BROOKHAVEN BULLETIN

Vol. 35 - No. 30 August 7, 1981

BROOKHAVEN NATIONAL LABORATORY

Doug Humphrey

Construction of the experimental area at 2 o'clock - the Small Angle Hall - provides a dramatic backdrop for Paul Mohn of the ISABELLE Construction Division as he describes the accelerator's progress to physicists participating in the ISABELLE Summer Workshop.

Looking Ahead To ISABELLE

"Physics is exciting precisely because there are unexplored new territories which are revealed when a new experimental domain opens before us," said Nobel laureate C.N. Yang, guest speaker at a banquet held at Berkner Hall on the last evening of the ISABELLE Summer Workshop. Yang went on to predict that "there is an overwhelming probability that ISABELLE will give us great excitement — perhaps more than has been discussed at this conference."

Many discussions during the two-week workshop, which ran from July 20 to 31, centered on how ISABELLE will be useful in testing theoretical predictions, including W and Z particles, Higgs mesons, technicolor, jets and grand unification. Most participants agreed that, even if ISABELLE starts with an energy of 350×350 GeV and a luminosity of 2×10^{31} cm^{-2} s^{-1}, it will not only be useful but will also be the accelerator of choice at which to conduct experiments aimed at finding these phenomena.

Some participants had recommendations for increasing ISABELLE's promise. In a lecture on "The ep Option," R.R. Wilson, first director of Fermilab who is now associated with Columbia University, suggested installing a third ring — an electron ring. He introduced his July 29th talk by saying, "Today is the marriage of a prince and princess. We propose to bring romance to ISABELLE with that king of the particles, the proton, and the queen of the particles, the electron."

Final suggestions were made on July 30 when the findings of the working groups were summarized. Charles Baltay, Columbia, speaking about "Large Detectors," discussed six unique designs already under consideration for ISABELLE. The report on "Experimental Areas" was presented by Robert Lanou, Brown University, who made recommendations regarding the most efficient use of ISABELLE's six experimental facilities.

The group discussing "Detector R&D" was represented by Bill Carithers, Lawrence Berkeley Laboratory. Referring to a high speed logic device developed at BNL for the MPS II (see Bulletin, June 5, 1981), Carithers said, "The electronics is so good and so cheap that you're no longer limited by the electronics — you're limited by the physics of the gases [used in the detectors]." Ling-Lie Chau presented the summary for the working group on "Physics." She, like Yang, emphasized that exciting things will probably happen that no one has yet envisaged.

At the closing session last Friday morning, Nobel laureate Samuel C.C. Ting delivered "Perspectives" on ISABELLE. Ting expressed high regard not only for the accelerator but also for BNL leadership. Noting, for example, that Nicholas Samios, deputy director for high energy physics, "is a physicist with important accomplishments," Ting said, "There are very few physicists I know who have done so much. This gives me confidence."

In his concluding remarks, Samios presented a view of the future of physics. "I think single event discoveries are a thing of the past," Samios said.

(Continued on page 3)

Benefits Improved

Because charges for medical treatment have risen very rapidly in recent years, effective August 1, 1981, the Laboratory's Group Medical Plan covering employees and their eligible dependents, has been improved:

• The Basic surgical benefit schedule has been increased by approximately 70 percent. The following are examples of old and new maximum amounts payable for selected surgical procedures:

	Old	New
Tonsillectomy (under age 18)	$105	$180
(18 years or over)	140	240
Appendectomy	280	480
Cesarean Section	350	600

As in the past, reasonable and customary charges in excess of those in the new schedule will continue to be covered under the Major Medical Plan (after satisfaction of the $100 deductible) at 80%.

• The basic benefit for medical care by doctors while you are confined in a hospital has been increased from $7 to $15 per day. The maximum payment will be for 31 days or $465. After satisfying the $100 deductible, excess charges will still be covered under the Major Medical Plan at 80%.

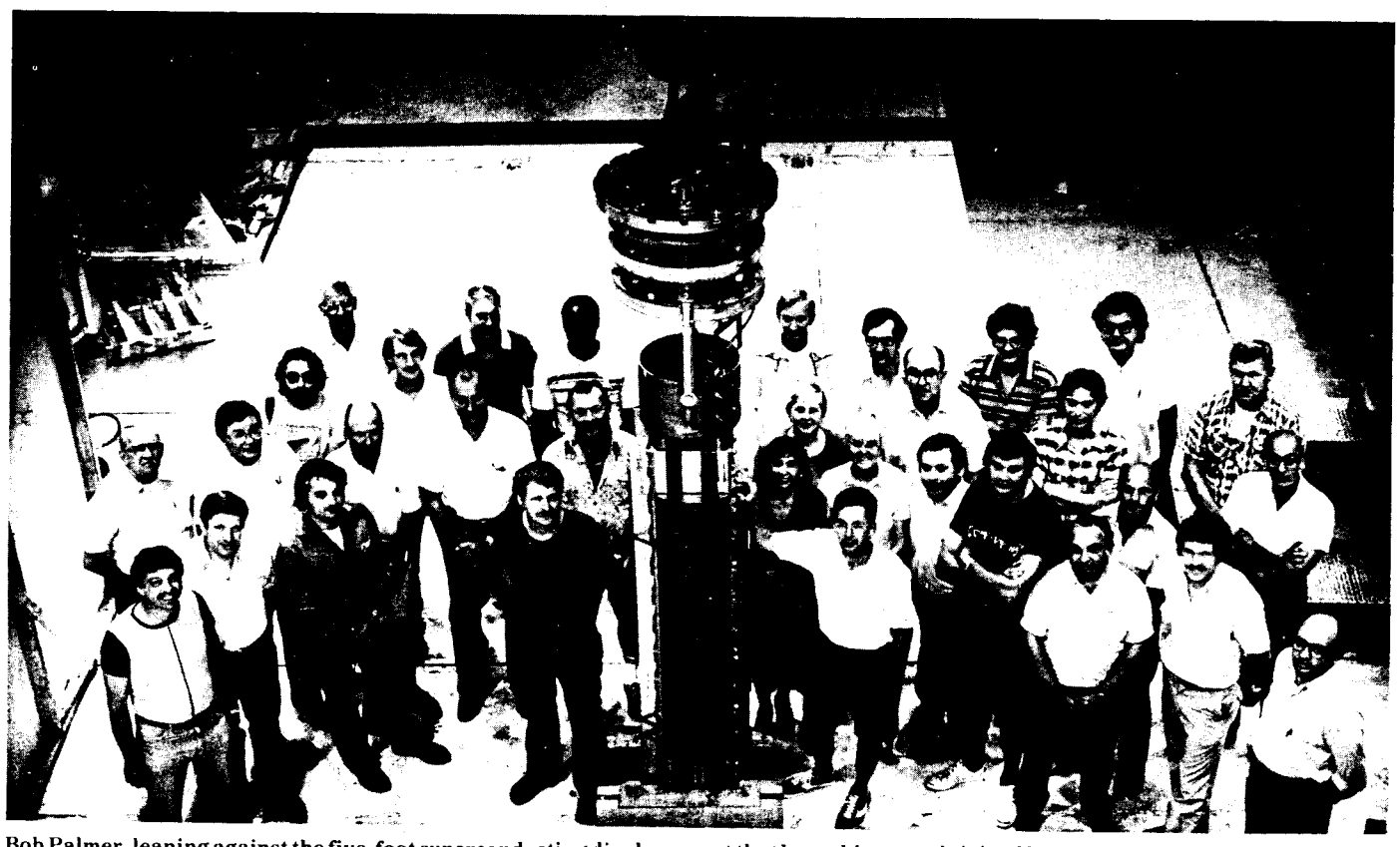
• Hospital charges for emergency room treatment of **injuries** have been paid in full as a basic benefit. Since emergency rooms are often overcrowded, and since many employees do not live near a hospital, emergency treatment of **injuries** at your doctor's office within 48 hours of the accident, will also be paid in full.

