BROOKHAVEN BULLETIN
Vol. 37 - No. 48 December 16, 1983
BROOKHAVEN NATIONAL LABORATORY

Stalking the Mysteries of Maize

Corn is a most versatile vegetable, serving variously as a succulent side dish, as farmyard fodder or as a doorway decoration at harvest time. And ever more frequently, corn can also be found in laboratories, helping researchers unwrap genetic mysteries.

In Ben and Frances Burr's Biology Department laboratory, Indian corn, or maize, is the primary research tool for an effort that Ben Burr described as "an attempt to integrate field work and state-of-the-art molecular biology." Their team, which also includes post-doctoral students Stephen Evola and Elli Wurtzel, and technician Marjorie Neuberger, is studying transposable elements — genes (the basic units of inheritance) that break out of their normal linear arrangement in a chromosome and move to different positions in the DNA, the chromosomal substance that carries genetic information.

Mort Rosen

In a field at the east end of the Lab site, Marjorie Neuberger puts pollen on the maize plants.

Mort Rosen

Stephen Evola examines an ear of corn to select kernels to put into tissue culture.

These "jumping" genes were first identified by Barbara McClintock, recipient of the 1983 Nobel Prize in medicine for her findings of almost four decades before. Since she discovered them in maize, Burr said, "These kinds of elements have been found to be ubiquitous in all life forms," which raises questions about the role of such genetic instabilities in evolution, genetic engineering, agriculture and human genetics. The Burrs began looking for answers to some of those questions in 1980. By 1981, they had converted their laboratory almost exclusively for work on transposable elements. Now engaged in several ongoing projects in this area, they are in frequent contact with McClintock, who continues her research at the Cold Spring Harbor Laboratory.

"Based on her work we know more about how these elements move around in corn, affecting the genetic information, than in any other higher organism." said Ben Burr. "Now, we're trying to make a molecular description of the phenomena which she described, to determine the structure and, eventually, the mechanism of transposable elements."

The corn studied by the Burr team comes primarily from plants grown in the Biology Department's greenhouses and from two main crops. One is grown on six acres at the east end of the Laboratory property; the other is on the island of Molokai, Hawaii, where Neuberger goes every winter to oversee the pollination of the corn.

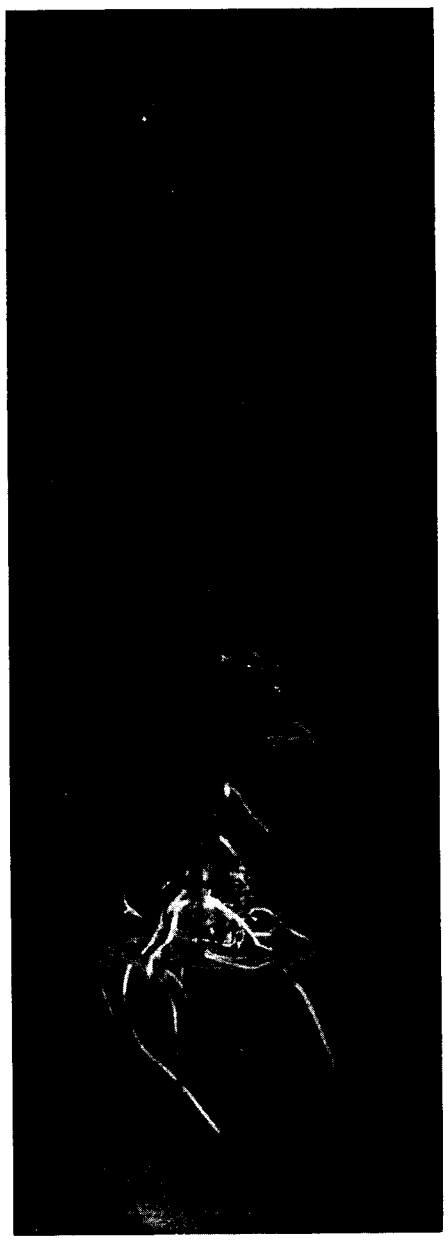
Some of the pollen comes from corn grown not from seed, but from tissue culture. For many years, scientists have known how to regenerate plants from single cells or from undifferentiated tissue. But about 15 years ago, it was found that when these plants proliferated, they often differed considerably from the parent plants. These variations intrigued the Burr team, which devised experiments to determine whether the tissue culture process could induce the appearance of active transposable elements when there were none in the parent.

When that was found to be true, a second set of experiments centered on the nature of the mutations induced, particularly in the shrunken gene, which finds visible expression in indented kernels. Last summer, pollen from plants which Evola regenerated from tissue culture was put on others, known to be homozygous (identical) for these mutations. After the crop was analyzed, the team was able to pick out new shrunken mutations. However, said Ben Burr, "When the DNA from the shrunken gene was extracted and examined, to our very great surprise, we found that it had not been rearranged.

"With our methods, we can detect changes — insertions or deletions — of up to about 50 base pairs of the DNA," he continued. "The smallest transposable element we ever observed had about 200 base pairs, so if the mutations were caused by an insertional element, we would have noticed the change in the DNA right away."

Having eliminated "jumping" genes as the source of the mutations, the Burr team continued to rule out other possibilities. One suspect was 2-4-D, the chemical used to proliferate the corn tissue in culture. But tests with *Tradescantia*, the BNL-developed plant mutagen testing system, were conducted by Rich Sautkulis of Lloyd Schairer's Biology Department group and proved that 2-4-D was not mutagenic.

(Continued on page 2)



Mort Rosen

A corn plant, regenerated from tissue culture, grows in a test tube.

Info Exchanged on Sister Chromatids

To honor the initial publication on sister chromatid exchange (SCE) in 1957 and the 25 years of experimental research that has followed, the Biology and Medical Departments sponsored the first international symposium on SCE which was held at BNL from December 4 through 8, and attended by 170 researchers from America, Europe and Japan.

Geneticist J. Herbert Taylor, a keynote speaker at the conference, had been a researcher at BNL during the summer of 1957 when he made the first microscopic identification of DNA exchanges between the joined "sister" pairs of chromatid strands formed by replicating chromosomes. Working in the Biology Department laboratory of Phillip S. Woods, and with chemist Walter L. Hughes of the Medical Department, Taylor was able to make the sister chromatids physically different from one another: one chromatid was radioactive and its sister was not, so they could be differentiated in autoradiographs.

