future accident planning, he noted that, overall, "It was much more complex in an actual field situation than is generally conceived."

In addition to answering questions, Gale's recent experience raised some. For instance, what are the respective merits of lymphocytes, granulocytes (another type of white blood cell) and cytogenetics as a measure of received

dose? Cronkite pointed out, "With Hiroshima victims, the granulocyte count was predictive of who would live and who would die." And in his discussion of the Bone Marrow Syndrome, Theodor Fliedner, of the University of Ulm in West Germany, suggested that granulocytes, which have a lifespan of less than a day, might be the best indicator when a quick decision must be made regarding transplant therapy. Since it would be known within five days whether the cells are reproducing, he explained, doctors would have a good indication of whether the bone marrow was viable.

Other conference discussions dealt with the effects of radiation on the gastrointestinal system, central nervous system, lungs, skin and thyroid. One discussion concentrated on the combined effects, such as the thermal (Continued on page 2).



Robert Peter Gale

whole body and approaches to treatment.

Thus the conference brought together many of the pioneers in the field of human radiation injury. Most of the 45 attendees were physicians who have had experience either with people who have suffered radiation injury, people who were exposed to radiation for treatment purposes or animals that received experimental radiation injuries. Representative of the vast experience of the group was E. Donnell Thomas of the University of Washington, who is acknowledged as one of the fathers of bone marrow transplantation. Providing firsthand experience in using that procedure to combat high radiation exposure from the nuclear power plant accident at Chernobyl was Robert Peter Gale, of the University of California at Los Angeles.

Just seven days after the April 26

## Inside Info

Michael Weinert, Assistant Physicist in the Physics Department, has been awarded a Research Fellowship from the Alexander von Humboldt Foundation. He will leave the first week in September for a year at KFA-Julich, West Germany, where his research will involve looking at defects in surfaces. Weinert is a theoretical solid state physicist who came to the Lab in September 1982 after receiving his Ph.D. from Northwestern University.

The Alexander von Humboldt Foundation has been in existence since 1860. It was dissolved in 1945, and re-established in 1953 by the Federal Republic of Germany. It aims to promote scientific cooperation between scholars in Germany and other countries.

## The Trouble With Tanning

The perfect tan has become a modern status symbol that sunbathers seek each summer. Whether at the beach or in the tanning parlor, millions of Americans expose themselves to ultraviolet (UV) radiation as they develop and maintain their tans. According to Betsy Sutherland, scientist in the Biology Department, UV light can cause considerable damage to DNA, the molecule that carries our genetic information.

Anthony Blackett, Steven Freeman and Sutherland have been investigating the molecular effects of UV radiation from the sun and tanning lamps on the DNA in human skin. They have been collaborating with Richard Grange M.D., Department of Dermatology at Harvard Medical School. He exposes skin of volunteers to UV radiation for a specified amount of time. He then sends the skin samples to BNL for molecular analysis.

As the tans start to fade in the waning days of summer, many people run to tanning parlors. What they do not realize is that the rays from "safe" UV A lamps are not as safe as people claim. The difference between exposure to the sun and a tanning lamp is that sunburn is a painfully obvious warning that your body has been overexposed. The danger of going to tanning parlors is that you don't burn. In tanning parlors, your tan becomes deeper, and there's no way to know when to stop exposure. Although tans can offer some protection against

further exposure to the sun, a tan from a tanning parlor may not protect you against burns from the sun.

To detect DNA damage, Sutherland and her group have exploited a very sensitive technique. UV light can cause the creation of pyrimidine dimers, resulting from abnormal bonds between DNA bases that can ultimately prevent the production of proteins, cause mutations and induce cancers.