Contract Ratified

On Thursday, July 30, the members of IBEW Local 2230 ratified a new contract with AUI.

The principal provision of the two-year contract, which took effect August 1, 1981, calls for a 9% wage increase, plus a 1% skill differential for the Crafts in the first year. Negotiations will be reopened the second year for economic items only.

The union represents 586 employees in Plant Engineering, Central Shops, Photography and Graphic Arts, Supply and Materiel, Firefighters and Staff Services.



Mort Rosen

Bob Palmer, leaning against the five-foot superconducting dipole magnet that bears his name, is joined by others who helped make his idea a reality: (first row, from left) William DeCaro, Gerhard Redelberger, Joe Cracco, Oscar Renault, Rae Greenberg, Mona Vitale, Iuliu Stumer, David Rahm, Sal Morano, Joseph Pasciak, Al Roberts; (second row, from left) Joseph Scheliga, Jerry Mayman, Carl Goodzeit, Arty Rosenka, Erno Ostheimer, Helen LaSauce, Monty Montag, Robert Lorenz, Bill Dieffenbach, Albert Pinto; (third row, from left) Augie Hoffman, Tim Tuttle, Bill Lenz, Jr., Gene Kelly, Carl Gardner, Gene Hassell, Rick Fernow, Serban Protopopescu, Bill Sampson, Laurie Pollard. (See Update on page 2.)

Mort Rosen

Light machine shop, where parts are fabricated for experiments all over the Lab.

High Tech In The Machine Shop

Stepping through the double doorway of the hangar-sized building, the first thing you notice is sound — different pitches of whines, hums, drones and buzzes. Not loud, but incessant.

Even when Edward Harmer ushers you into his office, sounds drift in over the conversation. Harmer is supervisor of the light machine shop, Central Shops Division. He explains that 30 machinists, inspectors and services personnel work in that building. You don't doubt they are busy. The sounds of work wash over everything.

Harmer says at any given time, about 200 jobs are logged in the shop. That's not to say they start and finish 200 jobs a day, but it is the scale of business they handle. In a place like Brookhaven, where most of the research is at the far reaches of technology, much of the hardware required cannot be bought off the shelf. Instead, it must be fabricated from raw stock.

"Job requests first come to the main office," says Harmer, gesturing up a flight of stairs outside his door. "They usually come in the form of blueprints, but sometimes we get sketches, verbal instructions and even sign language." Harmer says the main office checks everything out, orders raw materials and outlines job procedures. The bulkier jobs are sent off to the heavy machine shop on Rochester Street, and anything requiring welding is done at another Central Shops building.

Down on the floor of the light machine shop, Harmer explains, each job is usually done as a team effort, requiring the use of several different machines. "Most of the people here are highly skilled at operating all the machines in the shop," he says. "We also have an apprenticeship program in which our people train beginning machinists who are usually hired by the division when they graduate."

Harmer says the shop has 53 machines, some conventional and some exotic. The numerical control machine is a true combination — it drills, bores, taps and mills, all on computer command. Programmer William De Caro, joining our shop tour, points out the newest one. "We call it a machining center because it can handle up to 20 different tools," says De Caro. "It even changes its own tools and lubricates its own work."

Harmer picks up a metal flange. "Look at the multitude of holes, all at different angles and locations. The job called for nine of these flanges. If we had done them manually, it would have taken several times as long," he says. "When a job is complex but repetitive, taking that extra step to write the program and use this kind of machine saves time and improves accuracy."

Weaving his way around men working on lathes, drill presses and grinders, Harmer heads toward another corner of the shop, where he wants to show off a machine that does such a fine job of cutting, it could split a salt crystal. Indeed, it is used to cut crystals, among other materials. And besides being able to shave slices off an object, slices as thin as eight thousandth of an inch, the machine can also cut out shapes like a cookie cutter.

How does it work? Its name, electrical discharge machine, gives it away. The EDM cuts by sending electricity through an electrode, similar to the way a spark plug works. Sparks coming off the electrode actually burn through the material; the electrode never touches it. Harmer says this cutting method does not damage or stress the material.

