BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

Scientists Take Acid Rain Study Up To The Clouds

Mort Rosen

The inlet pipes being checked by chemist Tom Kelly scoop in cloud water samples.

What do you see in a cloud? A weather forecast? Fanciful creatures? Ask chemist Steve Schwartz, and he'll tell you he sees a beautifully designed chemical reactor.

For the past year, Schwartz and a number of coworkers in the Environmental Chemistry and Atmospheric Sciences Divisions of DEE have been involved in a unique study of acid rain, using an airplane to catch clouds. The scientists think cloud chemistry plays a major role in the process by which acids are incorporated into rain.

Actually, acid rain is the end result of a chemical process that starts with fossil fuel burning. This combustion puts into the atmosphere sulfur dioxide (SO_2) and nitric oxide (NO) gases. Once in the air, the gases are changed into sulfuric and nitric acids, the culprits in acid rain.

SO_2 and NO are not very soluble in water and not particularly acidic, notes Schwartz. So the question is, when and where is the change taking place — how do these gases react, get distributed and ultimately show up in rain?

"The reason for the focus on clouds," says Schwartz, "is that clouds are precursors of rain. They are also good chemical reactors, with lots of oxygen and other gases like ozone and hydrogen peroxide around to promote reactions."

Still another reason is given by Peter Daum, also a chemist in the group. He says the acidity measured in air samples cannot account for what comes down in rain. And in fact, there is more acid in clouds than in ambient air.

The acid in a cloud is dissolved in water droplets, which make up a tiny fraction of a cloud. Schwartz says even the grayest rain cloud contains only several parts per million liquid water, by volume. The rest is air. He points out, however, that the group is as much concerned with the chemicals that remain behind in the air and in aerosol particles between the droplets as they are with what is dissolved in the water.

The BNL project hinges around a twin engine airplane which has been outfitted with sophisticated sampling and analyzing equipment. People involved in developing the instrumentation, some of it unique, include Tom Kelly, Peter Daum and Roger Tanner.

The combination of airplane and fancy equipment is unusual, and Schwartz says there are "precious few studies in this area." He adds, "We are the only ones who have airborne measurements of pH in real time, for example." Besides cloud water, the airplane is also equipped to measure some 40 other variables which can affect the chemistry that takes place in a cloud. These include aerosols, trace gases and ammonia (which can neutralize acid rain), as well as meteorological variables such as temperature, humidity and cloud liquid water content.

Meteorologists from the Atmospheric Sciences Division of DEE work closely with this project. Routinely, either Bob Brown or Cy Fink is paired with Peter Daum or Dan Leahy from the environmental chemistry group to do the airborne sampling. Meteorologist Mark Hjelmfelt occasionally goes aloft, as does chemist Tom Kelly. On the ground, data processing is done by a group in atmospheric sciences and air and cloud water samples are handled by the analytical chemistry group in environmental chemistry.

Of the cloud project, Environmental Chemistry Division Head Leonard Newman comments, "It's very important that we understand the processes by which rain gets its oxides of nitrogen and sulfur. Through this understanding we will be able to construct

(Continued on page 2)

Mort Rosen

Chemists Peter Daum (left) and Steve Schwartz with BNL airplane used in cloud chemistry study.

New Proposals From Spin Symposium

Protons and electrons, in fact many of the fundamental particles of matter, exhibit an apparently perpetual spinning motion. The use and study of these spin effects in elementary particle physics was the subject of a cross-disciplinary conference held September 16-22 at BNL and Westhampton Beach — the 5th International Symposium of High Energy Spin Physics.

Over 200 physicists from throughout the U.S., Europe, Japan and the Soviet Union came to the conference to discuss the many large, unusual and unexplained effects of spin which have been observed at various accelerators.

According to Gerry Bunce, chairman of the local organizing committee, "The conference brought together people who prepare beams and targets of particles spinning in one direction, with people who use those beams for experiments and with others who predict what will happen, or, with hindsight, explain what happened. Using spin is often a difficult business, and it is useful to know what is possible or needed in fields outside your specialty."

When the symposium concluded, several significant events had taken place. Among those were a proposal for an international collaboration to study accelerator techniques and improve theoretical understanding of phenomena seen at the polarized beam in the accelerator at Saclay, France; the introduction of new schemes for polarized proton sources that would allow for beams with the same intensity as present unpolarized ones; the development, in a workshop, of several new theoretical ideas which will lead to experimental proposals for the AGS and, in the future, for polarized protons in colliders; the announcement of new experimental results on magnetic moments; and a discussion, by BNL senior physicist Ernest Courant, of a scheme invented in Siberia which, when used in storage rings, will keep the beam polarized despite the presence of severe resonances.

The symposium opened at BNL with a welcome by Lab Director Nicholas Samios, who remarked on the appropriateness of holding the conference here. Not only did Sam Goudsmit, a former chairman of the Physics Department, collaborate on the observation in 1925 that a spinning electron would explain several atomic effects, but beginning in 1984, spin effects will also be studied in depth at the AGS, which is now being converted to circulate polarized protons (where most of the protons spin in the same direction).

Other early remarks were made by Nobel Laureate C.N. Yang of SUNY, Stony Brook, who chaired the first session, and L.H. Thomas, Professor emeritus at North Carolina State University, who offered his recollections of a weekend's work in 1925 that led to his discovery of the Thomas precession frequency.

(Continued on page 2)

Doug Humphrey

Sharing ideas at the spin symposium are (from left) Alan Krisch, chairman of the international committee for the symposium and head of AGS Experiment 748, which uses polarized protons; BNL senior physicist Ernest Courant, whose calculations for accelerating polarized protons have been used in accelerators at Saclay, France and Argonne, and will soon be used at the AGS; and Gus Voss of DESY, the German laboratory where a polarized beam circulates through the collider PETRA.

A Dipole With A Difference

"LM-11 has demonstrated good behavior in every respect and represents a new milestone," said Per Dahl, physicist with the ISABELLE Magnet Division, in describing results of initial tests on this superconducting dipole, the latest of the full-size magnets for the ISABELLE project.

LM-11 is a dipole with a difference. It is the first magnet in the LM series constructed explicitly to meet all the final specifications for the accelerator magnets. These specifications include achieving a comfortable margin above the design operating field; satisfying stringent tolerances on field quality; and incorporating a set of superconducting trim coils, which must also perform reliably within a certain operating range. In addition, the magnet must be constructed in such a manner that all future magnets can be built in the identical way, while using mass production techniques.