By incorporating tritiated thymidine into the DNA of plant root tips in the process of duplicating itself, Taylor was attempting to create a high resolution autoradiograph to test the then recently published Watson-Crick hypothesis for replication of DNA. "The results were convincing, and

(Continued on page 2)

In Honor of Leland Haworth

The Leland J. Haworth Distinguished Scientist Appointments have been established by AUI in honor of the late Laboratory Director. Haworth, who died in 1979, guided the Laboratory from 1948 until 1961. It was under his direction that the graphite research reactor, the cosmotron and the AGS, were designed and put into operation.

The new appointments provide for a person with international repute in a field of expertise relevant to Laboratory programs, to spend from one to three weeks per year, for three consecutive years, in residence at BNL. During these periods, the distinguished scientist would be expected to hold scientific discussions with members of the staff; and present seminars or colloquia, at least one of which would be of Laboratory-wide interest.

Candidates will be recommended to the Director by a Selection Committee, chaired by Norman Sutin, Chemistry. Others on the committee are Victor Emery, Physics; Allen Goland, Applied Science; and Benno Schoenborn, Biology. As it is hoped that the first Haworth scientist-in-residence can be appointed by the summer of 1984, the committee asks that nominations be forwarded to it, through department chairmen, no later than January 31.

Haworth was, himself, a distinguished physicist who was named by President Kennedy to the U.S. Atomic Energy Commission in 1961, and as head of the National Science Foundation in 1963. He was widely respected for his insistence on high standards in the formation of the Laboratory's research facilities, and for his tirelessness in the pursuit of excellence.

Peter Horton

(Front left to right) BNL Biology Department chair Richard Setlow, Japanese SCE program chair Kanehisa Morimoto of Tokyo, Walter Hughes of the Medical Department, and keynote speaker J. Herbert Taylor of Florida State University. (Back left to right) European chair Bo Lambert of Sweden, BNL biologist Jane Setlow, head of AUI affiliate Council for Research Planning in Biological Sciences Alexander Hollaender, USA co-chair Raymond Tice of the Medical Department, and speaker Samuel Latt of Harvard.

Rearing Pups to Guide the Blind

It's the season for giving, but for puppy walkers, giving knows no season. All year round, puppy walkers give their homes, their time and their affection to future guide dogs for the blind.

Several BNL families have taken on the responsibility of rearing, socializing and preparing puppies to be guides and companions for blind people. When dogs were first used for this purpose, beginning just after World War I, they were raised in kennels. But guide dog training organizations soon learned that those dogs were hard to housebreak and, when placed with a blind person, had difficulty adjusting to such homey disruptions as kids and vacuum cleaners. Volunteers, now called puppy walkers, were sought to raise the pups at home.

All of the BNL families agree that puppy walking is just like raising any puppy — except that the family must be prepared to give the dog up when it reaches training age. For Vivienne and Vic Emery, who began puppy walking in 1970 when their three children were small, that was a deciding factor. As Vic Emery (Physics) recalls, "We wanted to have a dog, especially for the kids. But scientists go on leaves of absence from time to time, so this seemed like the convenient thing."

The experiment worked so well that the Emerys have taken in puppies almost every year since then. Initially, however, they were concerned about how parting with the pups might affect the kids. "It was always difficult," he says, "but in many cases they would meet the blind person who got the dog. It was helpful to find out that there was someone who needed the dog more." It also helped that there were often a number of puppies left at home, because the Emerys also kept breeding dogs and have whelped over 100 guide dog pups.

Dave Potter (Instrumentation) and his family also bred pups, about 90 all told, while volunteering twelve times as puppy walkers. "We're out of the business now because the kids are gone, but it was a great family project," Potter says. Each puppy that entered the household was given to one of Potter's three children to raise.

That's how it was for George Schwender's (NSLS) family too. "We assigned a kid to each dog," says Schwender. "to feed, brush and exercise it." With their three children grown, the Schwender's active puppy walking days ended last year. By then, they had raised 16 dogs, only to give them away. "It was hard," he says, "but if you prepare the family that the dog is being raised for a noble cause, the kids will accept it totally."

Unlike the others, Ed and Mary Grace Meier came to puppy walking after their children were grown. "The house seemed empty, and when M-G learned about puppy walking from her golf partner, we decided to try it," says Ed Meier (AGS). Their Labrador retriever, Rufus, is now about six months old, which means the Meiers are about halfway through the time they will have with him. "We thought it would be tough to give the dog up," says Ed Meier, "but it seems to be like having kids. They go and lead their own lives, and the dog will do basically the same thing."

When Rufus leaves the Meiers, he will return to the Smithtown headquarters of the Guide Dog Foundation for the Blind for three months of training. If no serious problems, either physical or temperamental, are detected during Rufus' year with the Meiers, and if he accepts responsibility during his training, he will be assigned to a blind person.

While the Smithtown foundation raises Labrador and golden retrievers, Fidelco, a Connecticut-based organization, trains German shepherds. Vivienne Emery is Fidelco's Long Island organizer for puppy walkers, and she and her husband are currently raising three dogs which they will keep until they are 1½ years old, the training age for German shepherds.

While the dogs are at home, the main thrust is to socialize them, by bringing them to shops, taking them in the car, getting them used to crowds. To ease their reception in places like malls and restaurants, puppy walkers carry cards identifying their charges as guide dogs, and the pups often wear special coats. "The dogs seem to know that when their coats are put on this is serious business," says Vivienne Emery. And they don't seem to mind. "The beautiful thing about dogs is that they live for praise. It's their only reward. You appeal to the dog's finer instincts," says Potter.

In addition to social training, puppy walkers help their dogs form good habits and discourage bad ones, such as jumping on the furniture or begging at the table.

But for these dog lovers, being a puppy walker is far more delight than drawback. "There's nothing like the thrill of watching the dog you raised graduate and go with a blind person," says Vivienne Emery.

After the dogs are gone, the families often follow their progress. "You're usually given a photo of the new owner with the dog, and then you hear something about them from time to time," says Vic Emery, whose dogs have gone as far as Argentina and Canada. One of Potter's dogs is working in Israel.

Volunteer puppy walkers are always needed, and no one who's interested should hesitate to apply. Potential puppy walkers can start by calling the Smithtown foundation at 265-2121 or Vivienne Emery (Fidelco) at 744-5079. "Think about it for a while, then do it," says Potter. "It's a fantastic activity." — Anita Cohen

Mary Grace and Ed Meier introduce Rufus to a new social situation at the cafeteria in Berkner Hall.

