BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

Inside the Maize Maze, Biologists Find Two Regulatory Genes

Most people study an ear of corn only when they are trying to figure out where to bite into it — and then they don't peruse all 300 kernels per ear. Research Collaborator Robert Schmidt, Biology, seriously studies corn — not sweet corn, but Indian corn or maize. Last summer, he examined over half a million kernels. His practiced eye, patience and persistence yielded three kernels to his liking — and the isolation of one of the first regulatory genes from a plant.

Genes are the basic units of heredity, made up of DNA and making up chromosomes. Regulatory genes control other genes — these master genes somehow tell their targets when to turn on and off during the course of an organism's development and life. Schmidt isolated a corn gene that regulates the amount of protein in the corn seed, and Research Associate Karen Cone, Schmidt's colleague in the laboratory of Benjamin and Frances Burr, had just earlier found another regulatory gene in corn, one controlling the color of the kernel.

"Our interest is in gene regulation," explains Schmidt. "We want to find out how genes get expressed and why they get expressed at certain times." Before he and Cone could begin to explore gene regulation, however, they had to find the regulatory genes within the corn chromosomes and make copies of them.

To do this, they used jumping genes, which hop from position to position along a chromosome. Each time they jump to a new location, these genes insert into the gene that is normally found there. In doing so, this jumping gene makes its presence known by disrupting the function of the normal gene.

Corn, unlike many other plants, possesses jumping genes that can be used to tag any gene whose mutant characteristics are easily recognized.

"Corn is a good genetic system because a single ear provides 300 to 500 progeny from a single crossbreeding," says Cone. "Besides, it is easy to control the pollination of the plant because the male and female parts of the corn ear are separate, and it is easy to see mutations when they affect the appearance of the kernel. Husking corn to look for kernel mutations is like tearing off Christmas wrapping — we are never sure we will find what we want inside the package."

The two biologists used a jumping gene known as *Spm*, which stands for *suppressor-mutator* because it suppresses the function of the normal gene into which it jumps, causing the gene to appear mutant. Because the DNA sequences corresponding to *Spm* had been previously cloned by Cone, she and Schmidt were able to use it as a tool to find regulatory genes.

For instance, Schmidt wanted to isolate the gene that regulates the amount of protein within a corn kernel. A normal kernel with the usual amount of protein within looks clear, like popcorn. A recessive mutation of the kernel-protein regulatory gene causes the kernel to have 50% less protein and look opaque.

By crossbreeding clear-kerneled corn that contained *Spm* jumping genes within its DNA with corn having opaque kernels, Schmidt hoped to identify some "opaque-mutable" offspring. That is, he hoped some corn kernels would be mostly opaque with clear patches on top. This appearance would indicate that *Spm* had inserted into the regulatory gene of the clear-kerneled parent. The clear patches on

(Continued on page 2)

Peter Horton

Robert Schmidt and Karen Cone

Robert Gale To Speak On Medical Aspects of Chernobyl

Robert Peter Gale, the bone marrow transplant specialist who treated radiation victims of Chernobyl in the Soviet Union, will speak on Tuesday, October 7, at 8 p.m. in Berkner Hall. His talk is scheduled as part of the AUI Distinguished Lecture series.

Drawing on his firsthand experience, Gale will address the medical aspects of the Chernobyl accident, in particular the combined effects of whole-body radiation, thermal burns and traumatic injuries. His lecture is open to the public and is expected to last about an hour, with a question and answer period to follow.

Mort Rosen

Robert Peter Gale

Just seven days after the April 26 explosion and fire at the Soviet nuclear power plant, Gale and his associates flew to the U.S.S.R. to treat radiation victims. During this initial trip, Gale assisted the Soviets in performing 13 bone marrow transplants. Since then, he 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 about 100,000 individuals.

Gale was at Brookhaven in August to attend an international conference on short-term health effects of reactor accidents, such as the one at Chernobyl. In his conference talk, he pointed out that while final analyses of the accident and treatment will help in future accident planning, "it was much more complex in an actual field situation than is generally conceived." According to Gale, the patients had injuries from multiple sources. In addition to burns from radioactivity, they had been burned by fire and had inhaled fumes of burning plastic.

Robert Gale is associate professor of medicine at the University of California Los Angeles (UCLA) School of Medicine. He specializes in hematology and oncology.

A native New Yorker, Gale received his M.D. degree in 1970 from the State University of New York at Buffalo. He then went to UCLA to do his internship and residency. In 1978, he completed a Ph.D. in microbiology and immunobiology at UCLA.

Gale also serves as chairman of the International Bone Marrow Transplant Registry, which is a computer registry started a few years ago to type bone marrow in individuals.

Research Reactor Issues Considered at Conference

Over 80 engineers and scientists involved in reactor operations traveled from all over North America to attend the Test Research Training Reactor Conference held on September 25-26 in Berkner Hall. Problems and ideas affecting most reactors were discussed in depth.

David Rorer, Deputy Manager of the Reactor Division, who arranged and directed the conference, described some of the points discussed. These included the shipment of spent fuel and the types of casks available for this purpose. A safeguards issue focused on the conversion of reactors run on high enrichment fuel to low enrichment fuel, so as to be less attractive to anyone who might try to divert inadequately guarded fuel to manufacture illicit nuclear weapons.

One of the more interesting topics proved to be the Nuclear Regulatory Commission's (NRC) proposed ban on the commercial distribution of objects irradiated in reactors to unlicensed persons. The ban would prohibit, for example, the irradiation of gemstones for commercial purposes. Neutron irradiation is sometimes used to enhance the value of an otherwise ordinary diamond or topaz by giving these stones an unusual color. While this is not practiced at BNL for commercial distribution, some small university reactors have funded other research by such methods.

Another adversely affected application is the neutron radiography of such objects as graphite and epoxy airplane parts. This method is the only means of non-destructive examination available to detect minute flaws in the parts. "Instead of the total ban on these irradiations," Rorer explained, "it was suggested that a maximum safe level of 'unwanted' radioactivity be established for the commercial use of irradiated objects."

While no decisions or final outcomes are expected from this type of conference, said Rorer, "Everyone agreed that these two days were exceedingly valuable as a forum for the exchange of information and ideas."

— Liz Seubert

Mort Rosen

Shown during the Test Research Training Reactor (TRTR) Conference are (from left) Gerald Kinne, Assistant Director for Reactor, Safety and Security; David Rorer, Deputy Manager, Reactor Division; Donald Alger, University of Missouri, TRTR Chairman; and Michael Brooks, Reactor Division Manager.