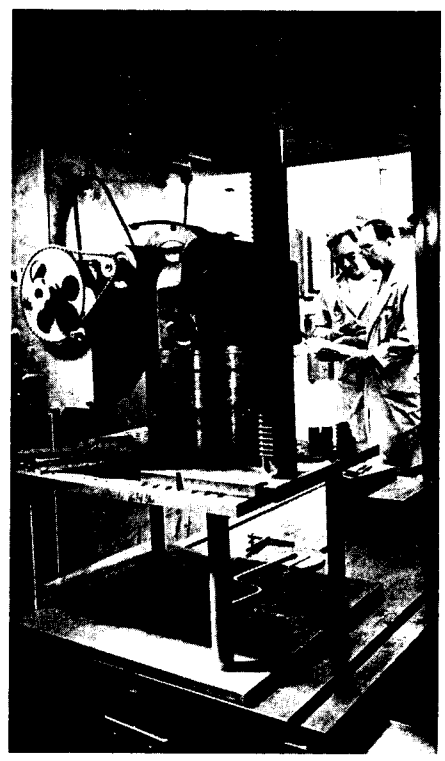
For straight cutting, the electrode can be a graphite or copper tungsten wire finer than a baby's hair. For cutting out a pattern, the electrode, commonly graphite, is first conventionally machined into the desired shape and then used like an interior template. Harmer says a skilled machinist in the shop can fashion an electrode into an infinite variety of shapes, whatever is required by the job. Realizing that words can't begin to describe the EDM's capabilities, he points to a display case that contains a sample of EDM work — a single edge razor which has been finely decorated by cut-out stars, triangles and other geometric patterns.

Moving on, the tour exits from the machine shop and jogs a block away to a nondescript building where the biggest piece of equipment had to be housed when it was added to the shop's array of machines about ten years ago. This one also has a giveaway name — electron beam welder.

"It welds exotic materials together by fusing them with high temperatures," says Harmer, who is talking about temperatures that can reach 11,000° F, roughly equivalent to the surface temperature of the sun.

Welding is done in a vacuum-sealed chamber large enough to accommodate an entire motorcycle. Aimed at the work, the electron beam flows though a filament similar to that found in a light bulb, and the strength of the beam can be modified from a low of 80,000 up to 150,000 volts, whatever is required by the thickness and type of materials being welded.

Back at the main building, Harmer concludes the tour by talking about the "bottom line" of the light machine shop — quality control. "Our inspection group uses computerized electronics to make sure the original blueprint has been followed. We also check dimensions of tolerance with an electronic scanner."



Mort Rosen

One of the more exotic machines in the shop is the electron beam welder. The vacuum chamber where materials are welded is large enough to accommodate a motorcycle. Richard Rozensky (left) is one of the machine's operators, and Eugen Johe is leadman.

Harmer says every job that comes out of the shop has been carefully fabricated from the beginning and thoroughly inspected at the end. "The only odd thing about this place is that we only make parts," he adds. "We rarely see where they all fit in."

— Mona S. Rowe

Update On Palmer Magnet

Further tests of the Palmer magnet were conducted recently with results as remarkable as those of the first test on July 27, when 5.35 tesla was achieved on the first quench. This field was well above the required 5 tesla even though the operating temperature was higher than that which ISABELLE will use.

On July 30, the magnet was tested at the correct temperature of 3.7° K to 3.8° K. Again, the five-foot superconducting dipole required no training to reach its new short sample limit. On its first quench, the magnet attained 5.85 tesla, thus assuring a very safe operating margin.

Testing also showed that the field quality was well under control and was maintained not only under all planned ISABELLE ramping, but even at rates 10 times faster.

Finally, tests were run to see if there was any danger of the magnet overheating when it accidentally quenches (turns itself off). Results indicated that the dipole could indeed absorb its own energy without damage. As physicist Bob Palmer summed it up, "The magnet was successful beyond all of our expectations."

About a year ago, Palmer first conceived of this magnet which would combine the use of twisted Rutherford cable with ISABELLE design specifications. This idea would build upon the groundwork already laid for the standard magnets, requiring relatively little redesigning or retooling. Further, it would benefit from a well-developed cable technology. Niobium-titanium cable has already been used successfully in hundreds of superconducting magnets at Fermilab.

In December 1980, Palmer received permission to build a five-foot dipole, and design began in January. The project, including testing, was completed one week ahead of schedule. For this, and for the magnet's success, Palmer credits "the tremendous amount of cooperation we got from everyone in Physics, at the ISABELLE project and in the shops."

When designing the magnet, Palmer's primary goal was to pay close attention to detail and consider every eventuality. Although he felt the group had done everything possible, he allowed for a small margin of error. Before the first test, Palmer said the magnet would be a real success if it reached 5 tesla in three quenches.

"To reach 5.3 tesla on the first quench was quite a shock," Palmer admitted. "To my knowledge, this is the first time anyone has ever made a superconducting magnet for accelerators that trained on the first quench —with the first magnet!"

Within the next few months, Palmer's group will build and test another five-foot magnet and a full-size dipole about 15 feet long.

Reports Available

The following reports are now available to the Laboratory staff and to affiliates of the DOE, AUI and NRC. Others may purchase the reports from the National Technical Information Service, U.S. Dept. of Commerce, 5285 Port Royal Rd., Springfield, VA 22161. Staff members should call Ext. 5068.

NUREG/CR-1879
BNL-NUREG-51322
Sensitivity of Risk Parameters to Human Errors in Reactor Safety Study for a PWR. R.E. Hall, P.K. Samanta, A.L. Swoboda

NUREG/CR-1880
BNL-NUREG-51323
Initial Quantification of Human Errors Associated with Reactor Safety System Components in Licensed Nuclear Power Plants. W.J. Luckas, Jr., R.E. Hall

BNL 51293
Flash Hydropyrolysis of Coal. Quarterly Report #12 January 1 - March 31, 1980. M. Steinberg, P. Fallon, B.L. Bhatt

NUREG/CR-1901
BNL-NUREG-51333
Review and Evaluation of System Interactions Methods. A.J. Buslik, I.A. Papazoglou, R.A. Bari

BNL 51079
Validation of the Materials — Process-Product Model (COAL SNG). A. Albanese, N. Bhagat, L. Friend, J. Lamontagne, R. Pouder, G. Vinjamuri

BNL 51196
Issues in the Use of Wood as an Energy Source in the Northeastern U.S. J.S. Munson

NUREG/CR-1688
NUREG-51205
A Comparison of Regional Screening Methods. B.F. Hobbs, M.D. Rowe

NUREG/CR-1689
NUREG-51206a
An Assessment of Nuclear Power Plant Siting Methods. M.D. Rowe, B.F. Hobbs, B.L. Pierce, P.M. Meier

BNL 51285
An Approach to Market Penetration Analysis for Advanced Electric Power Generation Technologies. J. Lamontagne, P. Love, A. Queirolo

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Letters To The Editor

To The Editor:

I am a professor of Biology at Villanova University, and I have recently finished my second sabbatical leave at BNL. In 1963, I learned liquid scintillation spectrometry. This year, I learned the basic techniques of plant electron microscopy from Dr. Myron Ledbetter of the Biology Department, who is a recognized authority in that field. Our association was very fruitful. Shortly before my departure the big question of my research project was answered by the transmission electron microscope. Our examination of my first thin sections showed that the mysterious plastids I had seen under the light microscope in sections of *Xanthium* (cocklebur) petioles were actually chloroplasts.