The tests, which began last week, demonstrated that LM-11 meets all of these requirements. "Like its predecessors," said Dahl, "it showed a quite respectable quench performance — 55 kG at the normal testing temperature of 4.5°K, and 58 kG at 3.8°K, the upper end of the operating temperature range for the accelerator." This is well above the design operating field of 52.5 kG.

As did earlier magnets in this series, LM-11 also met the requirements on field quality. Finally, the trim coils exceeded the specified operating margin by a large factor, without exhibiting any signs of training.

Having reached each goal established for the accelerator magnets, Dahl said, "LM-11 may be accorded the honor of being the first dipole certified for accelerator use." In the meantime, LM-11 will soon be transported to the accelerator tunnel for service in the first full cell of eight magnets scheduled to be tested there next spring.

Spin Symposium (Cont'd)

The spin symposium was the first BNL-hosted meeting to be held partially off site. "By splitting the conference," Bunce said, "people were able to be at BNL for several days and interact with people here before going out to Westhampton."

A dual location conference of this size necessarily required the help of many people. For their efforts in making the meeting a success, Bunce credited symposium secretary Joan Depken, along with Pam Brown, Henry Boyd, Anne Flood, Mary Glynn, Pat Glynn, Dot Groobert, Joe Hanson, Audrey Harson, Roy Johanessen, Dorothy Metz and Marion Newtown.

Learn To Program

A course entitled Introduction to Structured Programming with FORTRAN 5 is scheduled to begin on Monday, October 18 from 9 a.m. to 10:30 a.m. Classes will be given in the AMD Seminar Room, Building 515, and will meet on Mondays and Wednesdays for eight weeks. The course is designed to introduce structured problem solving techniques using the FORTRAN 5 programming language from an interactive standpoint. The computers will be those of the Central Scientific Computing Facility. No previous knowledge of programming or familiarity with computers is required.

For more information and to register for the course, refer to the October 1982 BNL Computing Newsletter, or call Ronald Wittlock at extension 4112. Class size is limited, so register as soon as possible.

Clouds (Cont'd)

and implement the most effective control procedures."

Adds Schwartz, "What goes up must come down, albeit in a different place and chemical form. Our study has provided the first indication of some of the differences in acidity of cloud water as compared to the other constituents of clouds, namely air and aerosols. Results to date indicate that the water is much more acidic than the air and particles left behind."

—Mona S. Rowe

Loans On Sale

The Teachers Federal Credit Union (TCFU) will be holding a loan rate sale throughout the entire month of October. During this time, loans for both new and used cars, as well as FHA home improvement loans, will be available to qualifying members at these reduced interest rates:

14.75%, if payment is made through payroll deduction.

15%, if payment is made by the member.

The loans can be negotiated for terms of up to 47 months. All loans are automatically covered by free life insurance.

To take advantage of this loan rate sale, you must be a member of TFCU. Membership is available to all BNL employees and their immediate families. For more information on TFCU membership, or on the special October loan rates, stop by the Credit Union office in Bldg. 179, or call Ext. 2790.

Logging The Hours Aloft

With an ease gained from repeated practice, Dan Leahy ducks through a four-foot square doorway into the plane's midriff, squeezes past the rear seat and folds his six-foot frame neatly into the forward seat, between racks of equipment, yards of tubing and coils of electrical connections.

Leahy is a chemist who does much of his work in flight. For the past eight years, he has been climbing into an airplane, buckling up and going aloft to take measurements of air pollution. This last year, he has been involved with a specific study on cloud chemistry, a project shared by the Environmental Chemistry and Atmospheric Sciences Divisions in DEE.

"I have an older brother who loves to fly, and when he first got started, he always asked me to come along for the ride," says Leahy. "When my boss needed someone to take part in these airborne sampling studies, he looked at me and said, 'You're always flying. You do it!' "

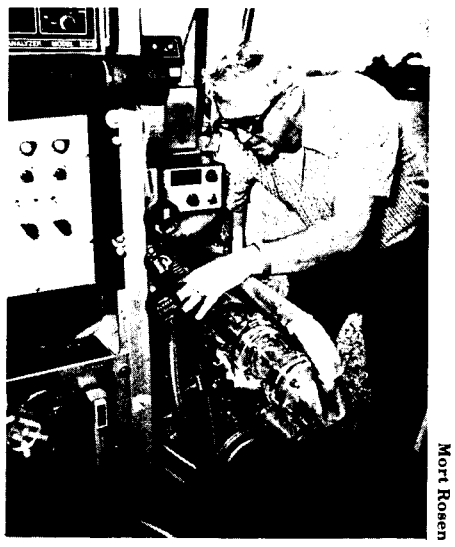
Brookhaven Lab has a Britten Norman Islander twin engine airplane, which is based at Brookhaven Airport, about six miles south of the Lab. The plane is on long-term lease from Mid-Island Air Service, which also supplies maintenance and flight crew.

For the cloud project, Leahy trades flight time with chemist Peter Daum. On these missions, one or the other of them usually pairs with either Bob Brown or Cy Fink, meteorologists in the Atomospheric Sciences Division.

About 150 hours of flight time have been logged by the group this past year. The cloud project has taken them over Long Island, upstate New York, Connecticut, other parts of New England and South Carolina.

"Long Island is not the best place for airborne sampling — too much traffic in and out of LaGuardia and Kennedy," says Leahy. "We usually fly between fifteen hundred to five thousand feet. When we see good clouds above that, the air traffic controllers don't often let us up there because that higher airspace is more or less reserved for the big fellows."

They fly through clouds, clear air and rain, daytime and nighttime, gathering samples and taking measurements which will lead to a better understanding of the cloud chemistry that results in acidic rain. Because they fly in almost all weather conditions, and particularly because they



Mort Rosen

Dan Leahy

fly at lower altitudes, coping with turbulence is a hazard of the job. In the plane, Leahy can point to pen marks on the ceiling, which attest to those times the plane took a sudden dip, leaving a pen-toting researcher levitated for a split second.

The seat pockets carry "sic sacs," which Leahy refers to as O'Rourke bags because of resemblance to the usual sound effects when a bag is used. He claims to have never needed an O'Rourke bag, "although I've come close often enough when the ride was really bumpy."