Harvey Thomas Looks Forward . . . And Back

For over 32 years, Harvey Thomas commuted to BNL from beyond the New York City line. But when he reached his Queens home last Tuesday, Thomas waved goodbye to his fellow vanpoolers for the last time, then turned toward a new phase of association with the Laboratory — as a retiree.

Mort Rosen

Harvey Thomas

Thomas's association with the Lab began in 1954, as an electro-mechanical engineer in the Accelerator Department. In his first phase at BNL, he worked on such projects as the upgrade of the Alternating Gradient Synchrotron, the design of the Accelerator Department office building and the hydrogen refrigeration system for the 7-foot Bubble Chamber.

In 1974, after 20 years with the Accelerator Department, Thomas's career entered a new phase: He became Assistant to the Director, for Affirmative Action. In that position, Thomas's objective was to see that minority groups were adequately represented in the work force and not concentrated in lower echelon positions.

"On the face of it, affirmative action seems a contrast to engineering," said Thomas, "but I always looked at it as human engineering. As the engineer looks at systems and how they respond to various existing situations, the affirmative action officer deals with people and their responses to situations. You need the same skills as an engineer: logic, reasoning ability, a thorough knowledge of your field and the skills to communicate with the people you're dealing with. And even in engineering you have to be a bit of a psychologist, because when you're right in what you think, whether it's accepted often depends on how it's presented and the receptiveness of the recipients."

Reflecting on his years as the Lab's affirmative action officer, he said, "While I feel I had a modicum of success, it's sometimes difficult to achieve your ultimate goal — there's still a lot to be done. As a consequence, it becomes time for someone else to move in and pick up the work with new energy and new directions, so more programs can ensue." In 1982, Thomas felt that time had come, and he returned to engineering, this time in the Department of Nuclear Energy. "I am happy that I came back to engineering. I enjoy it," he said.

For Thomas, the variety of work he has done at BNL is indicative of "one of the strong points of the Lab — a person can get quite a broad range of experience. There's an opportunity here to provide Lab employees with flexible job placement."

Throughout his career at BNL, Thomas has been a commuter. "When I started, I lived in Brooklyn," he recalled, "and it took almost three hours to get here. When I joined a carpool, it didn't cut down travel time, but my driving time was reduced. After I was here six months, we moved to Queens, which also helped. Now, with better roads and better cars, I can make it from Queens in approximately one hour."

Thomas will no longer spend those hours on the road. Instead, he'll use that time for some of the many things he has planned for his retirement. Primarily, Thomas plans "to start up a little consulting engineering company, see what I can build in that way for the next few years." And while he and his wife Moselle will keep Queens as their home base, Thomas said, "I hope to get away from the snow, at least in February. I try to play a little golf, but from November on, snow gets in the way. If I can get to someplace where it's warm, I can stay active."

Coming Up

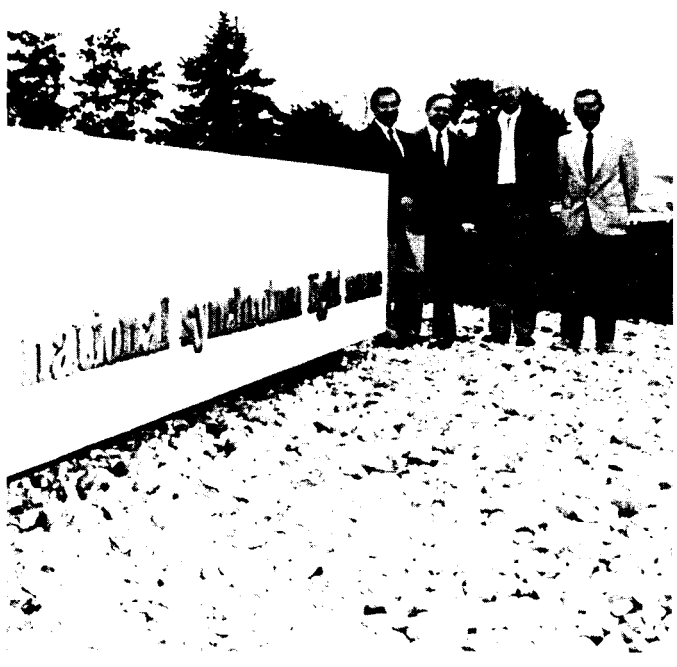
Smoking Cessation Workshop. Free orientation, Tuesday, October 14, 12-1 p.m., Berkner Auditorium.

Note to Diners

The Cafeteria will be closed on Saturday, October 4. On that day, snack bar service will be available from 9 a.m. to 2 p.m. at the Brookhaven Center.

Looking at the Lab

The National Synchrotron Light Source was one stop on the Laboratory tour taken on September 23 by George Hochbrueckner (second from left), the Democratic candidate for the House of Representatives from the First Congressional District. Accompanying Hochbrueckner on the tour are (from left) Martin Blume, Deputy Director; Gerald Kinne, Assistant Director for Reactor, Safety and Security; and Eric Forsyth, Chairman of the Accelerator Development Department.



Mort Rosen

Genes (Cont'd)

the otherwise opaque kernels arise when *Spm* jumps out of the regulatory gene, thus restoring normal function and appearance to a portion of the kernel.

After shucking about 2,000 ears of corn, Schmidt found three opaque-mutable kernels that bred true. That is, when they were planted and self-pollinated, three-quarters of the offspring kernels were opaque with clear patches.

To find the kernel-protein regulatory gene within the opaque-mutable kernels, Schmidt moved from the BNL cornfield to the laboratory. Using enzymes, he cut the DNA from opaque-mutable and opaque kernels into fragments. He searched for all the copies of *Spm* within those fragments, using previously obtained, radioactively labeled *Spm* jumping genes to identify the *Spm* within the fragments.