Outside of the Biology Department, BNL people were also helpful. For example, because of medical reasons, I could not drive. When I could not get other transportation to and from Biology, the Transportation Department helped me out.

On weekends, I commuted by train to Willow Grove, Pa., having my first experience with the Long Island trains. It wasn't bad. They get you to Penn Station mostly on time. A great help was the free transportation BNL provided to visiting scientists. It was really a joyful moment, after stepping down from the LIRR train at Patchogue, to hear a cheerful driver ask, "Are you going to BNL?" This made a stranger feel much less lonesome.

I plan to come back to BNL in the summer of 1982 to finish up my research. But I wanted to thank you all for a great summer this year.

— Roman Maksymowych

Doings On L.I.

The Long Island Guide, a potpourri of places to go and things to do, is available in limited supply in the Public Relations Office, Bldg. 134 A (Ext. 2345). Summer visitors and newcomers will be especially interested in the wealth of information provided by the guide, which was prepared by Newsday.

Looking Ahead (Cont'd)

"Physics at ISABELLE will be very different. It will be produced in great abundance, but detectors will be very important to sort it out. One strength of ISABELLE is that it does provide for a wide variety of physics, but you have to be clever."

On the lighter side, the Thursday night banquet gave the physicists a chance to bestow awards. Some recipients were honored with the conference's popular ISABELLE frisbees and/or T-shirts. Others received citations. The *Detector R&D Science and Society Award* went to Bruce Gibbard and Eric Siskind for "estimating that the information recorded in one month by a large ISABELLE detector will exceed in volume the entire data base of the Internal Revenue Service."

— Anita Cohen

NYC Train Trip

The Hospitality Committee is planning a group railroad trip to the city on Wednesday, August 19. Departure will be at 7:55 a.m. from the Patchogue LIRR station. Round-trip fare for adults is $3.50, children under six years ride free.

Reserve a ticket by sending your fare through the U.S. mail to P.O. Box 322, Upton, New York 11973, no later than *Thursday*, August 13. Make checks payable to "Brookhaven National Laboratory." Your tickets will be given to you on the train. Refunds will be made only if cancellations are received by the *Friday* preceding the scheduled trip.

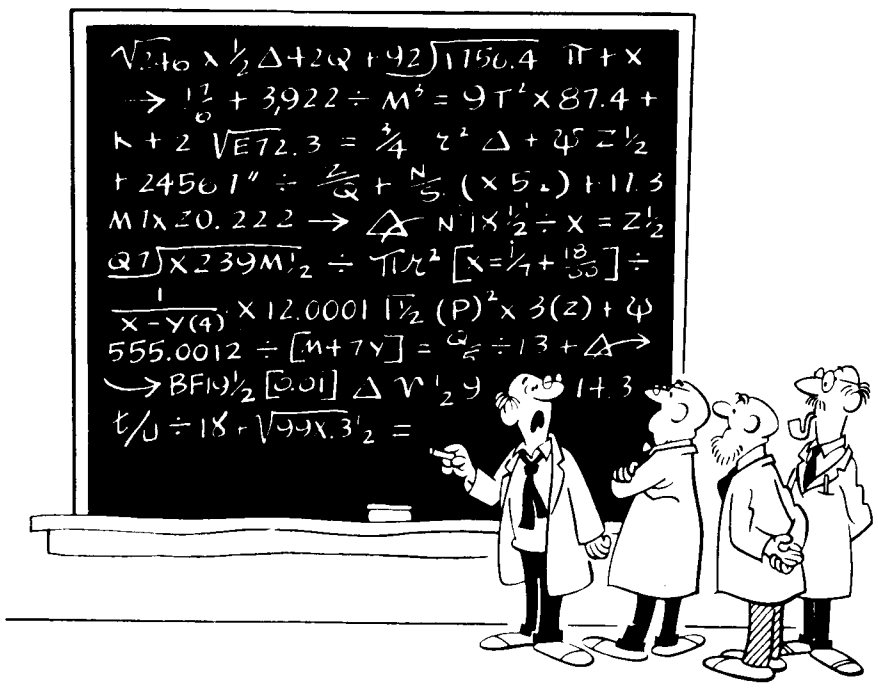
Aviation Club

The BNL Aviation Club will sponsor a sailplane exhibit on Tuesday, August 11 in Room B, Berkner Hall from 10:30 a.m. to 2 p.m. This sailplane, which is a Phoebus B, has a glide ratio of 37 to 1, which means that from one mile of altitude it can glide 37 miles in still air. It has a wing span of almost 50 feet and will just barely fit in the room.

The club will hold its next meeting in Room B, at noon, on the day of the sailplane exhibit. Plans for trips to Martha's Vineyard and Atlantic City will be discussed. New members and guests are welcome. For more information, call Ron Dobert, Ext. 7101 or Ed Schwaner, Ext. 4846.

WIS Meeting

The Women in Science will meet at noon on Tuesday, August 11, in Room A, Berkner Hall. Reports from the various committees and the proposed slate of candidates for next year's officers will be presented. Bring your own lunch.



"Of course, if the dealer blackjacks, forget the whole thing."

Tune In!

The recent announcement about the CHPS alternative coverage mentions that AUI subsidizes the CHPS cost by paying the same premium it currently pays for the AUI plan. Since the AUI plan involves a self-insurance arrangement under which AUI pays the costs incurred plus a fee to Connecticut General to administer the plan, how does AUI reference a "premium?" What is the "premium" for the CHPS coverage and what is the "premium" paid under the AUI plan?

Answer:

In response to your recent Tune In letter, even though the AUI Medical Plan is technically a self-insurance arrangement under which AUI pays the full cost (including a fee to Connecticut General to administer the plan), monthly premium amounts for individual employees and family coverage are still required.