One of those times was a flight over Baltimore, Maryland. Leahy says he and Peter Daum made the mistake of filling up on juicy submarine sandwiches before going on a flight. "It was an especially turbulent ride, and those submarine sandwiches nearly surfaced."

He says the activities aloft can usually help keep a person's mind off motion sickness. During an average three-hour flight, everyone is too busy changing bottles, scribbling notes on chart paper and checking digital readouts to even notice a queasy stomach.

Busy is a good word to describe what their flights are like. Says Leahy, "On some of these out-of-state trips, when we've come down from a flight, the second one that day, and we are really tired, facing a diner dinner and a motel room, then I wonder why I do this. But when we don't fly for awhile, the normal lab routine seems boring, and I find myself looking forward to the next excursion in a new location."

—Mona S. Rowe

Fight Fire With Fire Safety

The Great Chicago Fire began on October 7, 1871. When the blaze was finally brought under control, on October 9, 250 lives had been lost and more than 2,150 acres of the city had been destroyed. During that same period, a fire raging through Peshtigo, Wisconsin, killed 800 people in the small lumber town within 24 hours.

While the death toll from these two fires was the largest in American fire history, the National Fire Protection Association reminds us that something good did rise from the ashes — the knowledge that fire prevention must be practiced.

Fire Prevention Day, which was initiated in 1911 by the Fire Marshal's Association of North America, received official sanction from President Woodrow Wilson in 1920. The first Fire Prevention Week was proclaimed in 1922 by President Warren Harding. To commemorate the two conflagrations that inspired it, Fire Prevention Week is always observed during the week which contains October 9.

"Learn Not To Burn Wherever You Are" is the theme of this year's Fire Prevention Week, which runs from October 3-9. A fire can flare up anywhere — at home, at work or at play. Being aware of your surroundings, and how to escape from them if need be, could save your life or that of a loved one.

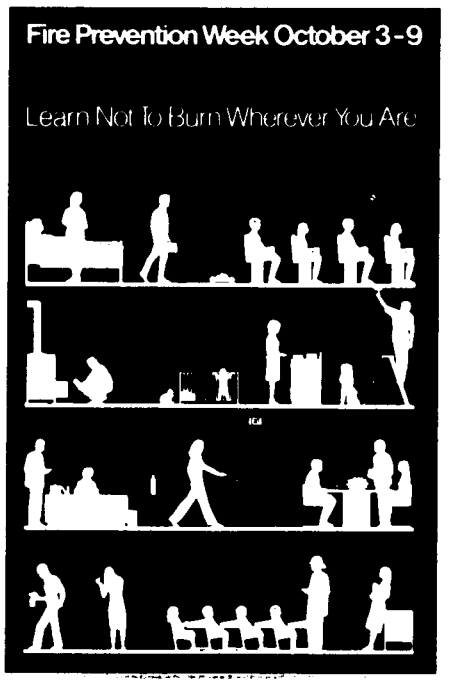
In 1980 alone, in the U.S., 2,988,000 fires claimed 6,639 lives and destroyed $6,254,000 worth of property. These tips from the National Fire Protection Association could conceivably save you and your family a great deal of anguish.

At Home

- Be aware of fire hazards. Go through your home from top to bottom and make a list of things that threaten your family's safety — then work together to correct them. Home fires account for 83.5% of all U.S. fires.
- Invite EDITH home. EDITH stands for Escape Drills In The Home. Have a plan for every room in the house and practice it to make sure it works. Your plan should call for immediate evacuation (report the fire once you're all safe) and include a place for the family to meet outside.
- Use smoke detectors. Of all the multiple death fires, 64% occur between midnight and 8 a.m. A smoke detector can give your family an early warning. Check your detectors' operation once a month.

Away From Home

- Check at check in. Upon arrival at a hotel or motel, ask about the building's fire safety features.
- Find the exits and check them out. This is the first thing to do in any new surroundings. During a fire it is easy to become disoriented, so being prepared ahead of time can only help.



In a Restaurant or Theater

- Locate the exits, especially if you are in an out-of-the-way area like a balcony.
- Check for a detection or sprinkler system.

Year End Closing

In order that employees may make their plans ahead of time, it has been confirmed that the Laboratory will be closed from 12:30 p.m., Thursday, December 23 until midnight, Sunday, January 2, 1983. This period includes a half day holiday on Thursday, December 23 and full holidays on Friday, December 24; Monday, December 27; Tuesday, December 28; and Friday, December 31 (December 27 and 28 are the floating holidays). Accrued vacation days or leave without pay may be used for Wednesday, December 29 and Thursday, December 30.

Arrivals & Departures

Arrivals

Michael T. Foran ..... NSLS
Aryeh A. Frimer ..... Medical
Donna Gallagher ..... Personnel
Joan P. Lankford ..... Contr. & Proc.
Maureen M. Mulcox ..... Medical
Robert E. Sikora ..... Accelerator
Patricia E. Sylvester .. Ph. & Gr. Arts
Donald L. Tarrant ..... Ph. & Gr. Arts

Departures

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

Marion L. Czaja ..... Accelerator
Robert M. Neilson Jr. ..... DNE
Akihiro Shima ..... Biology
Waldemar O. Sorenson .. Plant Engrg.

Cafeteria Menu

Week Ending October 7, 1982

Monday, October 3		
Cream of potato soup	(cup)	.65
	(bowl)	.75
Farmer's omelet & hash browns		1.75
Kielbasi & sauerkraut		1.85
Hot Deli: Baked ham	(bread)	1.85
	(roll)	1.95
Tuesday, October 4		
Beef barley soup	(cup)	.65
	(bowl)	.75
London broil w/mushroom gravy & 1 veg.		2.05
Spaghetti and sausage		1.90
Hot Deli: Roasted turkey breast	(bread)	1.85
	(roll)	1.95
Wednesday, October 5		
Turkey noodle soup	(cup)	.65
	(bowl)	.75
Sauerbraten potato pancake & red cabbage		2.10
Stuffed cabbage & 1 veg.		1.85
Hot Deli: Corned beef on rye		1.85
Thursday, October 6		
Pork & cabbage soup	(cup)	.65
	(bowl)	.75
Beef Stroganoff on egg noodles		1.95
Southern fried chicken & 1 veg.		1.90
Hot Deli: Sandwich steak w/peppers & onions	(bread)	1.95
	(roll)	2.05
Friday, October 7		
Seafood bisque	(cup)	.65
	(bowl)	.75
Macaroni, ham & cheese w/ 1 veg.		1.80
Veal scallopini & 1 veg.		1.85
Hot Deli: Pastrami	(bread)	1.85
	(roll)	1.95

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Meet The Softball Champs

Congratulations to the members of the winning teams of the 1982 softball season: The Ravens, League I; Ice Pops, League II; AMD (Applied Math), League III; Electric Co., League IV; Survivors, League V; and Mole-Esters, League VI. The Survivors also won the championship game between Leagues V and VI, beating the Mole-Esters 14-11.