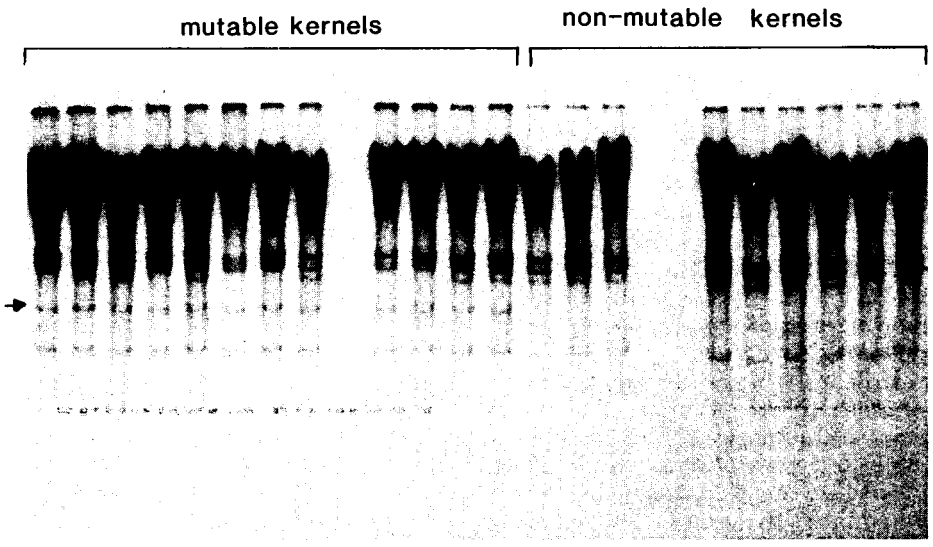
Separating the fragments of the opaque-mutable and the opaque kernel DNA by molecular weight using gels (see photo), Schmidt found one *Spm*-containing band from the gel of the opaque-mutable kernel DNA that wasn't in that of the opaque. Since the only difference between the genes of the opaque-mutable and the opaque-kerneled corn is the presence of an *Spm* jumping gene at the location of the kernel-protein regulatory gene, Schmidt knew that extra band had to contain *Spm* plus a portion of the regulatory gene itself.

By making copies of the DNA on either side of that *Spm*, Schmidt cloned the normal kernel-protein regulatory gene. Cone had previously developed these procedures when she cloned the gene controlling color in the corn seed.

"Now that we have cloned them, we can look at these regulatory genes to find out what product is expressed from them and how they interact with their target genes to turn them on and off at the right levels and at the right time in development," explains Schmidt. He will have to clone the target genes before he can evaluate the interaction between them and the kernel-protein regulatory gene.

Cone has already begun to look at the effect the kernel-color regulatory gene has on two of the target genes it controls. "It seems that this regulatory gene is a positive activator," explains Cone. "This means that its role in enhancing or inhibiting kernel color is to turn on or off directly the target genes that are directly responsible for pigment production.

"Corn regulatory genes are a good model system," concludes Cone, "and it is likely that the regulatory mechanisms are going to be universal and not very much different from those that operate in animals, including human beings." — Marsha Belford



A typical separation by molecular weight of the DNA fragments from mutable and non-mutable kernels. The arrow at left indicates the DNA fragment containing the jumping gene *Spm* that is present in the DNA from mutable kernels, but absent in non-mutable kernel DNA. This DNA fragment therefore also contains a portion of the regulatory gene.

BNL Encourages Minority Enterprise

. . . To remain the leader in bringing new products and services to the marketplace, and to successfully compete with products made abroad, we must do everything in our power to continue providing the widest possible economic opportunity for all Americans. We must also continue expanding opportunities to ensure strong growth for minority businesses. These businesses are adding jobs to industries that only a few years ago barely existed. The many contributions made by these companies will help generate the managerial and technological developments and the skilled and experienced work force necessary to strengthen and build the American economy in an era of vigorous international competition . . .

The above quote is extracted from a proclamation issued by President Ronald Reagan declaring next week — October 5-12 — Minority Enterprise Development Week. Richard Chester, BNL's Small/Small Disadvantaged Business Liaison Officer, said that the Laboratory would observe the week by presenting its annual minority vendor of the year award for 1986 to Fernando Ortiz, president of Tools for Industry, Corp., Lake Grove.

Encouraging minority enterprise is an ongoing affair at BNL, as evidenced by the awards the Lab has received from the Department of Energy year after year, for consistently meeting goals for making purchases from disadvantaged and small businesses. Minority businesses will also send representatives to the BNL Opportunity Fair scheduled for November 20 in Berkner Hall. Chester explained, "The fair, which will feature exhibits from every Lab department and division, will give small businesses an opportunity to see firsthand what the needs of various areas are, so they can be in a more familiar position when we go out for bids on goods and services."

NYC Train Trip: Big Apple Circus

Tickets are available on a first-come, first-serve basis for the Big Apple Circus on Saturday, December 27, and Wednesday, December 31. Showtime is 2 p.m. The price of $22 includes round-trip train fare and admission to the show. Send check or money order, payable to Cash, to BNL, P.O. Box 322, Upton, NY 11973. If you would like to receive a confirmation of your ticket purchase, please send a stamped, self-addressed envelope along with your check. The reserved tickets for the circus, as well as the train tickets, will be given out at the Patchogue LIRR train station on the day of the performance. Train departure times are 9:08 a.m. on Saturday, December 27, and 7:55 a.m. on Wednesday, December 31.

All film badges will be changed tomorrow. Please place your badge in its assigned rack space before leaving work today.

The telephone operators at Camp Upton during World War II.

Over forty years later, BNL operators (from left) Grace Vestal, Margaret Hedrick and Penny Byrne handle countless calls each day from their desks.

Peter Horton

The BNL Exchange

If your mental image of a telecommunications office is a writhing mass of wires and switches, the BNL telephone center in Bldg. 179 would surprise you. There are no headphones and no plugs, just three sleek terminals, each with a phone, placed conveniently for the Laboratory operators, Penny Byrne, Margaret Hedrick and Grace Vestal.

This makes quite a change from the old days at Camp Upton, when operators sat in rows behind counters. It also makes a change from the cord-board system that was familiar to Bill Webster, manager of the Staff Services Division (SSD) when he arrived at BNL in 1965. Then, there were up to ten operators and a supervisor, and high stools with safety rails were used to reach switches at the top of the board. Continuous coverage was required, weekends and overnight included, with a bedroom available during snowstorms or other crises.

By 1971, the cord-board system was saturated. A switch to the CENTREX system revolutionized the department, reducing the needed staff to four. "Then in 1981, for economic reasons," remembered Webster, "came our next cutover to the present Interconnect system, bringing all the advantages of computer control and features like add-on, call-forward and camp-on."