Annually, Connecticut General actuarilly estimates what premium amounts should be to cover claim and other plan costs. This total annual premium amount (based on the active number of employees with individual and family coverage for the year) determines a "stop loss" point for AUI. Should the plan's claims and other costs exceed this amount, Connecticut General will assume liability and pay claim costs for the rest of the year.

Connecticut General's deficit would be recouped by increasing premiums in the following year. This arrangement protects AUI's cash flow should one year's claims cost expense be unusually high.

For your information the monthly premiums, effective August 1981, for the CHPS and the AUI Plans are as follows:

	Individual	Family
CHPS	$51.86	$125.92
AUI	$52.27	$133.45

— Richard B. Schonberg
Compensation & Benefits Manager

Soul Food Picnic
Saturday, August 15
Info — Ext. 3316

Softball

Scores for Week of July 27:

League I

All games are double headers
First Game:
Ravens 32 — Source I 21
Roy D'Alsace had 2 homers and Wayne Rambo had 1 homer for Source.
Six Pax 8 — Phoubars 7
Second Game:
Ravens 13 — Source I 3
Phoubars 21 — Six Pax 5

League II

Big Sticks 28 — Cardinals 16
Deegenerates 15 — Moles 11
Roga 9 — AMD Bombers 1

League III

Ice Pops 29 — Lights Out 8
The Forties 14 — Nuke Powers 11
Magnuts 14 — Medical 6
Dirty Sox 20 — Binary Bombers 13
Electric Co — bye

League IV

Nads 7 — Random Sample 6
E-Z Riders 11 — Balls & Strikes 2
Good home run hit by Dr. Feelgood.
Turkeys (won) — Survivors (forfeited)
TNT vs Thrids
No results received.

League V

Who's On First 24 — Mudville Sluggers 11
Tony Fainberg had a home run, Billy Rabitin made a home run and the final play at home plate.
Underalls 13 — Source III 7
No Names 8 — Solar Power 7
No Names 16 — Who's On First 6
Mole-Esters (won) —
Solar Power (forfeited)
Mudville Sluggers 17 — Who Cares 12

Arrivals & Departures

Arrivals

Cecil E. Ayres ..... Plant Engrg.
Richard Chernis ..... Central Shops
Alfred J. Cordero ..... Plant Engrg.
Mark K. Culp ..... Plant Engrg.
Saswati D. Ghosh ..... Chemistry
James A. Harper ..... Medical
Peter F. Stelmaschuk .... Plant Engrg.
Philip K. Williams ..... Director's Ofc.

Departures

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

Pradeep Chandra ..... Medical
Edward A. Deutsch ..... Medical
Avraham Gal ..... Physics
Steven O. Howe ..... Nuclear Energy
Donald F. Koenig ..... Biology
Andres J. Kreiner ..... Physics
Michael A. Meyer ..... Medical
Joyce O. Mortimer ..... App. Math.
Marian Strzelczyk ..... Physics
Nancy J. Swezey ..... Saf. & Env. Prot.
William A. Tuthill ..... Energy & Env.
Walter H. Wild ..... Plant Engrg.
W. Carey Wilson ..... App. Math.
Hagai Zmora ..... Chemistry

Missing Volume

The following reference book is missing from the Research Library. The person who has it is asked to return it to the reference section as soon as possible.

REF QD151 Comprehensive Inorganic Chemistry
Editor, J.C. Bailar

Bowling

Recruiting continues for bowlers. There are still some openings in the various leagues. If you are interested in bowling, even as a substitute, and would like more information, contact Helen Keeley, Ext. 4649, Betty Jellett, Ext. 3631, or Charlie Bohnenblusch, Ext. 4758.

Cafeteria Menu

Week Ending August 14, 1981

Monday, August 10		
Cream of tomato soup	(cup)	.55
	(bowl)	.65
Sauerbraten & potato pancakes		1.65
Sauteed chicken breast on rice		1.65
Hot Deli — Grilled Reuben		1.70
Tuesday, August 11		
Cream of cauliflower	(cup)	.55
	(bowl)	.65
Shrimp Sukiyaki on rice		1.65
Beef hash & 1 veg.		1.55
Hot Deli — Veal pattie & pepper hero		1.60
Wednesday, August 12		
Split pea soup	(cup)	.55
	(bowl)	.65
Meatloaf & 1 veg.		1.55
Spaghetti & meatballs		1.55
Hot Deli — Clam boat		1.70
Thursday, August 13		
Beef barley soup	(cup)	.55
	(bowl)	.65
Meat cakes & onions w/1 veg.		1.60
Barbecued chicken & 1 veg.		1.55
Hot Deli — Roast beef	(on bread)	1.65
	(on roll)	1.75
Friday, August 14		
Clam & celery bisque	(cup)	.60
	(bowl)	.70
Tuna noodle casserole		1.60
Beef chili over rice		1.55
Hot Deli — Breaded fish filet hero		1.65

Camping Club

Come join us on the weekend of August 14 - 16 at the BNL campground. See what you are missing. French toast breakfast on Saturday; sports and swimming all weekend.

Motorcycle Club

The Motorcycle Club will meet on Monday, August 10, at 5:15 p.m. in the Recreation Building. Bring your ideas for another group ride after work.

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.

The determination of the best-qualified candidate for available positions will be based upon education, experience and other job-related criteria. Such factors will be evaluated and measured against the demonstrable requirements of the available vacancy, as well as the Laboratory's Affirmative Action objectives.

The Laboratory is committed to a policy of Equal Opportunity in its selection and placement of personnel. Its objective is equality of opportunity in employment, training, and promotion without regard to race, color, religion, national origin, sex or handicap.

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, as indicated below. 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.

1603. SECRETARIAL POSITION - Requires an AAS degree in secretarial science or equivalent experience. Wide range of duties include secretarial functions as well as establishing and maintaining files and record systems, handling contacts, arrangements and problems, both within the Laboratory and with outside agencies. Requires excellent communication skills as well as excellent typing skills. Department of Energy and Environment.

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

1604. SENIOR STATIONARY ENGINEER - Requires demonstrated experience in the maintenance, repair and operation of high pressure boilers firing #6 fuel oil. Current stationary or marine engineer license is highly desirable. Plant Engineering Division.

1605. RESEARCH ENGINEER - Requires an MS in nuclear or mechanical engineering. Demonstrated experience with thermal hydraulic systems and controls in light water reactors, especially boiling water reactors, is essential. Previous experience in computer evaluation and interpretation of the effects of safety systems during plant transients is desirable. Responsibilities will include assembly and verification of data for thermal hydraulic analysis and modelling of reactor plant transients. Department of Nuclear Energy.