Survivors — (No picture) — Bob Brown, Cynthia Church, Randy Church, James Garrison, Kay Hunt, Reggie Hunt, Henrietta James, Leroy James (Captain), Sydell Lamb, Jackie Larrie, Ken Sutter, Ed Taylor, Rosemary Taylor.

The Ravens — (kneeling) Bob Rowley; (standing, from left) Leroy James, Jim Garrison, Randy Church, Mac Thomas (Captain), Leon Lawrence, Harold Bolling; (not shown) Bob Brown, Herbie Harris, Greg Mack, Walter Mason, Pat Ross, Michael Shepard, Ed Taylor, "Stone" Wahl.

Ice Pops — (front row, from left) Kevin Yachnik, Pete Palamidis, Marty Leach, Tom Kelly, Steve Mercier, Phil Ouvrard; (standing, from left) Dennis Reuter, Bob Danowski, Ray Marlow, Joe Fortunato, Tirre Farmer (Captain), Tony Mendez, Al Cordero, John Kelczewski, Dick Dietz; (not shown) Joe Buscemi, William Devall, Frank Garcia, Merle Pringle.

AMD (Applied Math) — (front row, from left) Don Litcher, Paul Kessler (Captain), Dave Stampf; (standing, from left) Joe DePace, Don Gates, Bob Barone, Rick Moran, John Bennett, Mike Losquadro; (not shown) Curt Bergh, Frank DeVito, Bob Eich, Tom LoConte, Bill Michalouski, Chris Neuberger, Jim Niemczyk, Bruce Weatherell, Ron Yuhas.

Electric Co. — (from left) Pete Eterno, Jim Boomer, Walter Annand (Captain), Pete Zuhoski, Dennis Fuzie, Buddy Baumbach, Steve O'Kula, John Niemczyk, John Frezza; (not shown) Patti Bender, Mel Bonanno, Kevin Cosgrove, Bob Medina.

Mole-Esters — (front row, from left) Charlie Wilkins, Lisa Kistner, Merrill Osheroff; (standing, from left) Mark Sutherland, Dave Alenoff, Connie Koehler, Jeannee Yermakoff, Janet Firriolo, Ray Kutzman, Jayne Cutt (Captain), Dave Comstock; (not shown) Gerry Bida, Tomm Carr, Judy Clark, Stacey Ellis, Debby Eskenazi, Rich Ferrieri, Mike Luban, Michele Henderson, Bob Schoen.

Photos by Mort Rosen

Islanders Tickets

Tickets for the 1982-83 Islanders regular hockey season will go on sale at the BERA Sales Office in Berkner Hall on Wednesday, October 6, at 8 a.m. BERA's eight seats for the 40 home games at Nassau Coliseum are located in Sections 319J and 321A. Tickets are priced at $16 each.

During the initial sale only, an employee may buy a maximum of 8 tickets; i.e., either 2 tickets for each of 4 games or 4 tickets for each of 2 games. After the first purchase is completed, the employee may go to the end of the line and await another turn, at which time as many tickets as desired may be bought.

The BERA Sales Office will give no refunds or make any ticket exchanges after a sale is made.

Assuming the Islanders will again be in the NHL playoff and championship race next spring, only those employees who support the BERA Ticket Service Program by purchasing hockey tickets during the season will be eligible for entry in the special drawing for game tickets.

Schedule

October		
Thursday	14	Pittsburgh
Saturday	16	Los Angeles
Tuesday	19	Vancouver
Thursday	21	Washington
Saturday	23	Rangers
Tuesday	26	Calgary
Saturday	30	NJ Devils
November		
Tuesday	2	Pittsburgh
Saturday	6	Philadelphia
Tuesday	9	St. Louis
Tuesday	16	Edmonton
Thursday	18	Boston
Saturday	20	Chicago
Tuesday	23	Minnesota
Saturday	27	Rangers
December		
Tuesday	7	Toronto
Saturday	11	NJ Devils
Tuesday	14	Buffalo
Saturday	18	Philadelphia
Thursday	23	Washington
January		
Tuesday	4	Buffalo
Saturday	8	Quebec
Tuesday	11	Winnipeg
Saturday	15	Los Angeles
Tuesday	18	Hartford
Saturday	22	Philadephia
February		
Saturday	5	Minnesota
Thursday	10	Washington
Saturday	12	Hartford
Thursday	17	Pittsburgh
*Saturday	19	Montreal
Tuesday	22	Winnipeg
Saturday	26	Detroit
March		
Thursday	3	Toronto
Saturday	5	NJ Devils
*Saturday	12	Washington
Saturday	19	Philadelphia
Tuesday	22	Boston
*Saturday	26	Rangers
April		
Saturday	2	Pittsburgh

*Starting time 5:05 p.m. All other games start at 8:05 p.m.

Radio Club

The Amateur Radio Club will meet on Tuesday, October 5, in Room C, Berkner Hall, at noon. This will be a general business meeting, highlighted by a talk by John McNeil, WA2KSM. The talk will pertain to low power amateur radio communications (QRP).

Runners' Corner

On Sunday, October 17, the BNL Roadrunners will hold the 11th Annual Fall Races. There will be a 10 kilometer (6.2 mile) and a 5 kilometer (3.1 mile) fun run starting at 9:30 a.m. (registration 8:00-9:15 a.m.). There will also be a 30 kilometer pace race starting at 8:30 a.m. (registration 7:30-8:15 a.m.).

Registration is free and refreshments will be available to the runners. The courses are accurately wheeled. Runners will receive their finishing places and times.

If you don't want to run for fun, then please consider helping the club on race day. It's always an exciting time. For information call Bill Thomlinson, Ext. 3937, or Gus Prince, Ext. 5079.