October 1 was D day for the latest change, this time in administration, as responsibility for telephone operations transferred from SSD to the Applied Mathematics Department (AMD). In view of the smooth running of the present system, what has prompted the change? Said Arnold Peskin, head of the new Networking, Engineering and Telecommunications (NET) Division in AMD, "The transfer of the telephone operators is just one aspect of the significant changes in technology that now bind computers and telecommunications so closely together."

The NET division includes groups responsible for phones, data communications, computer networking, digital engineering and CAD/CAM. "It has long been recognized what an excellent job is done by the telephone operators," said Peskin, "and there are no major changes contemplated in this area." In fact, to avoid relocating underground wires, "home" for the operators will remain in the original Camp Upton site in Bldg. 179.

— Liz Seubert

Cafeteria Menu

Week of October 6

Monday, October 6

Thick beef noodle soup	(cup)	.65
	(bowl)	.85
Braised short ribs w/1 veg.		2.60
Turkey noodle casserole w/1 veg.		2.50
Hot vegetable plate (lite-weight)		2.25
Hot Deli: Roast fresh ham	(bread)	2.40
	(roll)	2.55

Tuesday, October 7

Bean soup	(cup)	.65
	(bowl)	.85
Sweet & sour fish w/1 veg.		2.55
Carved pork loin w/cranberry glaze and 1 veg.		2.50
Avocado half w/chicken salad (lite-weight)		2.50
Hot Deli: Catalina club sandwich		2.45

Wednesday, October 8

Chicken gumbo	(cup)	.65
	(bowl)	.85
Taco, rice & bean plate		2.50
Beef stew w/biscuit		2.50
Assorted cheese & fruit plate (lite-weight)		2.50
Hot Deli: French dip		2.50

Thursday, October 9

Cream of cauliflower soup	(cup)	.65
	(bowl)	.85
Super sausage pizza	(slice)	.95
Salisbury steak w/1 veg.		2.50
Broccoli & cheese quiche w/1 veg. (lite-weight)		2.50
Hot Deli: Roast beef	(bread)	2.50
	(roll)	2.65

Friday, October 10

Seafood gumbo	(cup)	.65
	(bowl)	.85
Shrimp scampi over rice		2.85
Pot roast of beef w/1 veg.		2.55
Melon & fruit plate (lite-weight)		2.25
Hot Deli: Pastrami	(bread)	2.40
	(roll)	2.55

Cooking Exchange

Southern specialties will be featured at the International Cooking Exchange meeting on Wednesday, October 8, at 12:30 p.m., in the Recreation Building. Stove-top barbeque, hush puppies, fried okra and sweet potato pie are some of the dishes to be demonstrated and sampled.

Lab employees and their immediate family members are invited to attend the demonstration meetings which are held on the second and fourth Wednesday of each month. For the $1.25 admission fee, those present at the meetings receive copies of the recipes prepared and samples of each dish, along with coffee and tea. Babysitting is provided at 50¢ for each child.

For further information call Nancy White, Ext. 3034.

Swim & Stay Fit

Can you swim 50 miles? If you swim a quarter of a mile (which equals about 14 lengths of BNL's 100-foot-long pool) each time you get in the water, in 200 days you'll have stroked 50 miles. If you swim a mile a day (about 54 lengths or laps), you'll have pulled and kicked 50 miles in 50 days.

Regardless of how long it takes you, fifty miles through regular and frequent swimming is the goal of the American Red Cross Swim & Stay Fit program. The Swim & Stay Fit program is neither an endurance contest nor a race, but a way swimmers can keep track of their mileage and improve their physical fitness at their own pace. This activity is now being offered at the BNL pool and is sponsored by the Swim Club.

Anyone having reasonable health and swimming ability can participate. Any stroke or combination of strokes may be used. The only requirement is that participants swim towards the 50-mile mark in quarter-mile increments.

Sign up on one of the wall charts, which are posted on the wall by the women's locker room at the pool and on the bulletin board next to the pool exit for the men's locker room. After each swim, record the distance on the chart and, if you wish, on the individual record cards, which are available at the pool desk.

For further information, consult the BNL lifeguards, or call Peter Heotis, Ext. 2304.

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Arrivals & Departures

Arrivals

Brigita Gordon ..... Reactor
Mark M. Ito ..... Physics
Chao Tang ..... Physics

Departures

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

Patsy A. Andrisani .... Supply & Mat.
George E. Arnold ..... DNE
R. Daniel Benz ..... Medical
Jakob Bohr ..... Physics
Melody D. Brown ..... S&EP
Yusuf Celebi ..... DAS
Cheryll A. Christie ..... S&EP
Rajiv V. Gavai ..... Physics
Peter J. Gollon ..... S&EP
Shih-Yung Hsieh ..... DNE
Marion Johnson ..... Plant Eng.
John G. Keohane ..... Accel.
Richard F. Krajewski ..... DAS
Yingfang Liu ..... Tech. Info.
Dov Maor ..... DNE
John G. Markott ..... Accel.
Frank G. Muller ..... Physics
John D. Nally ..... DAS
V.N. Narasimhachari ..... Biology
Brian G. Ormiston ..... Medical
Edwin A. Popenoe ..... Medical
Daniela Sciaky ..... Biology
Johan Tafto ..... DAS
Harvey J. Thomas ..... DNE
Denise M. Veidt ..... DAS
Yi-Cheng Zhang ..... Physics

Swim Club

The Swim Club will conduct a crawl clinic on Thursday, October 9, at 5:15 p.m. at the BNL pool. Coaching will be offered on the S-stroke pull, the flutter kick and flip turn, and a short all-crawl workout will be held afterwards. For more information, call Marsha Belford, Ext. 5053, or Peter Heotis, Ext. 2304.

Bowling

Pink League

High games were bowled by Maryann Reynolds 212, Sharon Zuhoski 180, Fern Coyle 177, Renie Rosati 162, Mary Grace Meier 160.

Red/Green League

R. Larsen rolled a 247/221/602 scratch series, K. Riker 221, K. Asselta 219, E. Sperry IV 216, R. Adams 212/202, J. Ferrante 204.

White League

Mary Grace Meier converted the 4/6/7/10. Joe Sheehan bowled a 219, Rick Murgatroyd 200, Mary Grace Meier 194, Pat Manzella 185, Maryanne Rignola 176.

Purple League

Bob Barberich bowled a 200, Jim Vogel 200, Fran Brown 184, Mary Addessi 180, Lee Barberich 178.