Peter Horton

An international Working Group on Comparative Risk Assessment of Energy Production and Use met at Brookhaven December 5 - 9. The workshop comprised 22 members from various government agencies both in the U.S. and abroad, as well as representatives from the World Health Organization (WHO), the United Nations Environment Programme (UNEP), the International Atomic Energy Agency (IAEA), and the Organization for Economic Cooperation and Development (OCED). The meeting was chaired by Leonard Hamilton, head of the Biomedical and Environmental Assessment Division (BEAD), DAS. BEAD was recently designated a WHO collaborating center for assessment of health and environmental effects of energy systems. Of particular importance at the meeting was a review of new data participants brought with them from their own countries, data which increased the information available to the group and was of considerable interest to developing countries. The group also reviewed a UNEP report on data for comparative assessment of environmental impacts of energy sources. During a break in the proceedings, Yehia El-Mahgary, UNEP (at left), talks with Leonard Hamilton, Antonio Novegno, IAEA, and G. Ozolins, WHO.

Kits on Sale Now

A new shipment of Suitcase Science kits has arrived at the Exhibit Center Science Shop — just in time for the holiday! The Science Shop is open today from 10 a.m. to 3 p.m., but if you've been waiting for a kit, you may want to come early, as supplies are limited. Many other items, ranging in price from 10¢ to $6, are in good supply. Today is your last chance to fill up those stockings with goodies from the Science Shop, on the west side of Bldg. 701.

New Train Time

Transportation has announced a change in the schedule for the morning van pickup at the Patchogue railroad station. Due to a LIRR schedule change, the van now meets the train that leaves Penn Station at 9:10 a.m., arriving in Patchogue at 10:47 a.m. There is no change in the afternoon schedule. The van leaves from the Public Relations Office, Bldg. 134, at 4:20 and those wishing to take it should call Ext. 2345 for reservations.

One Last Gift

Today is the last day of BNL's 1983-1984 United Way Campaign. As of Wednesday December 14, 968 employees have donated $57,511. If every one of the 2,291 employees who were waiting for today's deadline to make their pledge gave $1.09, we'd make our $60,000 goal with $8.19 to spare. So please give to the United Way of Long Island.

Corn

(Cont'd)

As this phase of testing came to an end, the Burr team concluded that they were seeing point mutations — disruptions to one or more of the base pairs of the gene's DNA. Such changes alter the nucleotide sequence, but do not affect the size of the gene.

In the final analysis, said Ben Burr, "We have shown that the process of regeneration in tissue culture is a sufficient shock to activate known transposable elements in stocks which did not have any active elements before. However, another error producing mechanism is at work in the tissue culture environment that produces the bulk of the observed mutations. We are now attempting to find out what that mechanism is."

If the Burrs can describe that mechanism it should interest commercial laboratories which now try to obtain mutations by tissue culture regeneration. The Burrs believe that some kinds of mutations can be more easily induced by chemically treating seed or pollen.

In addition to the tissue culture mutations, the Burr team is analyzing the DNA of corn plants grown under conventional conditions to see if transposable elements are involved in other observed variations. For example, how much do they contribute to spontaneous mutations at the genetic areas called shrunken and waxy (dull kernels) loci, which occur at the rate of approximately one in a million? To answer these kinds of questions, the Burr team is using recombinant DNA techniques to isolate and compare structures of normal and mutated genes and to create restriction enzyme maps which provide parameters for the structure of the corn genes under study.

But of all the life forms available for study, why have both McClintock and the Burrs turned to maize? First of all, corn is a higher organism with enough DNA to form about a million genes —about the same as in humans. And these genes often find clear, visible expression in corn kernels. such as in the shrunken and waxy loci. These types of mutations may not occur frequently, but with 250-1000 kernels on each ear, researchers can look at much larger populations than studies of other higher organisms would allow.

Another factor that makes maize a powerful way to do genetic analysis is that its structure makes it relatively easy to do cross pollinations. And finally, corn has staying power. "We can keep corn up to twenty-five years, if we don't need it right away," said Ben Burr. "It is an enormous advantage to have a dormant stage for doing genetics. It's something you don't have if you're working with mice." — Anita Cohen

Vivienne Emery meets her husband Vic in the Physics parking lot, before continuing on an excursion with their three guide dogs-in-training: (from left) Haley, one year old, and littermates Lambda and Liberty, six months old.

—photos by Horton

BROOKHAVEN BULLETIN

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Chromatids (Cont'd)

many of our colleagues and visitors to the lab peered through our microscope in a half-darkened room to see for themselves the first evidence that the Watson-Crick scheme for DNA replication operated at the level of a chromosome — a truly astonishing result," says Taylor. "The only complication was the exchange of labeled segments between sister chromatids: nearly every chromosome had one or more."

That "complication" was sister chromatid exchange, the occurrence of which had previously been debated by geneticists, although Barbara McClintock had evidence that it might occur during cell division in maize. "Twenty-five years later, scientific interest in the nature, significance, and utility of the SCE phenomenon continues to expand," says conference organizer Raymond Tice of the Medical Department.

Another keynote speaker was geneticist Samuel Latt of Harvard who developed the currently used nonautoradiographic staining method for detecting SCE microscopically. Topics presented at the conference included induction and formation of SCE and their relationship to carcinogenesis, DNA damage and repair, and cellular toxicity, etc. also discussed was the use of SCE as an indicator of inherited and acquired human diseases such as cancer, of treatment progress, i.e., during chemotherapy, and of genetic damage from exposure to toxic substances.

Cafeteria Menu

Week Ending December 23

Monday, December 19

Beef barley soup	(cup)	.65
	(bowl)	.75
Beef turnovers & 1 veg.		1.80
Broiled chicken livers & 1 veg.		1.80
Hot Deli: Sandwich steak w/peppers & onions	(bread)	1.95
	(roll)	2.10

Tuesday, December 20

Potato bacon soup	(cup)	.65
	(bowl)	.75
Beef & broccoli stir fry on rice		1.95
Turkey ala king on rice		1.85
Hot Deli: Corned beef	(bread)	1.85
	(roll)	2.00

Wednesday, December 21

Christmas Special

Cup of split pea soup
Steamship round
Rice pilaf or fresh turnip
Cauliflower au gratin or stir-fried vegetables
Holiday cake
$3.85

Thursday, December 22

Cream of chicken soup	(cup)	.65
	(bowl)	.75
Veal ragout on egg noodles		1.95
Baked meatloaf & 1 veg.		1.85
Hot Deli: Baked ham	(bread)	1.85
	(roll)	2.00

Friday, December 23

Pot luck

A limited supply of Holiday Hams are still available. To order, call Ext. 3541.