Hospitality News

The Hospitality Committee's next monthly morning get-together will be held Tuesday, October 5, from 9:30 to 11:30 a.m. in the Brookhaven Center. A formal program will not be presented in order that we may spend the time meeting newcomers and visitors to the Laboratory and greeting old friends.

All wives of Laboratory employees and guests are welcome. Please come and bring the children. Babysitting will be provided free of charge. Coffee, tea and danish will be served.

Bowling News

White League

High games were bowled by G. Fales 204, J. Griffin 204, K. Vogel 196. Clearwater is in first place with the Pinsplitters in second.

Red & Green League

R. Larsen rolled a 234, J. Connelly 207, J. Cochrane 200.

Pink League

D. Johnson bowled a 230, H. Keeley 202, J. Thiede 186/161, E. Kristiansen 162, R. Rosati 173, M-G Meier 162.

Cricket

The Brookhaven International Cricket Club finished the 1982 season in fine style with an easy win over the British Veterans Cricket Club from Oyster Bay in a match played here on September 19.

Batting first, the visitors struggled against steady Brookhaven bowling for a total of 91 runs, with John Millener (4 wickets for 20 runs) and Gnanalingam Anandalingam (2 for 14) sharing the main honors. When BNL opened their innings, Millener immediately took command and scored 49 not out in the winning Lab score of 93 runs for only two wickets down. Cricket activities will resume again next May.

Volleyball

A meeting will be held on October 6 at noon, Room C in Berkner Hall, for all captains of teams in both the Mixed and Open Leagues, as well as any persons interested in starting new teams for the coming season. Election of new officers will also be held at this time. Please be prompt. For more information, please call Lois Marascia, Ext. 4904.

Golf

The final BGA tournament and end of the year awards dinner will be held on Friday, October 22, at the Flagg Country Club. The tournament will start at 12:30 p.m. with a shotgun start, with foursomes beginning at various tees. The tournament will be followed by a hot and cold buffet dinner. There will be a $10 entry fee for BGA members and a $15 entry fee for non-BGA members. The entry fee includes greens fee, tournament entry fee, and cost of the dinner. The deadline for entry is at noon on Friday, October 15. All entry fees *must* be paid by that date. Checks should be made payable to BERA Golf Association. Entry fees should be sent to Marge Neuberger, Bldg. 463, Ext. 3396.

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.

The vacancies listed below have been exempted by the Director's Office from the current freeze on open requisitions.

SCIENTIFIC POSITIONS OPEN: The following staff positions are open. Candidates may apply directly to the department representative named, or through the office of Scientific Personnel, Ext. 3338.

PHYSICAL CHEMIST - To join research program evaluating High Temperature Gas Cooled Reactor safety systems. Candidates should have Ph.D. in Physical Chemistry and strong experimental background with experience in high temperature chemistry. Contact: A.J. Romano, Dept. of Nuclear Energy.

LABORATORY RECRUITMENT: Opportunities for present Labortory employes.

1761. SCIENTIFIC ASSOCIATE - Requires a BS or equivalent in a scientific or engineering discipline. Experience in mechanical and high vacuum technology and excellent organizational skills are essential. Background in electronics and scientific programming is desirable. Physics Department.

1762. MEDICAL ASSOCIATE - Requires a BS or equivalent in biology. Experience in chemistry is desirable. Must be willing to work with animals. Medical Department.

1763. BUDGETARY/ADMINISTRATIVE POSITION - Highly responsible position assisting the department administrator in budget preparation and analysis; and general internal system control and procedures. Requires minimum of BS degree or equivalent and significant pertinent experience. Medical Department.

1764. PRODUCTION ENGINEERING CLERK - Under direct supervision will assist in the collection, distribution and filing of records, information and material for the Production Engineering Section of ISABELLE. Will assist in inventory control of materials and liaison between technical staff and service groups. Will operate computer terminal to track ILR's, purchase requisitions, etc. Accelerator Department/ISABELLE Project.

1765. COMPUTER ANALYST - Requires minimum BS (advanced degree desirable) in computer science or related field. Will join systems development group. Responsibilities include development, design and maintenance of advanced computer systems. IBM, MVS experience preferred. Applied Mathematics Department.

1766. TECHNICAL POSITION - Requires AAS in electronic technology or equivalent experience and background in mechanical and p.c. layout, integrated circuits, semiconductors, soldering, etc. Candidate will assist in the construction and debugging of digital electronics, although linear work is also required. Physics Department.

1767. TECHNICAL POSITION - Requires AAS in electronic technology or equivalent and a minimum of 5 years' experience in troubleshooting and maintenance of digital and analog equipment. Work involves high current, low voltage power supplies, digital measuring and timing devices, computers, terminals, communications, patch panels and control room monitoring devices. Accelerator Department/ISABELLE Projects.

Autos & Auto Supplies

80 YAMAHA - 400 Special II, low mi., extras, sissy bar, crash bar, custom paint, carry pack, luggage rack, tools. 928-1004 after 4 p.m.

79 HONDA - CM400T, 2,000 mi., garaged, must sell, $1,000. Ext. 7125.

TRUCK/CAMPER - Sun Line, 9-1/2 ft., fully self-contained, excel. cond., $2,500. Bob Johnson, Ext. 3354.

79 DODGE OMNI - 4 dr., 4 spd., custom int., r/rack, low mi., asking $3,850. 331-2124 after 5 p.m.

74 PEUGEOT - Diesel (504), good cond., asking $2,500. 734-6415 after 4 p.m.

81 HONDA - Civic, 2 door, 4 spd., am/fm stereo cass., 4 new radials, excel. cond., low mi. Janet, Ext. 4049 or 744-8087 eves.

70 VALIANT - white, $500 or best offer. Scott, 286-0350.

70 RIVIERA - classic, excel. cond. in/out, rebuilt eng., new exhaust, new brakes all around, new front end parts, p/b, p/s, p/w, a/c, tilt steering, power seats & new plush carpet, very good tires, new shocks, asking $2,200. 878-1688 eves.

63 VW - runs well, new battery, recently inspected, $550. 744-6668.

CHEVY II - runs, some rust, $200. George Hrabak, Ext. 3536.