Golf

The end of the year tournament and awards dinner will be held on Tuesday, October 21, at the Fox Hill Country Club in Baiting Hollow. The tournament will begin at noon with a "shotgun start" and will be followed by the awards dinner. The tournament fee is $14 for BGA members and $28 for non-members. This includes entry fee, greens fee and cost of the dinner. Tournament entry forms and fees should be sent to Bob Mills, Bldg. 901, Ext. 5043. Checks should be made payable to the BERA Golf Association. Deadline for signing up is Tuesday, October 14.

Thirty-eight teams played in the two-man scramble held at the Timber Point Golf Course. Winners were: Flight A — Doug Sweely and Brant Johnson (69); Flight B — Dick Hildenbrand and Joe Bauernfeind (71); Flight C — Jim Petro and Jack Detweiler (74); Flight D — Henry Grahn and George Murdock (83); and Flight E — Rick Jackimowicz and Tom Dilgen (87).

Hospitality News

The theme of the next Hospitality Committee get-together, which will be held Tuesday, October 7, at 9:30 a.m. at the Brookhaven Center, will be the design and creation of Halloween costumes. The guest speaker, Linda McKnight of the Craft Barn in Wading River, will demonstrate how to paint faces using homemade recipes for makeup.

Please come and enjoy the morning with us. Spouses of Laboratory employees and guests are welcome. Coffee, tea and danish will be served. Bring the children; babysitting will be provided free of charge.

Aviation Club

The BERA Aviation Club is having its first annual sightseeing picnic and party on Saturday, October 4, at Brookhaven Airport, 1 p.m. to 3 p.m. Share the thrill of flying above Long Island with your family and friends. Don't miss this opportunity to meet fellow aviation enthusiasts. Short sightseeing rides will be available on a cost-sharing basis, and food and refreshments will be served courtesy of Mid-Island Air Service. Call Doug Sweely, Ext. 4237, for more information.

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 and/or appropriate bargaining unit, with preference to those within the immediate work group; (2) present employees within the Laboratory as a whole; and (3) outside applicants. In keeping with the Affirmative Action plan, selection decisions are made without regard to age, race, color, religion, national origin, sex, handicap or veteran status.

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

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

For further information regarding a placement listing, contact the Employment Manager, Ext. 2882.

THE VACANCIES LISTED BELOW HAVE BEEN EXEMPTED BY THE DIRECTOR'S OFFICE FROM THE CURRENT FREEZE ON OPEN REQUISITIONS.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees only.

2480. P&GA SPECIALIST - Requires AAS in art or 3-5 years' equivalent experience. Skills should include LeRoy lettering, layout, paste-up, mechanicals and isometrics. Experience with computer graphics for creating slides and viewgraphs is helpful. Ability to work with minimum supervision is essential. Illustration Section. Photography and Graphic Arts Division.

2481. AUTOMOTIVE OFFICE CLERK - Performs diverse office duties which include heavy telephone work, computations, preparation and maintenance of purchase requisitions and service reports. Accurate typing and data entry skills are required. Staff Services Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

2482. COMPUTER PROGRAMMER/ANALYST - Requires BS in computer science or equivalent and several years' pertinent experience. Prior background with UNIX system and "C" is very desirable; considerable experience with a high-level language and assembly language is required. Structured programming experience and knowledge of software control systems, e.g., SCCS is desirable. Knowledge of communications, multiplexors, Ethernet and UUCP is also desirable. Will assist in the creation of real-time control and monitoring system for the NSLS. National Synchrotron Light Source Department.

Autos & Auto Supplies

71 CHEVY C-10 - pickup w/cap, 350 V8, 3 spd/floor shift, $1,150; cap, insulated, alum., roof vent, $150. Joe Bush, Ext. 4638, beeper 572.

75 VW DASHER - new engine, clutch, alternator, runs well, $350. Ext. 4293 or 567-9362.

77 DODGE VAN - orig. owner, needs some work, hi mileage, a/t, p/s, cruise, $1,350. 929-4663.

JAWA MOPED - 50 cc, class C, $300. 924-7658.

TIRES - 1 10x15 A/T Tracker, new, $65; 2 ea. 205/75R14, all season radials, excel., $25/ea; 2 snows, v.g., $20/ea. Tony, Ext. 2462 or 269-9510.

79 TOYOTA COROLLA - 4 cyl., 5 spd., new battery, tuned, gray, 2 dr., good, $1,599. Ext. 3405.

79 BUICK LeSABRE - 350 V8, a/c, 4 dr., p/s, p/l, am/fm, good cond., asking $2,000. Ext. 7795 or 589-8331.

72 CHEVY MONTE CARLO - good cond., $500; 73 Cadillac, dependable, comfortable, $375. Frank, Ext. 2022 or 399-4480.

80 VW RABBIT - must sell, relocating, $1,000. Paul, 928-0413.

79 TOYOTA CELICA - 59k mi., 5 spd., excel. cond., must sell, asking $3,200. 289-8248.

81 PLYMOUTH RELIANT K - a/t, p/s, 4 dr., 4 cyl, 59k mi., new tires, excel. cond., $2,800. Ext. 5089 or Ext. 3016 (home).

TRAILER - 16ft., max. ¾ ton, tilt bed, needs rollers, lights, $50. Joe, Ext. 3464 or 281-7683.

TIRES - 2 ea., B78-13 snow tires on Chevette rims, $30; 2 ea., AMC, 14" rims, $10. Ed Baker, Ext. 2419.

76 MUSTANG - 4 spd., good cond., $400. 821-0144, after 6 p.m.

HUB CAPS - set of 4, 14" and 15", $15; battery, $10. 567-5947.

79 DATSUN 310 - a/c, am/fm stereo cass., new clutch, drive shaft, brakes. Mike, Ext. 4407.

MAG WHEELS - four, alum., 6-hole, Chevy pickup, $75 firm. Steve, Ext. 2314 or 929-6877.

80 200SX - a/c, 5 spd., htchbk, sunroof, 76k mi., am/fm, p/s, p/b, runs well, $2,800 neg. 654-0830.