1606. BIOLOGY ASSOCIATE - Requires a BS in biology, biochemistry or molecular biology. Knowledge of sterile technique and coursework biochemistry is required and experience with enzyme assays is desirable. Will be responsible for preparing and characterizing radioactive bacteriophage DNA. Biology Department.

1607. 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.

1608. HEALTH PHYSICS ASSOCIATE (2 openings) - Requires MS and relevant experience or Ph.D. in health physics or an allied field, or equivalent background. Will perform radiological engineering for a wide variety of projects of the Operational Health Physics Group. Should have strong analytical skills. Knowledge of ALARA practices is desirable. Safety and Environmental Protection Division.

1609. TECHNICIAN POSITION - Requires AAS degree or equivalent experience in electronic technology to operate and maintain the Tandem Van de Graaff accelerators and associated equipment. Should have background in complex electronic, electro-mechanical and mechanical equipment including some exposure to vacuum systems. Rotating shift schedule. Physics Department.

1610. BIOLOGY ASSOCIATE — Requires BS in biophysics or equivalent background. Also requires previous experience in basic biochemical procedures and protein crystallography plus knowledge of computer programming (FORTRAN) and computer operations. Will perform basic biochemical procedures, computer programming and operations, and maintain scientific reprint file.

Autos & Auto Supplies

80 TRIUMPH TR7 - white conv., 17,000 mi, forced to sell. $8,500. J. Klein, Ext. 4018; also 1980 Moped Puch, 200 mi, incl. Helmet & tools. $490. Klein, Ext. 2294 or 298-8805.

327 HEADS - milled fits Chev. small block triple cut valves. $30. Both. Joe, Ext. 2022.

74 CHEVY NOVA - Hatchback V8, 36K miles, excel cond. F. Miller, 589-5980 after 6 p.m.

RIMS - (2) Caddilac 15x6 like new. $10. 732-6266.

70 HARLEY DAVIDSON - Police Model stock, bags, lamps, new tires, rebuilt heads. $3,795. Ext. 3533 or 654-2076.

66 BRONCO - drivetrain w/transfer case; 1973 Vega GT drivetrain, both running cond. 744-3968 after 6 p.m.

65 JEEP - w/cap & plow. $1,200. Bud, 281-2289 after 5 p.m.

79 YAMAHA - 650 Special, mint, black w/extras, 2,800 mi. $1,850. Jim, 475-0939.

78 HONDA TWINSTAR - 6500 mi., 70 MPG, 2 Bell helmets, excel cond. $750. 728-3874.

74 MUSTANG GHIA - V6, air cond, stereo, 25 MPG, 70,000 mi, new radials, no rust. Asking $2,200. Debi, Ext. 2210

72 DODGE COLT PARTS - wheels to differential, reasonable. 732-3338.

76 HONDA CB360 - Windshield, crash bar, new battery, luggage rack, sissy bar & more extras. $895. 281-8274.

71 PLYMOUTH SATELLITE - hi mileage, mechanically sound, make offer. 727-0305.

77 FIAT X19 - very good cond. $4,000. 744-3899.

78 HONDA HAWK II - 400cc, excel cond, low mi., new extras, must see. $1,450. Ext. 2926 or 281-0268.

67 FORD 250 - 4x4 snow plow, 1200x16x5 tires, snow tires. Clean. $1,650. Walt, Ext. 5385.

69 VW BUG - in rebuilt engine, mechanically excel. Call Mani before 10 p.m. wkdays eves, wkend. 246-9165; Ext. 3773.

80 YAMAHA - 400 Spec. Mag-wheels elec/k/strt, blck/chrm, 63 MPG, 6 spd, 2 helmets, low mi., mirrors, excel cond. $1,400. 281-3342 after 6 p.m.

76 PINTO - 4 cyl, a/t, excel cond, good MPG. $1,300. Ext. 7561/4290 or 282-3233 eves.

70 T-BIRD - $1,500. Gary, 727-3047.

75 AUDI - 4 dr. Sedan, a/t, am/fm, a/c, sunroof, good cond. Ext. 4278.

74 HONDA - 750cc motorcycle, custom tank, seat, extended fork, paint, pinstriping, extras, showroom cond. $1,400. Daniel, 665-7895.

75 CADILLAC - Coup de Ville. $1,750. 331-1718.

78 NOVA - custom 6 cyl, 4 dr, a/c, p/s, p/b, new tires, 39K mi. $3,650. Steve, Ext. 4615.

TIRES - (2) LR70-15, 7 ply radials on Chevy rims. $45; tailgate & bumper (rear) for Chev. C-10 pick up. Jim, Ext. 4040 or 289-0876.

72 HONDA CL100 - rebuilt engine on/off road, needs lights & mirrors. $175. Dan, Ext. 2556 or 744-6148.

TIRE - radial 14" needs plug, $10; snap rims 14" for Buick (3) $5. ea. Ext. 4763.

67 CHEVY NOVA - 4 dr. good body & engine, 6 cly, new battery, brakes, radiator Regen. $420. Ext. 4845 or 282-3186.

61 CHEVY IMPALA - conv. 40K mi. on rebuilt 6 cly, manual 3 spd, new tires. $1500. Roger, Ext. 2384.

69 BUICK SKYLARK - low mi., std. trans, new battery. $200. Sharon, Ext. 2835.

72 FORD WAGON - runs well, rebuilt engine. Make me an offer I can't refuse. 331-2807.

65 PLYMOUTH BARRACUDA - V8, high mileage, runs very good. $350. or best offer Piero, Ext. 4396.

80 KAWASAKI - 440 LTD. $1,350. Russ or Renee, 433-3546.

20' CORSAIR TRAVEL TRAILER - many extras, excel cond. $2,500. C. Barrett, Ext. 4551 or 325-0013 eves.

RIMS - 14" Ford, hubcaps, H78x14 snows, 14" Plymouth or Dodge rims. Morris, Ext. 4192.

74 HONDA - 450cc. $450. Roger, Ext. 2384.

73 VW - Sq. Back, s/t, mechanically sound, very reliable transp., new radial tires. $1,950. Tom, Ext. 3535.

72 VOLVO - excel. cond. 399-0969 or 669-0224.

Boats & Marine Supplies

ALUMINUM BOAT - w/floatation, $225. Negotiable. Ext. 7148 or 363-2522 after 6 p.m.