77 HONDA - 400cc Supersport, like new cond., garaged, must sell, $700. 281-2257 after 5 p.m.

74 CADILLAC - Fleetwood Brougham, $1,500. Bill, Ext. 4633.

74 OPEL WAGON - good cond. throughout, $1,100. Ray, Ext. 7509 or 924-0569.

74 DATSUN - B210, hatch, runs, $600. Steve, 924-4826.

72 MGB - convert., new top, red, very good cond., $2,150. Ext. 4489.

71 TRIUMPH TROPHY - 500cc, very good, all stock, classic British machine, $1,000. 567-8811.

74 CHEVY - Nova, a/t, p/s, p/b, 6 cyl., good cond., $1,000. 588-5287 after 6 p.m.

CAR RADIO - am/fm with pushbuttons, $25. Ext. 2605 or 4160.

79 CHEVY - pickup, short bed, bucket seats, many extras. 289-1755.

CAR STEREO - am/fm, 7 mos. old, $35. Ext. 3492.

DUNE BUGGY - many new parts, new paint, real sharp, best offer. Ext. 5385 or 744-0290.

77 CHEVY - pickup, 305 V8 eng., 55,000 mi., good & dependable. Bill, Ext. 2353 or 331-4641.

66 PLYMOUTH - Valiant, 2 dr., 6 cyl., a/t, good cond., $350; 73 Plymouth Duster, 6 cyl., a/t, p/s, good cond., $850. 727-7626 after 5:30 p.m.

TRUCK TIRES - (5), mounted 800-16.5, (1) new, (4) 20,000, 8 holes, $125 takes all. Jack, Ext. 4660.

65 PLYMOUTH - Fury I, radials, good battery, $125 for quick sale. Rob, 929-8443.

72 COLT - parts. 732-3338.

75 FORD - 150 Ranger pickup, 351 V8, p/s, p/b, a/t, a/c, r/h, new tires, $1,500. 765-2085 after 5 p.m.

66 CHEVY - rusted, needs engine work, best offer. Dick, Ext. 4255 or 744-6794.

71 PINTO - parts. John, Ext. 4976 or 744-4386.

73 VOLVO - 164, green sedan, a/c, am/fm, a/t, $1,850. Ext. 2888 or 286-0422 eves.

65 VW BUG - body good, engine needs work, good for parts or dune buggy, $150. Joe, Ext. 5131.

75 CHRYSLER - Cordoba, am/fm stereo, a/c, velour int., new brakes, starter, asking $2,500. George, 732-8316.

72 CADILLAC - Sedan DeVille, runs well, new tires. Walt, Ext. 7154.

75 TRANS AM - 400 C.I., 4 brl., a/t, dk. blue, white int., 66K mi., $2,750. Ext. 2168 or 744-7679 after 5 p.m.

73 OLDS - Delta 88, a/c, a/t, p/b, p/s, am/fm stereo, new battery, trans., alternator, muffler, good tech. cond. Schauer, Ext. 7757.

73 CHEVY - Luv pickup, fair body, engine not running, recent valve job and timing chain, $275. Joe, Ext. 5131.

MOTORCYCLE WINDSHIELD - padded sissy bar, $12 ea.; Honda 500 twin parts, tank seat, fender, etc. Frank, Ext. 2022 or 399-4480.

78 DODGE - Aspen, 6 cyl, a/t, p/s, p/b, a/c, am/fm stereo cassette, $2,700. 399-4972.

72 CAMPER - Steury pop-up, hardtop, self-contained, sleeps 8, extras, like new. Richie, Ext. 4254 or 734-7342.

79 HONDA HAWK - 400cc, new cond., low mi., asking $995. 588-0805 eves.

70 FORD PICKUP - good cond., must see, $2,400. Henry, Ext. 3084 or 727-3830.

SNOW TIRES - (2) H-78-14, good cond., both for $30. Ext. 2964.

74 GREMLIN - stick shift, am radio, great mileage. 728-2223 after 6 p.m.

69 BUICK - sport wagon, new brakes, exhaust, tires, wires, good cond., $600. Ext. 2964.

67 PLYMOUTH - Barracuda, good cond., avail. Oct. 4, $600. Tony, Ext. 3850.

MERCEDES ENGINE - slant 6 cyl., head compl. except valve cover, $275; 56/57 Buick Dynaflow trans., ser. #1342992-6, $175; late 30's or early 40's Buick standard trans., short tail, ser. #317853-1, $100. 878-0201.

68 TR250 - 6 cyl., conv., wire wheels, best offer. 929-8475 after 6 p.m.

74 VEGA WAGON - 4 cyl., p/s, rear defroster, a/t, good cond., am/fm, $975. 758-7353 eves or 732-3350 days.

RADIO - am/fm stereo w/signal seeker, fits Caddy, excel. cond., $50. B. Azzara, Ext. 2050.

72 CHEVELLE - 307 C.I., V8, p/s, tuned-up, new carb., $850. Bill, 822-5144.

75 AUDI - 4 dr. sedan, low mi., sunroof, a/t, a/c, good cond., $2,800. Ext. 4278 or 3371 or 744-3203 after 5 p.m.

82 FORD EXP - black w/red int., am/fm cassette, fully loaded, still under guarantee, sacrifice, $9,200. 878-2375.

Boat & Marine Supplies

21' RENKEN - 1980 Cuddy, Volvo 120, I/O full canvas, compass, many extras, excel. cond., $7,800. John, 981-0989 after 5 p.m.

20' GARVEY - fiberglass, excel., 95 HP Mercury O/B, in water, will demon., $1,400. 589-4327 after 6 p.m.

CLAM RAKES - 20 tooth, 2" teeth, $20; 22 tooth, 1-3/4" teeth, $25. 589-4327 after 6 p.m.

71 MERCURY OUTBOARD - 65 HP w/controls and teleflex steering, excel. running cond., $700 firm. Ext. 4547.

17' GRUMMAN CANOE - aluminum, $300. Sherie, Ext. 2790 or 589-1250 after 7 p.m.

19' SAILBOAT - outboard, sails, AC mast, fiberglass over wood. 929-8475 after 6 p.m.

16' BOAT TRAILER - EE-Z, reconditioned, asking $350. Smitty, Ext. 4245.

Yard Sales

GROUP SALE - household, clothes, furniture, misc., Oct. 2 & 3, 10-4, 80 N. Country Rd., Shoreham, just west of Miller Ave.