81 CHEVY - 4 dr., 4 cyl., 83k mi., $1,750. 654-1146 after 5 p.m.

67 CHRYSLER CONVERTIBLE - 383 V8, a/t, p/w, p/s, p/b, new top, new seats, new am/fm cass. Tony, 698-9274.

83 NISSAN STANZA - 4 dr., 5 spd., 38k mi., extras, excel. cond., $4,800. 744-4611 after 6 p.m.

82 XJ6 JAGUAR - silver, black int., 4 dr., excel. cond., low miles, $16,500. 727-2725, eves.

79 MERCURY MONARCH - 6 cyl., 4 dr., a/t, a/c, p/s, am/fm radio cass., 71k mi., $2,000. Itsuki, Ext. 3028 or 4078.

74 CADILLAC - fair cond., new tires, $450. Alex, Ext. 2384.

83 FORD ESCORT - a/c, p/s, a/t, am/fm stereo cass., very good cond., $3,200. Neil, Ext. 2023.

79 BLAZER - 4x4, new tires, am/fm, excel. cond., 305 ci. 924-6779, after 6 p.m.

75 FORD LTD. - 2 dr., p/s, p/b, good cond., $650. Ext. 4309.

81 PONTIAC PHOENIX - htchbk, am/fm, new tires and shocks, excel. value., $1,500. Christoph, Ext. 4360.

80 DODGE MIRADA - a/c, a/t, p/s, am/fm stereo, new tires. 273-9603.

79 MONZA WAGON - 44k mi., excel. cond., 6 cyl, new tires, brakes, muffler, $1,500. Ext. 3254 or 289-0034.

74 DODGE DART - for parts, manual trans., self moving, new muffler, $150. Jurg, Ext. 3422 or 821-3243.

80 OLDS CUTLASS - Supreme, 49k mi., am/fm cass., very clean, 8 cyl, $4,000; 54 Pontiac, 4 dr. sedan, flat head, 8 cyl., runs well, $1,954. Ext. 5294.

CARRIERS - roof rack, 39" to 59", motorcycle up to 350lbs, bicycle hang-on type, carries two, $10/ea. Joe, Ext. 3464 or 281-7683.

83 HONDA ACCORD - 4 dr., sedan, blue, loaded, garaged, maintained, 54k mi., $6,200. 924-5419 after 3 p.m.

67 CHRYSLER CONVERTIBLE - p/s, p/b, p/w, a/t, 383 V8, new roof. Tony, 698-9274.

84 GMC - pickup, all options, cap, 1 ton, 29,500 mi., 10,800, 4x4. 585-2084.

80 MERCURY MARQUIS - Brougham, 2 dr., excel. cond., 56k mi., $3,500. 427-2435 after 6 p.m.

75 FORD ELITE - a/c, a/t, p/b, p/s, am/fm, reliable transp., $600. Ext. 7301 or 821-9328.

79 CHEVY MALIBU - station wagon, p/s, p/b, a/c, a/t, roof rack, powder blue, $1,800. 821-1215 after 6:00 p.m.

74 CHEVY VEGA - good local transp., $300. Tom, Ext. 4453 or 473-8739.

81 CHEVETTE - 4 spd., good cond., no rust, hi miles, burns no oil, $1,100. Joe, Ext. 5131.

74 OLDS TORONADO - rebuilt engine, low miles, very dependable, $700. 475-8440.

82 FORD BRONCO - V8, a/c, alum. rims, 4 spd. loaded, excel. cond., must see. 862-6970, eves.

81 PONTIAC PHOENIX - htchbk, am/fm, new tires, shocks, fuel pump, excel. value, $1,400. Christoph, Ext. 4360.

83 PLYMOUTH RELIANT - clean, very good cond., 2.2 eng., 33 mpg; 65 Jeep pickup, 350 ci Chevy engine. Bob Kiss, Ext. 4428 or 467-4222.

77 PINTO WAGON - 4 cyl., 4 spd., am/fm, must sell. $150. Dave, Ext. 4428.

82 PLYMOUTH CHAMP - 48k mi., excel. in & out, $2,750. 363-7032.

77 CHEVY MALIBU - runs excel., rebuilt trans., no dents, must sell, $1,200 neg. 744-5122 after 6 p.m.

79 DODGE - pickup, 318 V8, standard, $2,000. John, 283-8774.

82 PLYMOUTH RELIANT - wagon, 75k mi., a/t, p/s, p/s, a/c, cruise, good cond., $2,950. Ext. 4841.

72 CHEVY MALIBU - V8, 4 dr., sedan, runs well, $200. 584-7206 after 6 p.m.

77 TOYOTA CELICA GT - 5 spd., new radiator, clutch, body needs work, best offer. 744-6289 after 6 p.m.

79 CHEVY MONZA - wagon, 44k mi., 6 cyl., new tires, brakes, muffler, runs well, $1,500. 289-0034.

80 OLDS TORONADO - red, V8, diesel, all power, orig. owner, clean, $3,500 neg. Ext. 3794.

81 HARLEY DAVIDSON - 8k mi., super glide, must be seen, $5,200. Ext. 2309 or 473-9180.

79 FIAT X9 - hardtop convertible, 5 spd., very good cond., Ferrari-styling, 61k mi., new Blaupunkt stereo. 981-0838.

AUTO PARTS - for Duster & Demon, engine, fenders, drs., hood, glass, etc., low prices. 727-3608 after 5 p.m.

66 FORD - Mustang, not running, $500. 399-0942.

TIRES - P185/75R14, steel belted radials, excel. cond., 4 $75/ea. Richie, Ext. 2175 or 734-7342.

FORD RIMS - w/GR78-14 tires, $20/ea; GM 16" rims $5/ea.; Dunlop snow, like new, $25. Ext. 4782.

PICKUP/CAMPER - 70 Dodge truck, rusty but dependable, many new parts; Camper, 12v/110vac, gas heat, stove, sleeps 4, $950. Bob, Ext. 3145.

78 FAIRMONT - 2 dr., 4 cyl., 4 spd., p/s, am/fm cass., mag wheels, 38k mi., recond. eng., excel. cond., $1,200. John, Ext. 2380 or 929-8142.

68 CAMPER - Williams Craft, slide-on, self-contained, sleeps 6, good cond., asking $600. 744-9617 after 6 p.m.

79 JEEP CHEROKEE - good cond., a/c, a/t, p/s, p/b, trailer package, $3,700. 475-4792 after 5 p.m.

75 VW BUG - good running cond., mech. sound, make offer. F. Kuehl. Ext. 7947 or 4823 or 588-2268.

82 DODGE - Sportsman Royal Ram van, V8, a/t, a/c, p/s, p/b, excel. cond., extras. 758-6069.

85 MITSUBISHI - Mirage, red, turbo, 5 spd., am/fm cass., extended warranty, like new, extras, $6,500. 286-3679.

74 CAMARO - 350, p/s, p/b, a/t, G60's, am/fm cass., headers, new carb., distributor, heads, timing chain, rust, hi mi., runs, $550. 736-1706.