Diners Note

The cafeteria will be closed on December 17. On that day, snack bar service will be available from 9 a.m. to 2 p.m. at the Brookhaven Center.

Holiday Schedules

BNL will observe the Christmas holiday with a half day on Friday, December 23, and two full days, Monday and Tuesday, December 26 & 27. The following Monday, January 2, the Lab will close for New Year's Day. During this period, some areas will be on special schedules:

Medical Services

The Occupational Medicine Clinic will close from 12:30 p.m., December 23, to 8:30 a.m., January 3, except for regular working hours on December 28, 29 & 30.

The Research Hospital will close from 12:30 p.m., December 23, to 8:30 a.m., January 3. Thus, medical coverage will not be available during holiday periods or after working hours on December 28, 29 and 30.

To obtain medical services when the Clinic is not open:

- Emergencies — Call Ext. 2222. The Fire Group Emergency Medical Technicians will be available.
- Non-emergency health care — See family physician or nearest hospital emergency room.
- Return to work during holidays — Back-to-work slips will not be available from the clinic. Employees should contact supervisors before returning to work. Supervisors requiring clearance for employees to return to work should call Ext. 2238, and the Police will have a health care professional contact the supervisor. Employees cleared for return to work should report to the Clinic the earliest day the Clinic is open, prior to assuming further duties.
- Other assistance — Call Ext. 2238.

Food Services

- The vended food service, Bldg. 912, will be open and serviced regularly throughout the holidays.
- The cafeteria will close at 2 p.m., December 23 and all day December 25 and January 1. It will be open for snack bar service only, 9 a.m.—2 p.m., December 24, 26, 27 & 31, and January 2.
- The Center Club will close December 24-26, reopening at 5 p.m., December 27. The Club will also close December 31 & January 1, reopening January 2.
- The coffee truck will not make rounds December 23.

CSCF

The Central Scientific Computing Facility will close from 4 p.m., December 24 — 8 a.m., December 26, and from 4 p.m., December 31 — 8 a.m., January 2. At these times, doors will be secured and output bins will be inaccessible.

Photography & Graphic Arts

Photography, Bldg. 118, will be closed from 12:30 p.m., December 23, through 8:30 a.m., January 3. Calls will be monitored by Graphic Arts, Bldg. 197, which will be operating on a regular schedule. For emergency service call Ext. 7640.

Brookhaven Bulletin

The Bulletin will not publish on Friday, December 30.

Research Library

Open December 23 to 11 p.m.; 8:30 a.m.—11 p.m., December 24 and December 31.

Closed December 25, 26 & 27; January 1 & 2. Contact the Laboratory Police for access while closed.

Swimming Pool

Closed December 23—27.

Open for normal schedule, December 28—30

Closed December 31 — January 2

Resume normal schedule January 3.

Transportation

The Transportation van will meet the morning train at the Patchogue railroad station at 10:47 a.m. on December 23, *but there will be no return trip to the Shirley station that afternoon.*

Outside Services

The *U.S. Post Office* and *Barclay's Bank* will both close on December 26 and January 2.

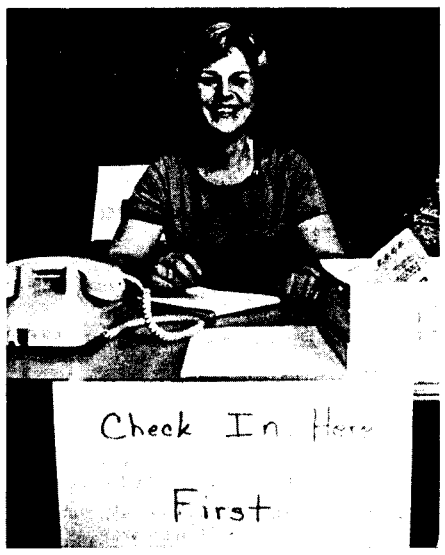
The *Teacher's Federal Credit Union* will remain open on December 23 until 5 p.m. and will close on December 26 & 27 and January 2. All other branches will be open on December 27.

The *Gulf Service Station* will follow the BNL holiday schedule.

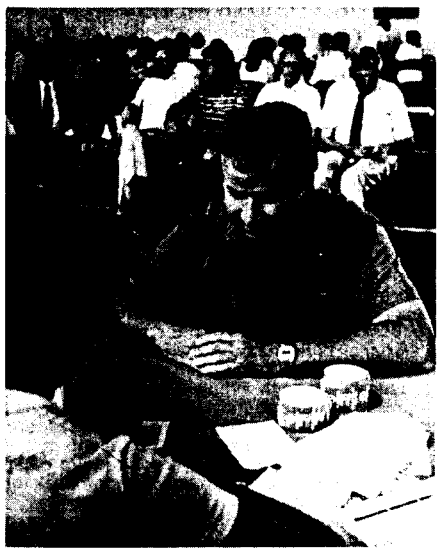
Coming Up

Once every two years, BERA sponsors an employee craft exhibit. The dates are now set for February 6-17, only two months away. A future issue of the Bulletin will carry a form for submission of entries to the show.

How To Give Blood



As the sign says, Check in Here First. Program Coordinator Elaine Zukowski keeps track of appointments during the BNL Blood Drive at the gymnasium on Monday December 19 and Tuesday December 20 from 10 a.m. to 3 p.m.



Next, you register, as Calvin Brewster, DNE, is doing with a Long Island Blood Services volunteer who notes your name, address, age, and other non-medical information.

Third, you, like Jim Yerry of Safeguards & Emergency Services, will have your medical history taken, your temperature, pulse, and blood pressure measured, and a drop of blood from your finger analyzed by a registered nurse.

Then, if you are between the ages of 17 through 65, weigh a least 110 pounds, and are in good health, chances are you can give blood like Susan Reinheimer of DAS is doing. A donation consists of a pint of blood. Giving a unit of blood in no way weakens your system: your body begins replacing it immediately. The actual donation takes only five to ten minutes.

Finally, you will have a chance to relax, and enjoy refreshments as Theodore Johnson, Medical Department, is doing. After 10 to 15 minutes you can be on your way, and resume your work schedule.