5 FAMILY YARD SALE - something for everyone, Sat. Oct. 2, 10-6, 199 Jayne Blvd., Pt. Jefferson Station.

YARD SALE - Oct. 1, 101 Jennings Ave., Patchogue, 10-4, collectibles, clothing, misc., rain date Oct. 2.

YARD SALE - Fri., Sat., & Sun., exercise bike, stroller, clothes, many more. 399-0864.

YARD SALE - furniture, 6V VW parts, new 4.5 Mercury, 9' surfboard, etc., Oct. 2, 9-5, 23 Seneca Trail, Ridge.

YARD SALE - Oct. 2 & 3, 504 Avon Place, W. Islip.

Free

SHEPHERD/HUSKY - young & friendly, also black cat with white paws, both small and in need of a good home. 286-0350.

WIRE-HAIRED TERRIER - 6 yrs. old, female, well trained lap dog, needs loving lap, papers. Ext. 2008 or 928-5875 after 6 p.m.

Miscellaneous

ELECTRIC BLANKET - queen, $50; 20 & 5 gal. aquaria access., $50; Garrard Zero 100 turntable V15-3 cartridge, $50. Ext. 3932.

OVEN HOOD - 36", stainless steel, $10; stove door, cast iron, 10"x10", good cond., $5. Victor, Ext. 2395.

WINDOWS - alum., double hung, RGH. OPG. 37-1/4"x40-1/2", 33-1/4"x56-1/2", $10 ea. with s/s. 475-8162 after 6 p.m.

3 WHEEL CYCLE - Iverson, foldable, single speed, caliper brakes, large rear basket, $50. 277-1284.

KAYAK - paddle & air bags, $180. Ext. 2521 or 928-8379.

COAL/WOOD STOVE - King, 1 yr. old, $250; tank with circulator for oil furnace, $75. Joe, Ext. 4139 or 467-2422.

DINETTE KITCHEN SET - Hordor, table & 4 bucket seats, brown leather, woodtone top, $250; black vinyl leather couch with pull out full bed, very good cond., approx. 5-1/2' wide, $60; walnut record cabinet & TV table, $30. Annmarie, 585-5256 after 6 p.m.

COUCHES - (2), (1) sleeper; miscellaneous furniture, must go, best offer. Ext. 2781.

MARE - 3 yr. old, thoroughbred. Scott, 286-0350.

HANG GLIDER - Rogallo type w/harness & helmet, $250. Ext. 2521 or 928-8379.

SKIIS - Head, 180 cm., Salomon 555 Equipe bindings $75. Mark, Ext. 5350.

FIREPLACE INSERT STOVE - Liberty, cast iron, air tight, wood burning, $450. Mary Dohrman, 473-2614.

ELECTRIC GUITAR - hardly used, $75. Chris, Ext. 2009.

TAPE CASSETTES - BASF Pro II, blank, CrO_2, C-90, $2.75 ea. Ext. 2521 or 928-8379 eves.

KEROSENE HEATER - Sears, 11,500 BTU, new wick, used 2 seasons. Jack, 924-4193 after 6 p.m.

DESK DRAWERS - solid oak, all sizes, $1 ea.; Peerless gas heater, natural gas, $10; o·d school desk, $10. 751-2867.

BRAIDED RUG - 9x12, oval, $40. Ray, Ext. 7509.

TV - G.E., b&w, 15", 1 yr. old, like new, $65. Bill, Ext. 3254.

STEAM CABINET - Nusauna portable, fiberglass construction, 3 yrs. old, 110 vac., $350. Ext. 3992 or 298-4937.

DOUBLE BED - w/bookcase headboard; recliner; sewing machine; wicker chair; sofa, dinette set w/4 chairs; Waring blender; quartz heater; pole lamp, tiffany style; hanging lamp; cabinet; Garrard automatic turntable. 744-6874.

PORTABLE DRYER - Maytag, $100; double bed, $75; 2 unfinished pine bureaus plus door core desk, $100. Julie, Ext. 3393 or 3414.

QUARRY TILES - new, brown, 6"x6"x1/2", 22 sq. ft., with mortar bag, perfect flooring for stove installation, $40. Tom, Ext. 4084 or 878-1060.

TV - Zenith, 19", b&w, in working order, make offer. Ext. 2459.

BOY'S BIKE - Schwinn, 5 speed, $75. 289-1755.

HOT WATER HEATER - 30 gal., oil-fired, good cond., $200. Hildenbrand, 588-5815.

PUMP - Burks, 1/2 hp, 2 stage, deep-well, 3 yrs. old, $125. 475-8504.

REFRIGERATOR - 17 cu. ft., Deluxe, walnut finish, temp. selector, new. Zhou, Ext. 4343 or 2520, rm. 28 after 6 p.m.

COAL STOVE - used one season, auto. feed, heats 1,200 sq. ft., new $900, asking $550. Ext. 2888 or 286-0422 eves.

DESKS - (3) with attached swivel seat, excel. cond., $30 ea. Vince, Ext. 4660.

CAMERA - Polaroid Auto-100 w/flash, att. plus 9"-15" close-up equip., uses 108 film, excel. cond. Charlie, Ext. 3354.

TOW CHAIN - 50 ft.; new chrome roof rack; (2) bicycles, ladies & men, spare parts; antique television; 1940 sleds. 732-3338.

MOVIE PROJECTOR - w/screen, $100; Singer sewing machine, $50; pool sand filter for 16x32, like new, $100; colonial couch & arm chair, $350; electronic garage opener, $100; Admiral freezer chest, good cond., $100. 281-4940.

WIRE ROPES - 5/8" dia., 20 ft., $10; 70 ft., $25. Tom, Ext. 4084 or 878-1060.

CHIMNEY PIPE - Insol, 5 ft., 8" dia. s/s, rain cap, fashing collar ceiling support; free standing wood stove. Ext. 3499.

SHEETROCK - & wall paneling, $2.50/ea; quartz heater, $15; floor fan, $10; floor tile, still in box, 450 sq. ft., $70; solid oak desk, 35"x56" w/file draw, $115; Bell & Howell movie projector, new, $50; Mexican handmade wall hanging. Ext. 4660.

KITCHEN FIXTURE - enameled, metal, white decaled, acrylic diffuser, new, $30. Ed, 585-2088 after 4 p.m.

COLOR TV - 17" w/stand, needs work, $25. Ext. 2348 or 286-8521.