20' GARVEY - 1979 glassed self bailing deck, no engine. Tom, 286-9659.

1981 MERCURY - 4.5 HP long shaft, brand new, no hours. Transferable Warranty. w/tank & prop. $550. Dan, Ext. 2556 or 744-6148.

Miscellaneous

POOL - childrens wading, 10' dia., 2' high, good cond, new liner, cover. $20; headboard, twin size, wood. $10. 286-2788.

FREEZER - Kenmore, mint cond, used 1 season only, 23 cu. ft. $400. G. Ince, Ext. 3786.

DEN SET - sofa & love seat, pine wood arms. $300; Contemp. Colonial triple dresser, 2 nite tables, amwoir, 2 twin beds, dark walnut. $300. Diane, 878-1630.

ICE CREAM MAKER - RCW 5 qt., like new, $20; child's car seat, excel cond, $15; 3 infant seats, $5. ea; wooden crib w/mattress, good cond. $20. Ext. 4084 or 878-1060.

ANTIQUE - Dining Room set, 9 pc. walnut, good cond, Pineapple leg, $1,250; Picnic table, 2x6 construction, good cond, coverts to park benches. $45. 928-8224.

LAWN SPREADERS - (3) all w/operational manuals. Scotts automatic s/s, like new, $40; Ortho Whirlybird hand spreader, like new, $6; Cyclone Broadcast rotary type, good cond. $20. 286-0379.

DOBERMAN - 1 yr. old w/papers. Call Bud 281-2289 after 5 p.m.

PRESSURE COOKER - 4 qt. brand new, $20. Ext. 3431 or 744-9677.

STANDARD POODLE - white male, 6 mos. old, good w/children. $75. 281-2471 or Ext. 5152.

LAWN MOWER - 4 HP self propelled, paid $350. Asking $175. Ask for Oscar anytime 281-5853.

BOWLING BALL - approx. 16 lbs., $4; tire w/rim 750-14, $10; dice game, $4. Susan, Ext. 4267.

DOUBLE WALL OVEN - stainless stell, 1 coil needs replacement, $10. D. Gurinsky, Ext. 3504 or 878-1013.

STROLLER - Perego folding, blue velour w/hood. $35. Louisa, Ext. 4207 or 286-2251.

POTTERS KICK WHEEL - all oak frame, extras. $150. Takes it. 698-5555 or 289-3917 eves. Carol.

COMPUTER - Apple II plus 48K, perfect, hardly used, 2 disk drives, Epsom Mx80 printer, DC Hayes. $3,500. Cost new $6,000. 928-1020.

SB400 TRANSMITTER - w/RF speech processor, new tubes, excel DX record, perfect cond. Ext. 3311.

OFFICE DESK - 30"x60" and upholstered swivel chair, good cond. Millie, 281-9172.

BOW HUNTERS - Compound bow-case, felt lined zippered, $15; 10' rope-ladder for tree stand. $15. Stan, Ext. 3284 or 286-1062.

PUPPIES - Free - mother Labrador/shepherd. Ext. 3805 or 981-5993.

POP UP - and alum. boat 12' $125. Popup all canvas. Cox Easy tow. $400. Ext. 2964.

LAFAYETTE - 180 watt reciever, 2 Criterian 3003 speaker, turntable w/sure cartridge. Sacrifice. $600. Gary, 399-6414.

WASHER/DRYER - G.E. portable white, excel cond. $250. Peter, Ext. 4272 or 698-3822 eves.

DISHWASHER - GE recently rebuilt. You pick up. FREE. Dick, Ext. 2911.

MARIGOLD PLANTS - mixed colors $1,10/doz. Bill Stars, Ext. 4278 or 298-9648 eves.

VENDING MACHINES - for 1"x2"x5" size item. Sacrifice. Will consider any offer 924-3066.

INTERIOR DOOR - w/steel frame. 3' wide. $20. Ext. 7154.

POOL - 12'x4' above ground, $30. E. Edwards, Ext. 4027 or 286-1121.

BIKE - ladies 3 spd excel cond, $60; stair carpet 24'x2', gold. $10. Tom, Ext. 3128.

POOL LADDER - stainless tubular type, 3 white steps for in ground pool or deck mounting, like new. $45. Jim, Ext. 4040 or 289-0876.

SHOP VAC - Sears wet & dry, largest sz., $60; Sears heavy duty ping pong table, good cond. $50. Annamarie, Ex.t 2352 or 473-9016 after 5:30.

BICYCLE - girl's 10 spd. Schwinn, yellow, like new. $100. 475-2629.

RCA - Color TV 23" console (rounded corner P.T.) 1½ yr. old, picture tube works well. $65. 744-9822.

ADOPT - Golden Retriever mix puppy female, beautiful & intelligent 7 wks. old. 585-4741.

DEER HUNTERS - Slim-Jim tree stand complete w/safety belt, hand climber, fold down seat, etc. $50. Stan, Ext. 3284 or 286-1062.

FREE, BELGIAN SHEPHERD - beautiful female, 1 yr. old, trained, affectionate, smart. Janet Tempel, Ext. 4049 or 744-8087.

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

SHOREHAM - 2 story, 4 bdrm Clarendon Colonial, 2 baths, living room w/fp, d/r, dinette, kitchen & mudroom w/2 stall garage on .45 acre corner lot. Deeded beach rights. 744-2766.

MIDDLE ISLAND - 4 bdrms, 2½ bath Colonial, fenced ½ acre, fruit trees, landscaped, eik, d/r, l/r, fp in den, all appliances, fully insulated, close to shopping, assumable 8% mortgage, excel cond. $45,000. 924-7148.

SETAUKET - Strongs Neck. immac. 3 bdrm ranch, ¾ acre, eik, d/r with bay window overlooking priv. yard, l/r with fp, screened porch, garage, bsmt w/separate heat, walk to priv. beach, 8½% assumable. $90,000. Ext. 3088 or 689-8095 after 6:30.

SHOREHAM VILLAGE - custom ranch, 3 bdrms, 2 baths, fam. rm, w/fp, d/r, l/r, gourmet kitchen, 2 car o/s garage, 0.8 acre, w/w throughout, new oil burner, good financing. Walk to priv. beach, tennis, club. 821-0890 after 5:30.