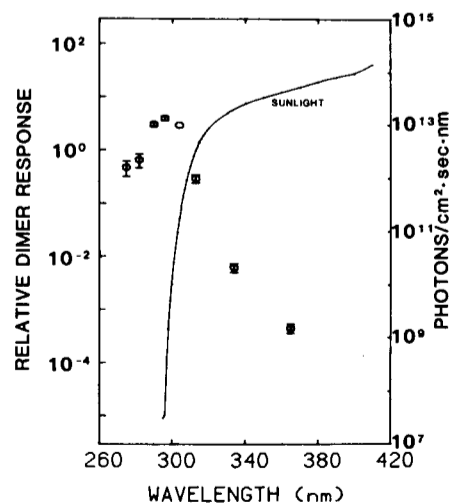
Sutherland and her group have isolated an enzyme, the UV endonuclease, which makes a cut in DNA adjacent to each dimer. When they treat the DNA from their skin samples with the enzyme, it breaks the strands into a number of pieces. They can then calculate how many dimers are in the DNA by examining the distribution and density of the pieces on a "gel," which separates molecules by their size. Currently, they can identify one site of damage per million DNA base pairs.

A direct correlation exists between DNA damage and the intensity of UV rays. The sun emits a wide range of ultraviolet radiation from the more energetic UV B light to the less energetic UV A light. Previously, researchers had thought that only UV B radiation could damage DNA. With their "UV endonuclease technique," they have shown that UV A radiation causes the same type of molecular damage, but at a slower rate than the

more energetic UV B radiation.

Tanners, beware! The "pale look" may make a comeback as people who are health conscious start staying out of the sun.

— Howard Rubin



The graph shows which wavelengths of light are the most efficient in damaging human skin. The points show the yields of dimers (abnormal bonds between DNA bases) in human skin exposed to equal numbers of photons of light of one wavelength. The curve shows the amount of light (photons/cm<sup>2</sup> sec nm) reaching the surface of the earth. The overlap of the data points and the curve indicates which wavelengths in sunlight are most efficient for damaging the DNA of human skin.

# In the Midst of Science — Nature

Throughout the summer, I have mused upon the changing face of nature at Brookhaven, watched torrential rains and suffered through hazy, humid weather. I have spied deer wandering around the Lab and rabbits hopping along the road. As a native of New York City working at the Lab for the summer, I have grown accustomed to the rhythms of nature here, its pleasant surprises and unwelcome visitors.

Hardly a Thoreau, I have not camped out in the woods, but observed nature before signaling a quick retreat to the office. To record what I have seen, I do not use pencil and paper, but compose on the nearest word processor.

Many of the Brookhaven scientists I have interviewed in the past three months are exploring the world of the microscopic, what the poet William Blake described as the "world in a grain of sand." To describe that world, they have built larger and more sophisticated equipment to look at smaller segments of it. Encounters with nature's macroscopic world, however, can still have a powerful effect upon all of us.

Unexpected contacts with nature have galvanized my perception and appreciation of it. Jogging on the field behind the firehouse, I noticed from a distance the Lab's huge antenna which pierces the sky in an elegant slender line. As I got closer I saw the metal cables anchoring it to the ground. Looking up at the antenna, I was startled. Out of the corner of my eye, I noticed something moving in front of me. A creature, which looked like a groundhog, must have been as startled as I was; he began running away from me with unexpected agility.

One friend of mine experienced a similar meeting one misty evening down by the playing fields. Out for his after-dinner stroll, he suddenly noticed three deer grazing. He was close enough to touch them but did not dare. One fawn kept on eating, but the other two deer raised their heads and

stared. Neither animals nor man moved.

In the guise of a chipmunk, with white markings down his brown back, nature often greets me in front of Berkner Hall. I have seen him stand on his haunches to watch what is going on around him. He is an example of the adaptability of nature.

Far from the bright lights of the Big City, the sky over Brookhaven's natural landscape liberates me. On a clear night, the sea of stars speaks as eloquently to the heart and soul as the physicist trying to explain what he sees up there. While the scientist takes his place at the computer console or on his beam line, I sit at the Brookhaven Center, looking west. After the sun has dipped below the horizon, the red-tinged clouds herald the darker tones of evening. The stars, inspiration for the astrophysicist, welcome the poet and the writer too.