TIRE - w/rim, 14", good for spare, $15; (2) 13" snows, $10 ea. Janet, Ext. 2345, 929-8152.

WHEELS/TIRES - new for Nova, Corolla, Tercel, $160; Delco, am radio, $5. Jay, Ext. 4994 or 751-0538.

Boats & Marine Supplies

21' BAYLINER - 1986, Cierra, sleeps 5, 135 hp Volvo I/O, full canvas, $19,500. 878-0480 after 6 p.m.

EVINRUDE OUTBOARD - 1981, 2 hp engine, completely rebuilt, mint, 3 mo. guarantee, $200. Sanchez, Ext. 3848 or 281-6498.

TRAILER - 16' boat/utility, 13" tires, spare wheel, crank, $150. 744-9429.

19' LIGHTNING SAILBOAT - fiberglass, w/trailer, $2,500. Bob, Ext. 7197 or 399-1679.

18' BOWRIDER - 1984 Century Bronco, 120 hp Merc-cruiser I/O, excel. cond, extras, must sell. 286-0372.

29' ULRICHSON - fiberglass, fwc, galley, head, sleeps 5, new canvas, many extras, must see, $5,500. 732-2754.

Services

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

LESSONS - for ballet, tap and jazz for children. Registration Sept. 29, 4 p.m. Lilo Levine, for information 473-2754.

GENERAL CONTRACTOR - and carpenter, extensions, dormers, garage, conversions, basements, deck, kitchens, licensed. Jim, 698-2501.

TREE REMOVAL - free estimates, firewood by pickup, load, delivered. Ken, 289-8212, eves.

BABYSITTING - my home, Bellport, experienced, references. Maryann, 286-2435.

VIDEO TAPING - wedding, birthdays, special events, VHS, 8 mm or Beta formats, reasonable rates. Chuck, 821-1525.

MAGICIAN - children's parties, Lab discount, sculptured balloons, book early for Halloween. 395-3963 after 6 p.m.

BABYSITTING - my home, Bellport village. 286-8470.

BRICKWORK - walks, patios, swimming pools, landscaping ties, Belgium blocks. Tony, 698-9274.

KAYAK LESSONS - winter program, Stony Brook University pool, sessions, basic thru advance. Tim, Ext. 3496 eves. or 281-7873.

WORD PROCESSING SERVICES - manuscripts, reports, mailings, thesis, etc., reasonable rates, efficient. Sharon, Ext. 3359.

Miscellaneous

KILN - Paragon, 18½" wide, 18" deep, 2 full shelves, 1½ shelf, w/accessories, $175. 475-5448.

CORDLESS PHONE - Sears, am/fm clock radio, $30. Ext. 4607 or 368-0452.

ENGINE - Brigs & Stratton, 2 hp, horizontal shaft, 4 cyl., runs great, will demonstrate, $40. Dan, Ext. 4987.

COLOR TV - 19" Toshiba, $150; boys bicycle, $30; child car seat, $15; (2) humidifiers, $25 & $8; (2) flourescent lamps, $10 & $5. Itsuki, Ext. 3028/4078.

COAL STOVE - Franco Belge, 22 btu, $150. 878-2482 eves.

WASHER - Westinghouse, works well, $50; 33'x59' maple table, $35; children's dresser, $20. Ext. 3933 or 689-7559.

COAL STOVE - Surdiac 713, 44 btu, excel. cond., $375. Ext. 7686 or 878-0897.

ANTIQUE FURNITURE - desk, mirror, tables, mahogany box, pedestal table, etc., reasonable, Ext. 4251.

PORTABLE TV - 7" black & white, $20. Christoph, Ext. 4360.

KEROSUN HEATER - reasonable; new home water distiller. 363-7032.

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

DRAPES - approximately 7'x8', very good cond., $20. Morris, Ext. 4192.

SKIS - w/Nordica boots, size 6-7, youth, good cond., $25. Ext. 4194 or 924-4922.

KEROSENE HEATER - Yausha, 96 btu, w/5 gallon gas can and pump, very good cond., $50. Ext. 4524.

COAL STOVE - Surdiac Southpost; wood door, weatherstrip, w/weatherstrip jams, 1¾x36x6'8"; gate leg table, 46x72; Farberware convection turbo oven. 475-0509.

HUTCH/BUFFET - small, white. $40. 289-0687.

FIREWOOD - split, seasoned oak, 4'x16'x20-22" pieces, $105., delivered. 732-2849.

FREEZER - Whirlpool, upright, 19 cu. ft., $395; dining room set; kitchen set; other items. 728-6353.

DINING ROOM SET - table, 6 chairs, hutch, wood walnut finish, $150. Alex, Ext. 4244.

FIREWOOD - split, seasoned oak, 4'x16'x20-22" pieces, delivered, $105. 732-2849.

TURNTABLE - Thorens 150, good cond., includes new audiotechnical cartridge, best offer. Ext. 2914 or 286-3742, eves. & wknd.

FREEZER - G.E. upright; 42" range hood; new Sears leaf shredder. 924-6582.

SOFA - w/2 matching chairs, excel. cond., $275. Richie, Ext. 2175 or 734-7342.

FIREWOOD - split, seasoned, quality hardwoods, avail. for pickup, near lab in small or larger amounts, $125 for full cord. Tom, Ext. 4084 or 878-1060.

BALCONY SEATS - Met Opera, La Boheme (2), Dec. 19; Manon LeScaut (4); Jan. 23 $22/ea. Dave, Ext. 2694 or 941-9022.

MOVING SALE - 13" Color TV, white wall phone, tennis racket, corner and center tables. Ext. 5161 or 736-1864.

REFRIGERATOR - GE, white, $65; maple kitchen set, $60; marble lamp table, $45. Ext. 2460 or 744-9822.

DOUBLE BED - wood burning stove; dresser desk, each $75. 924-3104 after 5 p.m.

KITCHEN CHAIRS - 5 black metal w/table, like new, $100; speakers, 2 Arzak, new, $100; portable typewriter, electric, Sears, new, $100, firm. 929-4701.

RECORDER - Dokorder, 4-track, sync, mike/line mixing, reel to reel, good cond., $125 neg. Ext. 5110.