— photos by Humphrey

Stockroom Service

As of Tuesday, December 20, requests for Supply & Materiel stock items may be relayed by phone, or on Inventory Stock Requisition (form S-82000). But over-the-counter trade is out. Immediately affected are the electronics stockroom (Bldg. 90) and maintenance supplies stockroom (Bldg. 91). After the holidays, when regular operations resume on January 3, the other stockrooms will follow suit.

Regular withdrawals are handled by phone or mail through the Data Entry Center, Ext. 2970, Bldg. 211. If the unexpected happens and you need some item immediately, the Center will also take care of your requirements. Just telephone and the stockroom attendant will have the material ready for you by the time you arrive to pick it up. If, for some unusual reason, you should need to gain access to the stockroom, have your supervisor or group leader call Ext. 2974, or 2441.

And the delivery service has been streamlined. Deliveries will be made twice a day from each stockroom; orders entered in the morning will be delivered in the afternoon. Michael Guacci, head of Supply & Materiel, says that the longest time anyone would have to wait would be 24 hours.

NYC Train Trip

The Hospitality Committee is planning a group railroad trip to New York City on Wednesday, December 28. Departure will be at 7:55 a.m. from the Patchogue LIRR station. Round-trip fare for adults is $3.50; children under five years ride free.

Reserve a ticket by sending your fare through the U.S. mail to BNL, P.O. Box 322, Upton, New York 11973. Checks or money orders, payable to BNL, must be received by Thursday, December 22. Put the date of the trip, your BNL life number and your phone number on the back of your check or money order. Do not send cash. Tickets will be given out at the railroad station on the day of the trip. Refunds will be made only if cancellations are received by the Monday morning preceding the trip.

Arrivals & Departures

Arrivals

Peter J. Abrams ..... Plant Eng.
Christopher J. Gardner .. Accelerator
Steven L. Hulbert ..... Physics
Joseph J. Kehayias ..... Medical
Michael R. Polito ..... Accelerator
Georgette F. Smith ..... Tech. Info.

Departures

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

Tony C.T. Chang ..... Chemistry
Deborah L. Halkins ..... Plant Eng.

Classified Advertisements

Placement Notices

The Laboratory's placement policy is to select the best-qualified candidate for an available position, with consideration given to candidates in the following order of priority: (1) present employees within the department, with preference to those within the immediate work group; (2) present employees within the Laboratory as a whole; and (3) outside applicants. 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 Personnel Placement Supervisor, Ext. 2882.

LABORATORY RECRUITMENT: Opportunities for present Laboratory employees.

1977. RESIDENCE CUSTODIAN - Staff Services Division.

1978. SECRETARIAL POSITION - Requires AAS degree in secretarial science or equivalent experience. Excellent typing, word processing and communications skills mandatory. Will assist lead secretary in the preparation of patent applications and legal briefs. Director's Office.

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

1979. STATISTICS ASSOCIATE - Requires MS in statistics and a background in biostatistics to provide applications statistics support for the inhalation toxicology program. Applied Mathematics Department.

1980. INDUSTRIAL ENGINEER - Requires BS in industrial engineering or equivalent and a minimum of two years' experience in productivity improvement, work simplification, plant maintenance or management systems implementation. Individual will join plant maintenance management team. Plant Engineering Division.

1981. PATROL OFFICER - Requires AAS in criminal justice or equivalent experience performing diverse security duties for a large organization. Excellent communication skills are necessary as well as ability to work shifts. Will participate in comprehensive training program in order to become knowledgeable of site and police procedures. Safety and Environmental Protection Division.

1982. TECHNICAL POSITION - Requires AAS degree in electronic technology or equivalent and background in pulse circuits, analog and digital controls and high voltage and/or high current power supplies. Should be skilled in troubleshooting of power supplies and associated controls. Shift work required. Accelerator Department.

1983. TECHNICAL POSITION - Requires AAS in engineering or physical science or equivalent. Responsibilities include the monitoring of radiation and contamination at the AGS and accurate record keeping of personnel exposure. Prior training or experience in health physics very desirable. Shift work required. Safety and Environmental Protection Division.

Autos & Auto Supplies

58 FARM TRUCK - International cab & chassis with 1969 V8 eng, takes 12 ft. body, very good cond, $450. Tom, Ext. 4084 or 878-1060.

SLIDE ON CAMPER - for 8 ft. bed pickup, stove, sink, lights, dinette, cabinets, $450. 928-8709.

80 OLDS - custom cruiser, diesel, p/s, p/b, p/w, p/seat, a/c, cruise, tilt wheel, roof rack, $4500. Ext. 3082 or 924-9164.

TIRES - (4) 1200x16.5, Dunlop gold seal, $225. 732-2998.

USED TIRES - (2), with rims, Goodyear, $40/pair. Ext. 5271.

69 VOLKS SQ. BACK - std shift, $300. 928-5684 after 6 p.m.

FORD TRANS. - 3 & 4 spd.for 66 Mustang, 6 & 8 cyl.; 1964 Fairlane V8, fair prices. Tom, Ext. 4662 or 929-3566.

55 FORD V8 ENGINE - auto. trans., running cond., can demo. Tom, Ext 4662 or 929-3566.

71 SQUARE BACK VW - good for parts, $125; 4 chrome wheels 13" w/hardware, incl. locks, $150. Randy, Ext. 2550 or 363-2138.

72 DODGE VAN - 6 cyl, auto., radials, no rust, low mi., clean, $1600. Joe, Ext. 7961 or 722-3957.

76 FORD TORINO - p/s, p/b, a/c, excel. cond., $1200. Bobbi, Ext. 3929 or 924-3761 after 5:15 p.m.

76 CHEV. PICKUP - 4x4, a/t, p/b, p/s, 50,000 mi., asking $3700. Ed, 286-3377 after 5 p.m.

78 YAMAHA YZ-100 - kidney belt, face-mask, helmet, riding gloves and boots, mint cond., $750. Call 878-8803.

SNOW PLOW - 6', Meyers electrolift, comp./alum, rims, 5 slot, 5 lug, 15x8, set 4. 281-7230.

69 MERCURY MONTEGO - excel, 302, new rubber, needs brakes, $250. Call Colin, Ext. 4184 or 286-8743.

71 DODGE DEMON - 6 cyl, good cond., $400. Jim, Ext 3184 or 744-6842.

80 TOYOTA TERCEL HATCHBACK - immac., many extras, new tires, brakes. Call Walt, Ext. 7154.

70 R/W FORD - so. parking lot bldg., #50. $250. Call B.R. Gwathney, Ext. 2238.

78 FAIRMONT - 2-dr., 4-speed, 4-cylinder, reliable, good transportation. 727-7387 evenings & weekends.

BENCH SEAT FROM 71 FORD VAN - blue, good cond., $40. Dick, 878-1580 after 6 p.m.