Toward the beginning of the summer, a friend and I sat on the patio of Berkner discussing science and society, and gazing at the drama of the nighttime sky. Suddenly, I saw a falling star—a meteor burning through the atmosphere. It appeared as a trace of white light arcing downward, visible for only a moment before it vanished. If I hadn't been looking directly at it, I would have missed it.

Watching a falling star is like "observing" the short-lived particles produced in collisions of particles in accelerators. From studying computer printouts of their interactions, a scientist can tell something about a particle. He looks at it indirectly, just as I could only see the fiery descent of the meteor, not the rock itself. The particle and the falling star are gone almost as soon as they are detected. You have to be ready to catch their evanescent tails of light.

Upon my return from stargazing, I am impressed and discomfited by the number of insects that invade Compton House. They are nature claiming its stake, moving in on the house we dared to build in their domain. Their



Three baby woodchucks emerge from their underground tunnel system on site to check out our current research.

entry into this house is usually their death. The protective coloration of the moths, which served them so well outside, offers no protection upon the white tiles of the bathroom. After my initial uneasiness, I have begun to acquire an entomologist's eye. Each "swiggly crawl" creature has elaborate structures that make it uniquely fit to occupy a niche in its natural environment.

Settling deeper into a comfortable chair in my room, temporarily undisturbed by the crawling multitudes outside my door, I mull over the name of the laboratory. We are neither Upton, nor Yaphank, nor Middle Island Laboratory, but Brookhaven National Laboratory. Norman Ramsey, a former trustee of AUI, chose the

Lab's name precisely because it "had a misleading association with quite shady streams which might make the laboratory site sound more attractive than it actually was." But seeing a deer while gazing out your office window is always a possibility here. Brookhaven may not be a sanctuary for babbling streams and fields of wildflowers, but it is a haven for many animals. Brookhaven is more than just a place to work or a place to look for rabbits and deer. It is a national laboratory. Like our parks and undisturbed wild places, it is a natural resource. We must care for it and protect our scientific heritage, just as we preserve a Yellowstone or a Yosemite National Park.

— Howard Rubin

## Chernobyl

(Cont'd)

and radiation burns Gale had noted at Chernobyl. And the final talk focused on the effects on fetuses in early stages of gestation. Jack Schull of the University of Texas at Houston has conducted a long-term study of people born following the bombings of Hiroshima and Nagasaki. He has found cases of severe mental retardation in some exposed between the eighth and fifteenth weeks of pregnancy — a loss of about 25 points of I.Q. following a dose of 100 roentgens (rads). Since no data on these victims was compiled until three years after the exposure, Schull said, "We don't know what transpires in this very early period of time immediately following exposure." He suggested that

at Chernobyl, or in a similar situation, modern techniques such as ultrasound may be able to provide such information.

The conference summary was conducted by Stuart Finch, of Rutgers University. He reiterated Thiessen's opening charge to the group, saying, "If we are to accept the nuclear option, we must be prepared for the inevitable outcome of future accidents." This, he stressed, requires concern for the lessons learned at Chernobyl, planning, education and research. Of great importance to the field, he added, is an infusion of both new funding and "new blood," people interested in continuing the important work that those attending this conference started and brought to maturity. — Anita Cohen

## Patents Awarded

Because of potential danger to the environment, particularly from acid rain, much attention has been devoted to the control of emissions from fossil fuel combustion. Meyer Steinberg, DAS, was recently issued U.S. Patent #4,555,392 for inventing a way to use Portland cement to remove oxides of sulfur from the emissions of fossil fuel combustion.

Portland cement, the common name for calcium silicate cement, can be injected into the boiler with the fuel, the combustion air, or downstream in the combustion gases. In any event, it reacts with the sulfur dioxide formed from the fossil fuel being combusted to form calcium sulfite silicate. In the presence of sufficient oxygen, it will form calcium sulfate silicate. Both of these products can be removed easily and efficiently with the fly ash using existing collection equipment. The process of the invention, therefore, is readily adaptable to retrofit engineering.