TWIN MATTRESS - & box spring, good cond., $10. 689-8605 after 6 p.m.

CIRCULAR SAW - 7-1/2", $10; lawn spreader, drop type, $10; both good cond. Victor, Ext. 2395.

SPINNING REEL - Penn 7102 w/12 lb. mono line, like new, 2 mos. old, $30 firm; archery left hand recurve bow & quiver, excel. cond., good for beginner, $35. Bob M., Ext. 2514.

TRANSMITTER - & receiver, SB400 & SB300, ideal station for novice or general ham. Kuper, Ext. 3311.

FURNITURE - Etegere wall storage unit, Mediterranean chair & table, lawn chairs. 744-7033.

RECORD COLLECTION - contemp., R&B, easy listening, good mixture, old & new, 5 ea. Michele, Ext. 4303.

Real Estate

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

For Sale

WADING RIVER - custom built colonial, 4 bdrm., 2 baths, d/r, f/p, den, 2 car garage, full bsmt., private beach. Ext. 7727 or 929-4631.

E. PATCHOGUE - 2 bdrm. cottage, cellar, new effic. heating system, fenced in, located by Swan Lake, $28,500. 286-1062.

WADING RIVER - 90 ft. Clarendon ranch, 1 acre, heavily wooded, 150 ft. off road, full landscaped, low maintenance, many extras. 929-8464.

QUOGUE/WESTHAMPTON - house w/1 acre, needs lots of work, $18,000. Jim or Alberta, 288-9271 after 4 p.m.

NORTH CORAM - Tangelwood Hills, 3 bdrm., 2-1/2 bath, colonial, new w/w throughout, professional landscaping, 1/2 acre, excellent school district. 928-5732 after 5 p.m.

SHOREHAM - 3/4 acre wooded building plot, will hold mortgage. 744-0047.

EAST SETAUKET - 4-5 bdrms., 2-1/2 bath, Story Book ranch, den, sundeck, 2 car garage, walk to SUSB, mint condition, assum. 9-1/2% mort., $89,500. Ext. 7111 or 751-7268 eves.

PORT JEFFERSON STATION - 3 lrg. bdrms., roomy eik, full bsmt., low taxes, .36 acres w/adjoining woods on quiet dead-end street, north of 25A, low $50's. Ext. 3388 or 331-3329.

CONDO - Medford, Birchwood at Blue Ridge, 15 min. from Lab, 3 bdrms, many extras, facing golf course, $50's. 698-7213.

For Rent

SHIRLEY - professional wishes to share 3 bedroom home, with same, fireplace, very comfortable. 399-3910 eves.

MILLER PLACE - 2 bdrm. apt., kitchen, bath, l/r, use of garage in winter mo., $425/mo. + util. 744-2536 after 6 p.m.

MEDFORD - studio apt., kitchen, bathroom, panelled, private entrance, $290/mo. util. incl. Don, 475-7532 after 6 p.m. weekdays.

MARCO ISLAND, FLORIDA - luxury 2 bdrm. condo, 2 bath, on Gulf beach, exclusive area, pool, tennis, golf, boating, fishing, fine restaurants, weekly/monthly rental. 473-6432.

BAYPORT - 1-1/2 acreas, 3 bdrm., bath, l/r, kitchen, 2 car garage, partially furnished, oil hot water, Nov.-May, $600/mo, or for sale, $150,000. Ext. 3420 or 472-9159 after 6 p.m.

MANORVILLE - house, 6 mi. from Lab, 3 bdrms., fenced yard, $500/mo. 878-0201.

Carpools

NORTHPORT - 25A area, 1 or 2 drivers needed for existing carpool. Brian, Ext. 2799.

N. SETAUKET - Birchwood/Birchfield (Terryville) - Strathmore Village (So. Setauket), 4th driver needed. Barry, Ext. 4118 or Dick, Ext. 2911.

FT. SALONGA - Smithtown, fill 5 man pool, on-time. Walter, Ext. 3499.

Lost & Found

LOST - brass & silver colored rings on 9/16, 5/32 in. diam., sentimental value. Louise, Ext. 4973 or 3397.

Wanted

HOUSE - to rent or buy, Brookhaven/Bellport area. Ext. 2781 weekdays or 286-0745 eves & weekends.

CAR SKIRTS - for 1970 Riviera, any color. Ext. 4303.

MALE ROOMMATE - to share a 2 bdrm. home in E. Patchogue, nice area. Glenn, 732-3350.

MANUAL - for 1971 Plymouth Valiant or motors manual, 1971 or later. George Hrabak, Ext. 3536.

RUGBY PLAYERS - Montauk RFC, home games & practice in E. Hampton. Charlie Whitmore, Ext. 267-3756.

CROCK - old but in good cond. for pickling. 924-4054 after 5 p.m.

S-100 COMPUTER - also Atari, reasonable; power rotary mower, any cond. Jim. Ext. 3372 or 821-0250.

WHEEL CHAIR - 689-9282 after 7 p.m.

CAMPBELLS SOUP LABELS - for St. Mary School, East Islip, send to F. Chandler, Bldg. T-89.

ROTOTILLER - 289-3604.

AMBITIOUS PERSON - $200-$300/mo., 6-8 hrs./wk. 698-5861 after 7:30 p.m.

BIKE WHEEL - 16", front, with/without tire & tube. Walter, Ext. 3499.

NEED EXTRA MONEY - for Christmas, part-time only. 732-6647 for appt.

STUDIO APARTMENT - to rent, or small cottage if rent right, Middle Island/Ridge/Yaphank/Manorville/Moriches area. Ext. 4102.

FEMALE TO SHARE HOUSE - Eastport, 20 min. from Lab, must be responsible & mature, references, no pets, $250/mo. + 1 mo. security. Ext. 2950 or 325-1024.

Services

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

SECRETARIAL SERVICES - fast, accurate. Colette, 744-2816.

PAINTING - wallpapering, panelling, carpentry, call for free estimates. John, 924-5012.

ELECTRIC WORK - licensed, insured, reasonable rates, no job too small, commercial or residential. 744-0722.

PLUMBING AND HEATING - Lab discount. John, 654-8189.

CLEANING SERVICE - office, home, apt., work by owners, free estimate, references. Ray, 732-4885 eves.

HOUSEKEEPER - Mon.-Thurs., excel. references. 369-1624.

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

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