SOUND BEACH - 3 bdrm ranch on ¼ acre corner property, fenced, patio, full bsmt, taxes $1600. Possible hold 2nd mortgage. $33,500. 744-6148 eves.

For Rent

N. PATCHOGUE - air cond, 2½ room apt, priv. entr., 11 miles from Lab, furnished and cablevision TV. $290/mo. pays all. Single only and no pets. Carol, days, 698-5555 or 289-3917 eves.

YAPHANK - 5 room modern duplex apt, 3 miles from BNL, l/r, d/r, kitchen, 2 bdrms, full bsmt and patio. $425/mo. 1 month security, includes heat and water. 581-2909.

MEDFORD E. - LIE exit 66, 2 floor, 3 bdrm, w/w, washer, dryer, 1½ baths, wood stove, 2 zone oil heat, unfurnished. $550/mo. 914-576/1905.

BELLPORT VILLAGE - 3 bdrms, 1½ baths, hi-ranch, eik, den, family room, deck, screened-in-porch, attached 2 car garage. $500/mo. 286-9310 eves and wkends.

ROCKY POINT - 1 bdrm w/fp, 1 block from beach, 15 min. from Lab. $245/mo. plus util. 744-9032 or 212-833-1186.

WADING RIVER - very large furnished room on separate floor of quiet house. One block priv. beach and Wildwood Park. Avail. immediately for 1 or 2 months. 10 miles to Lab. $175/mo. includes all. 929-4180 before 10 p.m.

BELLPORT - 2 story, 4 bdrms, study, 3 baths, full attic, bsmt, 2 screen porches, brick patio, fenced backyard, 2 car garage, 0.8 acre. $550/mo. Available Sept. 1st. 286-0851.

WATERFRONT WADING RIVER - cliff house, rustic, charming. Sleeping loft, stone fp, 4 appliances, furnished or unfurn. Sept. 7th thru June. $325/mo. 929-8165.

Wanted

HOUSESITTER - Sept. 17 to Oct. 5th. No pets. Few plants. References. Ext. 4077.

METRONOME - good cond. Reasonable price. G. Ince. Ext. 3786.

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

PING PONG TABLE - in good cond. Reasonably priced. Ext. 4660.

APT. - unfurn. 2 bdrms. Westhampton or Southampton area. 283-6437 eves.

PARTS - for '62 Chevy full size body, mech. and glass. Reasonable. Joe, Ext. 2556.

SMALL COFFEE MILL - or grinder. Ext. 4240 or 286-0295.

TENNIS PARTNER - beginner (female) living in East Moriches area to play on court behind my house. Linda, Ext. 3632 or 878-8491.

COMPRESSOR - used, but good working. Joe, Ext. 2556.

RUDDER - and centerboard for Sunfish 1970 Model. Dick, Ext. 3636.

TEMPORARY HOME - for neutered 3 yr. old cat. Fee will be offered to the appropriate home. Ext. 3592.

EVINRUDE PROP - 13x19 or 13x21 and retaining nut for 1979 140 hp engine. Ext. 2482.

ROOMMATE - 3 bdrm. apt. 7 miles from Lab, Sept. 1st. $150/mo. Bob, Ext. 3905/3992.

GOLF CLUBS - women's starter set. Jay Adams, Ext, 4994 or 732-5641.

DRUMMER - to play w/Polish American Band. Dick, 722-3251 after 6 p.m.

WHEEL CHAIR - used, lightweight. Reasonable. Fran, Ext. 2979.

LATHE JEWELERS - clocks, watches, watch clock maker tools. George, Ext. 3536.

GLASS FIREPLACE DOORS - to fit 27"hx35"w opening. Walt, Ext. 7154.

RIDER(S) - to Cleveland/Detroit/Ann Arbor. Aug. 21st. Share gas and driving. Ext. 4360.

APARTMENT - Sayville area. Female BNL employee. Ext. 3341 or 281-3567 after 5:30.

REFRIG - and stove, any working cond. Steve, Ext. 5213.

WHEELBARROW - construction type. Reasonable. Dan, Ext. 2556 or 744-6148.

BOX SPRING - twin size, good cond. Reasonable. Paul, Ext. 4665 or 727-4859.

ROOM - for single person in an apt. or house starting Sept. 1st. Pushpito, Ext. 4360 or 928-5761 eves.

Car Pools

SOUTHAMPTON - riders/drivers needed. Linda, Ext. 4478.

FROM PATCHOGUE VIA BELLPORT - 9 yr. old car pool, on-time, has vacancy for paying rider starting 8/17. Alyce, Ext. 2901.

Lost & Found

LOST - heavy duty Jumper cables on 7/30 in parking lot near 902. Conrad, Ext. 4754.

LOST - eyeglasses w/plastic redish/pink frames and light pink tint. 665-6366.

LOST - 12" steel scale; Starrett, 10ths-100ths, 32 nds-64ths. NSLS area. Arnold, Ext. 4973.

Services

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

SANDBLASTING - chassis trailers, headers, boxes etc. Any kind equipment metal. Reasonable rates. 744-3968 after 4 p.m.

RIDING LESSONS - Beginners thru advanced, also dressage. Semi and private. $10/hr. Your home or in Yaphank. Renee, 924-6992.

BABYSITTING - reliable mother w/playmate, wkdays, my home, any age, Coram area. Joan, 732-1610.

FIRESIDE CHIMNEY SWEEPS - all types of flues. Only $30 through August 31st. Insured. Dustless removal. Bill, 584-6425.

MOTORCYCLE REPAIR - tuneups, brakes, flats, wheel lacing and truing engine work, etc. Kevin, 281-8031.

SIGHT SEEING FLIGHTS - aerial photogr., Long Island, Conn., New York, modern all weather aircraft. 929-6148 day or eves.

LIMO SERVICE - luxury chauffeur driven for Weds, Proms, all occasions. Call Ray, Ext. 4664 or 744-8779.

HOUSE RENOVATION - work done. Interior/Exterior. Good references. Free estimates. Very reasonable. 929-4180 before 10 p.m.

BABYSITTING - mother w/babysitting experience, and references will sit in my home. Reasonable 751-5539.

ABOVE/IN-GROUND POOL INSTALLATIONS - and repairs, insured, licensed. Work guaranteed. Pat, 363-2497.

EXTERMINATING - all kinds. $22.95 and up. 281-7798.

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