Alfred W. Maschke, a former BNL employee, was issued U.S. Patent #4,560,905 for inventing a charged particle accelerating assembly that uses a plurality of linearly spaced electrostatic quadrupoles to focus and accelerate charged particles in a beam. More particularly, the invention relates to an assembly with structural and operating parameters that effectively maintain an essentially laminar flow of a beam of particles as it traverses the electrostatic fields of the quadrupoles in the assembly.

U.S. Patent #4,572,285 was awarded to Thomas E. Botts, a former BNL employee, James R. Powell, DNE; and Roger Lenard, a collaborator, for inventing a heat radiating apparatus that is useful in spacecraft for ejecting heat energy from such craft into space.

In the past, many different types of energy radiating devices have been designed in an attempt to overcome the dilemma between the need for a large energy radiating surface and the need to minimize the overall weight of an energy radiating system. The present invention uses a magnetic focusing means for directing and accelerating liquid droplets into a relatively small, lightweight droplet collector within the radiator system. The magnetic focusing means is also effective in suppressing splashing of liquid when the droplets impinge on the collector.

Former BNL employee William G. Wilhelm was awarded U.S. Patent #4,559,924 for inventing a thin film absorber for a solar collector.

There are myriad solar energy absorbers and collectors available. Generally, these have tended to be complicated and labor intensive. Wilhelm's absorber departs from standard practice in that it uses high performance, low cost, thin films for the window of the collector and for the absorber. The thin films are bonded to the collector in a stressed state, thus adding to the overall strength of the panel.

## Further Comments . . .

Following last week's meeting at BNL, Robert Gale and Victor Bond appeared at a press conference on Saturday. Highlights follow.

Reporters focused on Gale's feelings about nuclear power. Stressing that he is neither for nor against it, Gale said, "The question is not whether we want nuclear energy; it exists. Even if there were no nuclear station here . . . five hundred will be in operation [in the world] by 1990. We are living in a nuclear age. It's inevitable that accidents will occur. The most important issue is that these accidents know no international boundaries. . . ."

"We must convince the public that we can deal with these accidents. Nuclear energy will expand, but the rate will depend upon the public's confidence that we can prevent accidents and deal with them when they occur. . . ."

"Every form of energy has its cost, and society, by and large has accepted this price. Except for an unprecedented change in civilization's attitude, nuclear energy is going forward."

To deal with accidents, both Gale and Bond stressed the need for new people to enter the field of radiation biology. Bond said those now in the field are "an aging population that is well acquainted with these problems. There are not many people interested in going into this." But Gale expressed the idea that this would begin to change, particularly as the nuclear power industry becomes more open about plans to deal with accidents.

Gale did not start out dealing with radiation injury. As an immunologist, however, he has done many bone marrow transplants and sees the connection. "About 1,500 people receive bone marrow transplants each year for leukemia," he said. "We cure approximately one-half of these individuals because scientists in the past asked, what could we do if we had a radiation accident? . . . We don't always understand the full impact of a course of research."

—A.C.

## Reports Available

The following reports are now available to the Laboratory staff and to affiliates of the DOE, AUI and NRC. Others may purchase the reports from the National Technical Information Service, U.S. Dept. of Commerce, 5285 Port Royal Rd., Springfield, VA 22161. Staff members should call the designated contact at the extension listed.