FRONT & REAR WINDSHIELD - also front & rear bumpers for 1962 Chevy, best offer. Joe, 929-8321.

76 VW RABBIT - 2-door, auto trans., am/fm, incl., snow tires, $1000. Bruce, Ext 5091 or 472-0463.

80 FORD FIESTA - 2 dr, 4 spd., gold, 43K mi., 32 mpg., $2750. Takumi, Ext. 7561.

DODGE CORONET - fully loaded, good running, clean, $650. 281-8031.

CHAINS - 7.10-15/8.00-14, $30. Bill, Ext. 3254.

76 TOYOTA COROLLA - deluxe, hatchback, auto., a/c, am/fm, cass., 67,000 mi., excel. cond., $2250. 360-3808 eves.

78 DIRT BIKE - K.T.M., 400 cc, MX/Enduro, good cond., extras, $850. Steve, 331-2291.

72 VW SQUAREBACK - runs well, $750. 286-1163 eves or 924-7238.

72 VOLVO 145 WAGON - a/t, clean, many new parts, must sell, price negot. Amy, Ext. 2369 or 821-0754.

79 OLDS DELTA - 2-dr, a/c, p/s, auto trans. 59,650 mi., $4495. Vic, 541-4318.

67 CADILLAC SEDAN DEVILLE - 100,000 mi., mechanically very good, body poor, $280. Ext. 3828 or 751-7250.

PONTIAC SPORT RIMS - (4) with chrome lining and center, excel. cond., $75. Pete, Ext. 3075.

73 OLDS CUTLASS - 89,000 mi., a/c, runs well, some rust, must sell, $800 neg. Wolfgang, Ext. 4571 or 3107.

70 BUICK SKYLARK - 4 dr., 6 cyl., a/t, p/s, $325. Fred, Ext. 3259.

76 FURY - nice cond., am/fm stereo, a/c, p/b, p/s, velour seats, best offer over $900. Erik, 281-5565 after 6 p.m.

75 HONDA CVCC WAGON - 4-speed, roof rack, am/fm cassette, runs good, body fair, 74,000 mi., $875. Call 588-0677.

75 PONTIAC LEMANS - 2-dr., a/c, p/s, p/b, am/fm, $595. Ext. 4422.

81 COUGAR XR-7 - "loaded," new tires, red/silver, sm. V8, 25+ mpg, AOD, mint cond., $6500. Ellen, Ext. 4486 or 878-0480 eves.

74 CORVETTE STINGRAY - p/b, p/s, p/w, 42,000 mi., white, excel. cond., $7200. Call 286-2221.

81 FORD E150 - 6 cyl, ps/pb, carpeted, caged, 2 tanks, must sell, $4895. Mike, 887-7857, 9-5 p.m. days.

73 FORD LTD - 9 pass. wagon, p/s, p/b, auto., am/fm, 8 track, good cond., $400. Call 581-4318 after 6 p.m.

BENCH SEAT - blue, for Datsun truck, very good cond., $20. 286-8448.

SNOW TIRES - Goodyear CR-79x13, all winter radials on Mustang rims, good cond., $55. Ext. 7112 or 472-1922.

66 VW BUG - just inspected, old, reliable, good tires, good local trans., $450/offer. VW parts, rebuilt head (1300) w/new valves, rebuilt 12 v. gen., new regulator, misc., cheap. Ext. 5038.

80 CHEVY CAMMARO SPORTS COUPE - p/b, p/s, a/c, power windows, low mileage, $5850. 744-5224.

73 AUDI 100 LS - runs, good for parts, $250. Call 751-0182 after 5:00 p.m.

74 PINTO - new tires and brakes, very reliable, 74,000 mi., good cond. Al, $600. Ext. 4473.

77 GREMLIN - radial tires, am/fm, good cond., standard, $900. 751-5241.

78 TOYOTA COROLLA LIFTBACK - a/t, Blaupunkt am/fm cassette, $2800. Pat, Ext. 4628 or 286-8490 after 6 p.m.

76 CAPRI - 2300 cc, 4-spd., silver, am/fm asss., very good cond., $1500. Ext. 3242 or 7192.

72 VOLVO 145E - $950. M. Elzinga, Ext. 2364 or 929-8944.

15" SNOW TIRES - (2) on 5 lug Ford pickup rims, good cond., $30. Artie, Ext. 2697.

Boats & Marine Supplies

OUTBOARD MOTOR - 1-1/2 h.p. Evinrude, light weight, low hrs., ideal for small dink, $150. Walt, Ext. 3256.

DEPTH RECORDER - Rathyeon chart & flasher, $75. John, Ext. 4312.

1927 31' CLASSIC ALDEN - design wood sailboat, well built, equipped, $13,000. Joe, Ext. 7961 or 722-3957 eves.

Miscellaneous

DRESSER - Broyhill, Palm Court, 6-drawers, $125; Parsons table, lacquered, 5'Lx2'Wx2'H, $40. 286-9389.

SKIIS - Head GK03, 175's, fiberglass with Solomon binders, $45 firm. Ext. 2705 or 286-1062.

SNOW PLOW - 7' Meyers with hydraulics, $375. Call Ext. 4100 or 929-8876 after 6 p.m.

LHASA APSO PUPS - A.K.C. registered, 4 male and 1 female, deposit holds for Christmas, 6-1/2 wks. old. Lynn, 289-3667.

LAWN TRACTOR - 36" snow blower, 32" mower deck, skid chains, 8-h.p. Simplicity, $500. 473-1967.

STORM WINDOWS - (2) for storm door 32"x29-1/2". Ext. 5271.

ROSS DIRT BIKE - boy's, mag. wheels, pads, 1 yr. old, blue/silver, $100. John Ingoglia, 331-9171.

CONSTRUCTION BOOTS - sz. 10, worn twice, $10; electronic baseball, $2; electronic 2-man soccer, $2. 473-7460.

B&W T.V. - 19", fair cond., needs work, $5; range hood with fan, filter & lights. Victor, Ext. 2395.

VACUUM CLEANER - Eureka, cannister, w/attach., $35; kitchen dinette set, table w/leaf, 4 lt. brown chairs, $35. 929-4840.

KNEISSL SKIIS - 170 cm, Caber boots size 10-1/2, Solomon bindings, excel. cond., $99. Tom, Ext. 4662 or 929-3566.