STOCKADE FENCE - and 4 posts, three 5'x8' sections, new, $45. Mark, Ext. 5350.

CAR AMPLIFIER - Infinity MRA-90, $235; Fisher 45, w/CB receiver, $75; Sherwood car stereo, $60. Thomas, 283-4788.

METAL WARDROBE - 66'x42'x21', brown, $120; GE refrigerator, 23.5 cu, ft., brown, side-by-side, w/custom dispenser, $500. Ext. 2683 or 751-2469 eves/wknds.

TRUMPET - Holton, nickel-plated, case, music stand, extras, $200; (2) Lenox "Olympia" 5-piece setting, (platinum band), $50 each, $95. for both. 286-3679.

Yard Sale

SHOREHAM - multi-family, Oct. 4, 10 a.m.-4p.m., 4 Regis Place, off Randall Rd.

Free

SIAMESE CAT - needs loving home, declawed, house trained. Donna, Ext. 3305 after 5 p.m.

BABY GERBILS - tan and white, cute, clean, easy to care for. 286-0002.

Car Pools

MASTIC - need ride to/from Lab, 8:30-5:00 p.m. shift, will pay. Jody, Ext. 2907 or 395-3963 after 6 p.m.

GREENLAWN/HUNTINGTON - one person needed. Jim, Ext. 5057.

Real Estate

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

For Rent

HILTON HEAD, SC - 2 bdrm. condo, sleeps 6, many extras, beach, pool, tennis, golf, fall special, Lab employees & families only. $300/wk, $200/5 days. 585-9149.

WADING RIVER - fully equipped house, share & cat sit, off season, non-smoker, $250/mo. + ½ util., security. 929-8443.

CENTER MORICHES SO. - 3½ lg. rms., priv. ent., full bath, new refrig., carpet, no children/pets, 1 mo. sec., 11/1 occupancy, $575/mo. pays all. 878-0480 eves.

AQUEBOGUE - 3 bdrm. ranch, OHW heat, ⅓ acre, fenced in yard, 1½ car garage, all appliances, $750 mo. + util. 722-3338.

SHIRLEY - 3 mi to BNL, 3 rm apt., avail. Oct. 1st. $550 util. inc. Ext. 4512.

HOLBROOK - newly decorated, 4 bdrm. home, 1½ baths, dining area, country kitchen, dishwasher, new stove & windows, enclosed sun room, storage & closets galore, Sachem SD. Avail. Nov. 1. $900 + util. Ext. 2529 or 588-7989, eves.

MEDFORD - immaculate, comfortable 3 bdrm. ranch, l/r, eik, 2 baths, fin. bsmt., fenced ½ acre, attached 2 car garage, 3 miles to Lab. Ext. 2487.

NORTHPORT - apt., pvt. ent., bdrm., l/r, kit., laundry room, single preferred, $450 + util. 261-2454 after 5 p.m.

RIDGE - apt., 1 bdrm., eik, full bath, l/r, pvt. ent., plenty of storage, no pets, non-smoker preferred, $550 mo. inc. all. 924-6219.

MEDFORD - charming 2 bdrm apt., non-smoker, no pets, large, private, off LIE, exit 64, avail. Nov 1. 654-5539.

BAYPORT - for mature working single, kitchenette, full bath, furnished, deck, pvt. ent., no pets, $475 mo. inc. util. Ext. 3555

NORTH SHIRLEY - 3 bdrm., apt., lg. eik, all appliances, l/r, full bath, on ½ acre, $650 mo. + ½ util. 395-1084.

MORICHES - room in home by water, $315 mo + util. 1 mo. security, avail. Oct. 1, non-smoker prefered not essential. 874-3729. eves.

MASTIC BEACHES - 5 room house, adults only, no pets, $625 mo. inc. heat. Call 281-8538 after 4 p.m.

HAMPTON BAYS - winter rental, 2 bdrm. waterfront house, 10/1/86 to 4/30/87, non-smoking, no pets, $390 mo. + heat + util. 728-2401, eves.

For Sale

SHOREHAM NORTH - 4 bdrm., Colonial, 2½ baths, den, f/p, bsmt., fenced, patio, formal dining rm. 744-1750.

CALVERTON - mobile home, over 55, 2 bdrm., l/r, kitchen, bath, washer, dryer, patio, awning, shed, mint, $46,000. 727-2604 after 5 p.m.

BELLPORT - 3 bdrm. split level, eik, dinette, l/r, den, attached garage, all alum. siding, fenced back yard, 80'x185'. Joe Ext. 3569 or 286-9560 after 6 p.m.

ROCKLEDGE, FLA. - 2 bdrm., 2 bath, d/r, l/r, kit., fam. room, combination porch, 2 car garage, like new, stucco, lot 75'x115', excel. location. 305-631-2840.

AQUBOGUE - 3 bdrm. ranch, ⅓ acre, fireplace, finished game room + wet bar, all appliances, asking $132,000. 722-3338.

Wanted

PEOPLE HELPED BY UNITED WAY - willing to have their story used in the Bulletin to encourage donations. Liz, Ext. 2346.

SOPRANO - to sing with on-site octet. John, Ext. 2617 or Janet, Ext. 2345.

BULLDOZER - with operator to dig basement + cesspool. 924-3674.

NEW OWNER - of Seamus, English Springer Spaniel, please call Lois, Ext. 2956 or Gertrude, 751-6758.

APARTMENT - large 1 bdrm or 2 bdrm (or small house) north of LIE within 10 mi. of BNL, year-round only. Alan, Ext. 2928 or 821-1389.

DOLLS - antique or unusual, Teddy Bears or related items. 475-4199.

CEMENT MIXER - to rent. Ext. 4098 or 924-9508.

HAND TRUCK - appliance. John, Ext. 4243 or 924-3492.

BASEBALL CARDS - any year, any condition. Ed or Dennis, 744-7796 after 6:00 p.m.

FILTER & PUMP - from small pool for fish pond. 286-0795.

ROOMMATE - share condo, Middle Island, a/c, washer, dryer, pool, tennis, furnished, $400 all. Ext. 3160 or 289-5704 after 5 p.m.

SOMEONE TO ROTOTILL - area approx. 30'x75'; someone to level & grade fill, area approx. 30'x75'. Ext. 2492 or 475-8658 after 7 p.m.

REUNION - Huntington H.S. 1967, July 18, 19 1987, other classes welcome. Claudia de Billis-De Giovanniat, 654-3005.

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