- NUREG/CR-2331**  
**BNL-NUREG-51454**  
Vol. 5 #3  
Contact: J. Wilson, Ext. 2922  
Safety Research Programs Sponsored by Office of Nuclear Regulatory Research. Quarterly Progress Report July 1-Sept. 30, 1985. Compiled by A.J. Weiss.
- NUREG/CR-3137**  
**BNL-NUREG-51643**  
Contact: J. Murray, Ext. 2446  
Seismic and Dynamic Qualification of Safety Related Electrical and Mechanical Equipment. Prepared by M. Subudhi, et al.
- BNL-51870**  
Contact: C. Baum, Ext. 4835  
A Technical and Economic Assessment of Condensing Space Heating Systems. J.W. Andrews, et al.
- NUREG/CR-4207**  
**BNL-NUREG-51872**  
Contact: C. Conrad, Ext. 2272  
Fault Tree Application to the Study of Systems Interactions at Indian Point 3. Prepared by R. Youngblood, et al.
- NUREG/CR-4319**  
**BNL-NUREG-51904**  
Contact: L. Marascia, Ext. 4904  
NUCRAC: A Code for the Estimation of Adversary-Action Consequences in the Nuclear Power Fuel Cycle. Prepared by Science Applications, Inc, D.C. Kaul, et al.
- NUREG/CR-4374**  
**BNL-NUREG-51917**  
Vols. 1 & 2  
Contact: C. Conrad, Ext. 2272  
A Review of the Oconee-3 Probabilistic Risk Assessment. Vol. 1 - Internal Events, Core Damage Frequency. N.A. Hanan, et al. Vol. 2 - External Events, Core Damage Frequency. N.A. Hanan, et al.
- NUREG/CR-4493**  
**BNL-NUREG-51951**  
Contact: K. Becker, Ext. 3652  
An Experimental and Analytical Investigation of Quenching of Superheated Debris Beds Under Top-Reflood Conditions. Final Report. T. Ginsberg, et al.
- NUREG/CR-3957**  
**BNL-NUREG-51956**  
Contact: D. Votruba, Ext. 2746  
Reliability Assessment and Probability Based Design of Reinforced Concrete Containments and Shear Walls. Summary Report. H. Hwang, et al.
- NUREG/CR-4545**  
**BNL-NUREG-51965**  
Contact: A. Donegain, Ext. 4425  
Pipe Crack Evaluation in Operating Boiling Water Reactors. Prepared by C. Auerbach, et al.
- NUREG/CR-4547**  
**BNL-NUREG-51966**  
Contact: S. Flippen, Ext. 2507  
CONTEMPT4/MOD6: A Multichannel Containment System Analysis Program. Prepared by C.C. Lin, et al.
- NUREG/CR-4557**  
**BNL-NUREG-51969**  
Contact: A. Fort, Ext. 2114  
A Review of Issues Related to Improving Nuclear Power Plant Diesel Generator Reliability. Prepared by J.C. Higgins, et al.
- BNL-51978**  
Contact: B. Ivero, Ext. 2208  
Technical Assessment of a Direct Contact Heat Exchanger as an Energy Conservation Retrofit Option, R.J. McDonald, et al.
- BNL-51954**  
Contact: K. Hauser, Ext. 2223  
Waste Form Evaluation Program. Final Report. Prepared by: E.M. Franz, et al.

## Nursery School Needs Substitutes

The Upton Nursery School needs two certified teachers for the school year beginning September 8, to act as substitutes for its regular teaching staff. Those wishing to apply should do so in writing, before August 25. Send resume to: Upton Nursery School, P.O. Box 324, Upton, New York 11973. For more information, call Susan McCafferty, 878-1255.

## Registration Open

The Upton Nursery School is now registering children for September. Enrollment is open to three- and four-year-old children whose parent or relative is an employee of BNL.

Classes are held on site in the Recreation Building. The three-year-olds attend twice a week, while the four-year-olds meet three times a week.

The program provides an excellent opportunity for children to experience learning in a creative atmosphere under the supervision of qualified teachers.

There are still openings for September enrollment. For more information and enrollment forms, call Marietta Veligdan, 924-4074, or Susan McCafferty, 878-1255.

## Wasp Alert

The fabled killer bees have not reached Long Island, but wasps are here to stay. Party goers, be on your guard! Wasps, particularly, yellow jackets, are most numerous during August and September. And they love the same food we do, including hot dogs, hamburgers, soda, beer and cookies. And they sting people.

What can you do to thwart the invasion of the wasps at your next outing? Cooperative Extension of Suffolk County advises that proper sanitation around picnic areas can reduce the number of foraging insects. Eliminating flowering plants will have the same effect.

People who are afraid of being stung should wear light-colored, smooth-finished clothing. Bathe frequently and avoid using perfumes or colognes which may attract stinging insects in search of food.