DOG SUPPLIES - discount prices, dog breed stationery, chains, other accessories. Arnold, 282-2050 or 473-6432.

SKI BOOTS - lady's size 6, $20. John, Ext. 4312.

SOFA-BED - fair cond., perfect for holiday guests, $25; L.R. SET - couch, chair, love seat, table lamp, $75. Ext. 2529.

PIANO - Bremen, apt. size (72 keys), $200. Sharon, Ext. 3995.

COUCH - convertible, good cond., $50 firm. Ed, Ext. 2362, 286-8091.

BUNN COFFEE MAKER - always hot, like new, $20. Ext. 4049, 744-8087.

YOUTH'S X-COUNTRY SKIIS - Silva, 170 cm., wood, 3 pin bindings, poles & size 8 boots, like new. Al, 467-2484.

COMPUTER - Atari 400, 48 K, full keyboard, basic, asking $350. Keith, Ext. 7148 or 765-3371.

STOVE - Hotpoint, 30" w, aqua, elec. 4-burner, timer, clock, Rotis., outlet, very good cond., $100. 281-7720.

STROLEE CAR SEAT - mint cond., 2-yrs.-old, $28; baby automatic swing, $7. Call 878-4128.

YOGURT MAKER - "Salton," 5-8 oz. cups with lids, thermometer, $6; record-turntable, "Sanyo" w/shure cartridge smoke, dust cover, $40; Oster can opener, citrus juicer combo, $15. 878-0717

COUCH - country style, high back, wood trim, plaids, will deliver, $250. Joe, Ext. 7961 or 722-3957 eves.

STEREO - Akai amp, equ, Sony tuner with Dalby, Pioneer turntable, speakers, 60 w max., 45 w./channel. Ext. 2528.

DISHWASHER - portable w/butcher block top, GE potscrubber, avocado, good cond. $75. 744-9677.

CRAFTSMAN 12" BAND SAW/SANDER - $250; Craftsman 1/3 h.p. grinder, $30; both like new. 588-3894.

SEARS UPRIGHT VACUUM - $50, crystal chandelier, $75; Pioneer stereo, $60; green brocade couch, $50. 289-8212.

LADY'S ICE SKATES - white, sz. 8-9, $8; small elec. kiln, $10. 475-4199.

WOOD/COAL STOVE - w/all outside attach., cast iron, $300. Rose, 737-0246.

ARMSTRONG CEILING TILES - white wood grain plank - 180 sq. ft., 1/2", 2x4 tiles, $100. Ext. 2238.

REBUILT SIT-ON MOWER ENGINE - 5 h.p., $35. 924-6751 eves.

DRILL MOTOR AND DRILLS - Black & Decker, $375 r.p.m., heavy duty 1/16-1/2" index, $50. Catherine, 281-8021.

PIONEER STEREO RECEIVER - SX-636, $90. Ext. 2041.

PANASONIC PORTABLE 8 TRACK STEREO PLAYER - (hand carry). Ext. 2950.

CHRISTMAS GIFTS - unusual hand sculptured wood (birds, fish, etc.) Call Sandberg, Ext. 2050.

DRESSER - walnut antique, 4 drawers and mirror. Call Walt, Ext. 7154.

SKI BOOTS - Sierra, sz. 6, $25. 473-2473.

LIVING ROOM SET - Queen Anne Penn. House, 5 pieces, $750; Pine captain's bed with storage space, $80. Joanne, 277-0955 eves.

RANGE HOODS - 30", ducted G.E. with ducting never used, $49. Catherine, 281-8021.

GOLF GLOVES - ladies, new still in package, new price $7.50, sell for $4.00. Ext. 4843 lunch hour, or 878-2239.

DISH WASHER - older model but runs well (portable), $50. Call 331-2419.

ADMIRAL 19" B&W TV with stand, good cond., $40. Call Ext. 3604 or 878-0516 after 6 p.m.

L.C.D. QUARTZ WATCH - new metal case, band, $4 each. Ed, Ext. 3840.

REFRIGERATOR - 19 cu. ft. G.E. frost-free, energy saving door opens either side, brand new, $450. Call 286-0874 after 2 p.m.

CANARIES - buy male bird, get 2 hens free, $75 for all. Ramona, 928-3088.

ATARI 2600 - with 10 tapes, $140 or best reasonable offer. S. O'Kula, Ext. 4167.

FIREPLACE HEATER - Sears, new $100, asking $40. Call 265-1072.

ATARI 2600 - with joy sticks, paddles and original box, $50. Call 878-0516 after 6 p.m.

BAR W/STOOLS - 6' wide, lg. storage area; Sears sewing machine with cabinet; Bell and Howell "Sound" movie camera and projector, like new. 331-1572.

TV - 19" Zenith B&W with table. 698-3856.

X-MAS LIGHTS - outside, never used, 80 lights, $20; candle lights, 1 pr., $5. Ext 5274 or 281-2767 eves.

SERVING CART - colonial maple, excel. cond., $50. Judy, Ext. 2590.

CURTAINS - beige seeded voile, 4 pr. 36" long tiers; 2 pr. 24" long tiers, 6 valances. Ext 3565 or 924-8594.

HASSELBLAD & NIKON CAMERAS & EQUIPMENT - all in excel. cond. Fred, 935-8767 eves.

GRACO CRADLE SWING - with seat, excel. cond., $35. 941-4328.

STANDYNE STAINLESS SINK - new 25"x22", $20. Frank Rumph, Ext. 4581 or 588-3565.

HOLIDAY GOODIES - gingerbread houses, fruit cakes, chocolates. Medina, Ext. 7636 or 924-6971.

LOVELY SILVERPLATE GOBLETS - 12 each water, wine, champagne, never used, $300. Call 475-8971 after 6 p.m.

FUR CAPE - short, good cond., $40; 2 elegant pocketbooks, black leather, $30; woven from thread $20; good Xmas presents. Ext. 3701.

BOY'S BLUE BLAZER - sz. 16, $10; slacks, sz. 16 slim, $4. Ext. 2543.

COUESON TRUMPET - good cond., $85. K. Riker, Ext. 2819.

DRESSER - maple, colonial style, 8 drawers, 50"l, 18"w, 30"h,$100. Ext. 2041.

ATARI 2600 - video game w/12 cart., incl. pitfall, asteroids, game, $70; cart., $8 each; all $150 or best offer. Ext. 4053 or 732-7634 after 6 p.m.

CARE BEARS - hand made, all ten available, $15.50, deposit required. Call 878-9102 or 878-0026.

SEA SHELLS - exotic types from all over the world; good Xmas gifts. Whitey, 197B, Ext. 2913.

DINING ROOM SET - table, 4 chairs, leafs, pads, china closet, contemporary, light wood grained formica, like new, $300. 727-2167.

SEARS TIMING LIGHT - like new, $30. Artie, Ext. 2697.

COAL/WOOD AIR-TIGHT STOVE - Comforter, colonial design, blue, heats 2000 sq. ft., make offer. Call Divadeenam, Ext. 5076.

SWORDS - (2) hand painted Spanish swords, nice wall ornaments or for duals, $15 ea. Bruce, Ext. 7132 or 653-9655.

MAPLE DROP-LEAF END TABLE - $25; swivel captain's desk chair, $30 (originally over $100); 2 Wagner cast iron pots, $35. 878-6637.

DINING TABLE - w/2 leaves and 4 chairs, Salem Maple, $175. 399-0233 after 5 p.m.

LEATHER JACKET - brown, waist length, 42l, zipper, zipout lining. Ext. 5038.

BISTRO TABLE - white formica, oval top, wrought iron with ice cream parlor chairs, $40. Judi, 928-5714.

ICE SKATES - CCM Broncos, size 10-1/2, good cond., $30. Call 751-0182 after 5 p.m.

RACING SKATES - sz. 7 narrow, would fit boy's foot also, excel cond. Steve Plate, Ext. 4475.

MEN'S ELECTRIC SHAVER - $25; cassette deck, $30; hems are brand new. Doreen, Ext. 2456.

KENMORE WASHER & DRYER - 6 yrs. old, excel. cond., $75 each. Raul, Ext. 4331, 924-1421.

ODYSSEY VIDEO COMPUTER - 6 game cartridges, orig. box, $50. Cumming, Ext. 4347.

HUNTING BOW - 45 lbs, $35; ski boots, lady's sz. 8. Ext. 7197.

Free

GOOD HOME - for my pet mice (female, non-pregnant), all equipment, food incl. 331-1889 eves.

Real Estate

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

For Rent

WESTHAMPTON BEACH - now until 4/30/84, 4 rm. furn., $200 per mo. + utilities. Ext. 5124.

CENTER MORICHES SO. - 3-1/2 lg. rooms, 1 bdrm, full bath, carpet, refrigerator, private entrance, heat & electric, immed., must see. $475 pays all, 1 mo. security. Ellen, Ext. 4486 or 878-0480 eves.

VERMONT - vacation, 2 baths, 3 bdrms, f/p, house with beautiful view, X-country & downhill skiing, family oriented. 732-6499 after 6 p.m.

BERKSHIRES CHALET - 3 hrs. from NYC; 3 bdrms, 2 baths, fully equipped kitchen, elec. heat, deck with spectacular view, near lake, hiking trails, near ski areas, cross country skiing on property, available weekends or weekly. Call 929-6946 after 6 p.m.

For Sale

CATSKILLS - Belleayre Village, 3 bdrms, 2 baths, sauna, sleep-in loft, 1600 sq. ft. glass and wood home, beamed cathedral ceiling, walk to swim and tennis, 5 min. to ski centers $97,500. Call 536-3538.

Car Pools

RONKONKOMA - 2 drivers wish to join or form car pool near LIE Exit 59, 8:30 - 5 p.m. Victor, Ext. 2395

NORTHPORT - Ft. Salonga, 8:30 to 5:00, need 1-2 riders. Call Walt, Ext. 7154.

RIVERHEAD - Sound Ave., start or join existing car pool, flexible hrs. Peter, Ext. 2824 or 727-3218.

Lost & Found

LOST - beige cardigan w/burgundy chevrons. Call Pat, Ext. 4628.

Wanted

TRAINS - Lionel, any "O" gauge or "027" gauge cars, track and equip. Frank, Ext. 3120.

CAMPBELL SOUP LABELS - (for St. Mary School, East Islip). Send to F. Chandler, Bldg. T-89.

289 V-8 ENGINE - very good cond., band saw for wood and metal. Call Joe, 929-8321.

OAR OR OARS - 7 or 7-1/2 ft. Kurt, Ext. 4698.

TRAINS - Lionel, American Flyer, accessories, any cond., brings good price. Carole, Ext. 3362 or 924-4097 eves.

HOME - adult home for adult cat, beautiful Persian calico. Call 736-3573 eves.

SMALL HOME TO RENT YR. 'ROUND - in area of Westhampton Beach. 288-6367.

TENOR OR ALTO RECORDER - reasonable. John, Ext. 2269 or 281-2623 after 6 p.m.

ENGINE 6 CYL. FORD - 240 cu. in, 67-72, reasonable. Charlie, 878-8984.

HOUSE-SITTER - for 3 days (flexible) between Christmas and New Years). Call Andy, Ext. 4210.

PIANO BENCH - adjustable, black. Ext. 3828 or 751-7250.

ROOMMATE - to share large house, 5 min. from Lab, rent low. Call Jack, 924-3669.

OUTDATED CALENDARS - pictures to be used as a teaching aid for a handicapped child. Forward to Edy Thornhill, Bldg. 460.

OLD PLAYPEN - wood type. Call Steve Plate, Ext. 4475

VACUUM CLEANER - Raul, Ext. 4331 or 924-1421.

ZIPPERS - any shape or size, new pr., old, working or not. Bob, Ext. 4672.

BABYSITTER - part time, my home, Ridge area, 12:15 to 5:15 p.m., 4 yr. old girl, 6 yr. old boy (from 3-5). Marie, Ext. 7716/4207 or 744-4047 eves.

275 GAL. OIL TANK - 50 h.p. outboard, 1973 or later, reasonable; 18 ft. boat trailer, reasonable. Bill Sanchez, Ext. 3848 or 281-6498.

KITTENS - preferably black or black & white. Ext. 3565.

In Appreciation

I would like to thank everyone at the Lab for the cards, gifts and phone calls during my recen illness, your messages were heartwarming anc greatly appreciated. — Thomas W. Tully
GTE/Site Manager

I wish to express my sincere thanks and gratitude to my friends at the NSLS and throughout BNL for their kind words of condolence on the sudden death of my father. — Bill Foyt

Note: Employees who wish to express appreciation for kindness shown during serious illness or personal tragedy may use this new section.

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