## Arrivals & Departures

### Arrivals

**Elbio R. Rotela** . . . . . NSLS

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

### Departures

**James M. LeMaire** . . . . . Budget

## Archery Club

Joseph Bauernfeind took top honors at the New York State Field Archery Championships held in Watkins Glen, N.Y., last Sunday, August 10. Bauernfeind also won the state championship in 1978.

## WIS Meeting

A lunch meeting of Brookhaven Women in Science will be held at noon, Tuesday, August 19, Room A, Berkner Hall. The purpose is to nominate candidates for WIS officers for the next fiscal year. The nominating committee of Harriet Martin, Mary Kinsley and Ellen Gannon-Weider is considering nominations for a group coordinator, secretary, treasurer, program coordinator, publicity coordinator and seminar-lecture coordinator. Bring your lunch.

## Safety Shoes

The on-site safety shoe representative will be on vacation the week of August 18. Normal operations will resume the week of August 25.

## Cafeteria Menu

### Week of August 18

#### Monday, August 18

Old-fashioned Dutch green bean soup	(cup) .65
	(bowl) .85
Broiled flank steak w/1 veg.	2.65
Ham & potato au gratin w/1 veg.	2.50
Hot vegetable plate (lite weight)	2.25
Hot Deli: Turkey	(bread) 2.35
	(roll) 2.50

#### Tuesday, August 19

Turkey noodle soup	(cup) .65
	(bowl) .85
Chicken burrito/hot sauce w/1 veg.	2.45
Seafood Newburg over rice	2.55
Yogurt & melon plate (lite weight)	2.25
Hot Deli: Chicken patty on onion roll	2.35

#### Wednesday, August 20

Cream of cauliflower soup	(cup) .65
	(bowl) .85
Polish-style stuffed peppers w/1 veg.	2.45
Liver & onions w/1 veg. (lite weight)	2.45
Hot Deli: Roast beef	(bread) 2.35
	(roll) 2.50

#### Thursday, August 21

Chicken gumbo soup	(cup) .65
	(bowl) .85
Veal Parmesan w/spaghetti or 1 veg.	2.65
Shrimp Oriental over rice (lite weight)	2.65
Hot Deli: Meatball hero	2.45
Top your own baked potato	1.50

#### Friday, August 22

Cream of mushroom soup	(cup) .65
	(bowl) .85
Beef stroganoff over noodles	2.45
Baked pork chop w/1 veg.	2.55
Seafood quiche (lite weight)	2.45
Hot Deli: Knockwurst w/German potato salad	(bread) 2.45
	(roll) 2.55

## Afro-American Club

**Who:** The Afro-American Culture Club.

**What:** is sponsoring a family gathering and invites everyone to attend.

**When:** Saturday, August 16, from noon until 6 p.m. (rain date - Sunday, August 17)

**Where:** at the Recreation Park.

The gathering will feature contests, games, prizes, good food and drink, J.J. the Clown, a magic show, face painting, dancing and music by our own "E.T.," as well as Reggae music by D.J. "Raz Marvin" from WUSB. Lunch will be served at 1:30 p.m.

Tickets are \$5 for adults, \$2 for children under 12. It is preferred that tickets be purchased in advance, but no one will be turned away "at the door."

For information and tickets call April Donegain, Ext. 4425; Sandra Dozier, Ext. 4933; Frances Ligon, Ext. 3709; Bruce Penn, Ext. 7213; or Barbara Simpson, Ext. 7009.

## Swim Club

At the New York City Parks Department Astoria Pool Masters Swim Meet on Sunday, August 3, Toshi Sugama placed first among men 35-39 and third overall in the 100-meter breaststroke with a time of 1:23.88, and second in his age group in the 100-meter individual medley, with a 3:27.65.

## Softball

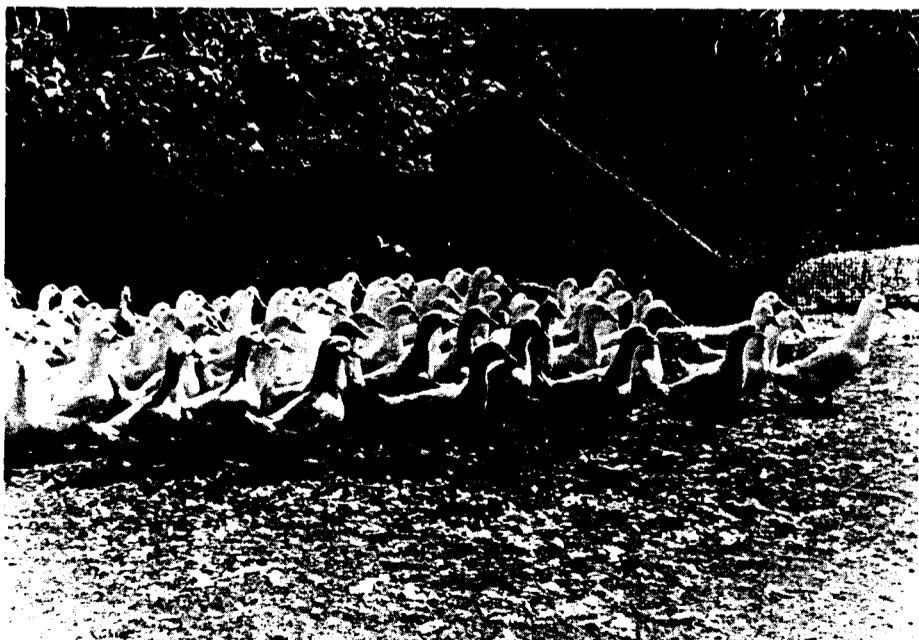
### Standings as of 8/8

Team	Won	Lost
<b>League I</b>		
<b>Division I:</b>		
Cool 'n Gang	5	4
Ravens	5	5
Moles	3	6
SMF	3	7
<b>Division II:</b>		
Blue Jays	7	2
Phoubars	7	3
Six Pax	7	3
A-Team	3	6
Dirty Sox	3	7
<b>League II</b>		
Magnuts	9	2
Scram	8	3
AMD	8	3
Titans	7	4
Binary Bombers	7	5
Phase II	5	7
Medical	3	8
Lights Out	3	9
Cutting Edge	1	10
<b>League III</b>		
Snakebites	10	1
Survivors	8	2
Farm Team	7	4
Kidz-R-Us	7	4
Septembers	6	4
Mole-Esters	6	6
Source	3	8
Turkeys	3	9
Who Cares	0	12
<b>League IV</b>		
Foul-Ups	11	0
No Feedback	6	5
Sandboxers	6	5
Hit 'N Run	6	6
Who's on First	6	6
Simply Awesome	5	6
Underalls	4	7
Spacekadets	4	8
Mudville Sluggers	3	8

### Games for week of 8/4

<b>League I</b>	
Cool N' Gang	13 - SMF 4
Moles	12 - Ravens 11
Phoubars	23 - A-Team 13
Six Pax	16 - Dirty Sox 7
<b>League II</b>	
Magnuts	11 - Cutting Edge 5
Phase II	14 - Binary Bombers 3
AMD	3 - Medical 2
<b>Games of 7/28 and week of 8/4</b>	
<b>League III</b>	
Septembers	15 - Source 6
Kidz-R-Us	11 - Who Cares 3
<b>League IV</b>	
Simply Awesome	15 - Underalls 6
Hit N' Run	13 - Who's on First 1
No Feedback	9 - Sandboxers 7
Spacekadets	15 - Mudville Sluggers 9

<b>Makeup Game from June 12</b>	
Spacekadets	21 - No Feedback 5



Long Island Farm Bureau

There are 4 million quacks on Long Island, but everything is just ducky. They are residents of Suffolk County's 19 duck farms. Duck raising is a \$20 million industry, which provides delectable Long Island duckling and down feathers for winter clothes and fluffy quilts. Historians have traced the ancestry of the Long Island duck back to the Pekin duck, which nineteenth-century sea captains brought back with them from China.

# BROOKHAVEN BULLETIN

Published weekly for the employees of BROOKHAVEN NATIONAL LABORATORY

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