BROOKHAVEN BULLETIN

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BROOKHAVEN NATIONAL LABORATORY

How Disinfectants Disinfect: Chlorine and Ozone vs. Rotaviruses

Rotaviruses, first isolated in 1976, are a leading cause of acute, non-bacterial gastroenteritis, an intestinal inflammation, in children and adults. They do not readily attach to sludge solids produced in sewage treatment plants and septic systems and are stable in water. Therefore, rotaviruses are released in sewage effluent and septic leachate, and may become the cause of outbreaks of waterborne gastroenteritis.

Since the 1920's, chlorine has been used in the U.S. to disinfect drinking water and sewage, and ozone has been used in Europe and Canada for the same purpose since the late 1950's. The viricidal effect of these disinfectants was incidental, as they were selected because of their bacteria-killing ability. Virologist James Vaughn, DAS, has conducted the first study, funded by the Environmental Protection Agency, of the mechanism by which chlorine and ozone inactivate rotaviruses.

Vaughn, head of DAS's virology program, began studying intestinal viruses as a graduate student at the University of New Hampshire and continued this work when he arrived at BNL in 1974. He has assessed human virus occurrence in the Long Island Sound and its shellfish, in Long Island groundwater and in New York City drinking water.

Most enteric viruses consist of a protein coat surrounding a single strand nucleic acid core, but rotaviruses are unusual because they have two protein coats and a double strand nucleic acid, in this case RNA. Once the outer coat is damaged, the virus cannot attach to its host; if it can't attach, it can't infect. Vaughn set out to find if rotaviruses were more resistant to chlorine and ozone than single coated viruses such as the ones responsible for polio.

In the lab, Vaughn and associates Yu-Shiaw Chen Hsieh, McHarrell Thomas and Lois Baranosky reacted single particle suspensions of purified human and monkey rotaviruses with chlorine and ozone. They found that rotaviruses are rapidly inactivated by these disinfectants — inactivated much faster than other enteric viruses like polio. They also proved that the simian rotavirus, which has been used as a model for the human rotavirus since it is easier to grow in culture, is indeed a viable model because its response does not significantly differ from that of the human virus.

"Our lab inactivation studies were not meant to mimic what goes on in a drinking water or sewage treatment plant," explains Vaughn. "There, inactivation would take significantly longer because the virus particles aggregate with each other, organic matter and particulate. More important than inactivation times, our study looked at the physical effects of chlorine and ozone on rotavirus."

Using gel electrophoresis, a technique for separating molecules by electric charge, the collaborators placed protein coats and RNAs of human and simian rotaviruses on gels and found that they separated into eight and eleven molecular bands, respectively. After treatment with chlorine, the protein bands shifted in the gel, indicating increases in molecular weight, and also showed loss of material. "All previous studies with enteric viruses had indicated that there was no interaction between chlorine and viral protein," says Vaugh.

Peter Horton

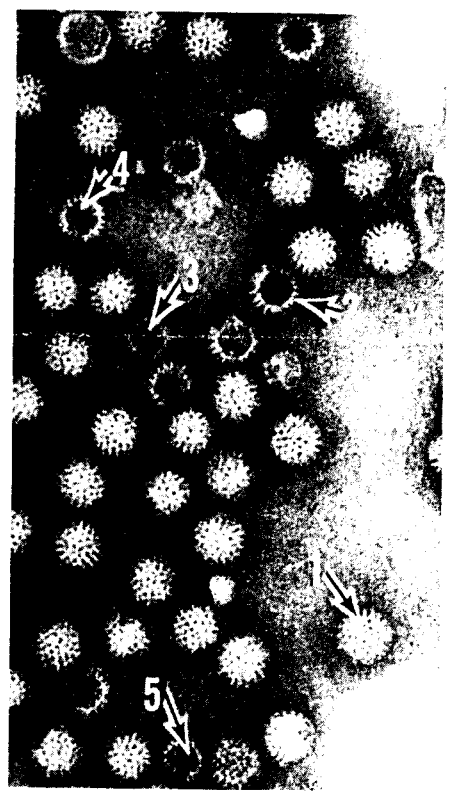
(From left) McHarrell Thomas, Lois Baranosky, Yu-Shiaw Chen Hsieh and James Vaughn.

When radioactive chlorine was used to indicate where the protein coat was attacked, only the protein bands that had shifted were incorporating the labeled chlorine. "We suspect that these are proteins of the outer coat," says Vaughn. After exposure to high concentrations of chlorine, 0.5 parts per million and more, physical damage to the outer coat was evident under the electron microscope.

Though noted in the human viral strain, chlorine exposure did not cause similar changes in simian rotavirus RNA segments. Electrophoresis yielded 11 RNA segments, and no change was seen in them even at high concentrations of chlorine.

To test ozone's disinfectant effect, it was bubbled into separate solutions containing human or simian rotaviruses. Vaughn repeated the inactivation and electrophoretic experiments and found it to be a more effective viricide than chlorine. "The experimental setup did not allow us to measure contact times of less than five seconds," explains Vaughn, "but by that time, even at low concentrations, 0.1 parts per million, we were blowing

(Continued on page 2)



Rotaviruses after treatment with ozone.
1. Whole, undamaged rotavirus particle.
2. Virus showing damage to outer protein coat and movement into the particle of stain used to prepare the slide for microscopic examination.
3. Particle without its outer coat.
4. Rotavirus having lost portions of its outer and inner coats.
5. Particle stripped of almost all of both protein coats.

Setlow Receives Honorary Degree

Richard B. Setlow, chairman of the Biology Department and acting Associate Director of Life Sciences at BNL, has been given an honorary degree of Doctor of Science from York University in Canada. He received the degree at the Spring Convocation of the Faculty of Graduate Studies, Environmental Studies, and Education, on Thursday, June 20, in Toronto.

A member of the National Academy of Sciences, Setlow is one of the pioneers in determining the effects of radiation on DNA molecules, and his current research focuses on the repair mechanisms of DNA damaged by chemicals or radiation.

York University has a strong basic biology program and wished to honor Setlow for the brilliant series of experiments that he and his co-workers carried out in the early sixties, which established unequivocally the biochemical reality of DNA repair. His discovery of excision repair in bacteria laid the basis for what has become one of the most fruitful, far-reaching and intellectually important areas of modern molecular biology.

Dr. Ruth Hill was the first person to discover what is now known to be radiation sensitive bacteria. Hill and Dr. Robert Haynes, who extended a lot of her discoveries to experiments with DNA repair in yeast, were colleagues of Setlow and conducted much of their work at York University. Haynes still works there and has visited Brookhaven on a number of occasions.

Setlow addressed the York University Convocation in a speech entitled "First Approximations and Numbers in Politics and Science," in which he discussed the absurdities of the ongoing arms race and the dangers of acid rain in light of scientific data that clearly suggest the initial perils of letting either continue to build up. "To the first approximation," Setlow said, "the best way to make the world safe is not to have any armaments. We really have to understand the uncertainties when people talk about numbers and what numbers mean. The question of acid rain will come home to the Canadians. As a first approximation, acid rain is bad. I think one should take really the simplest point of view, not the most complicated."

— Alexander Laszlo

Mort Rosen

Richard Setlow

SSC Demo Magnet Successfully Tested at BNL

The first 4.5-meter demonstration magnet for the proposed Superconducting Super Collider (SSC) was successfully completed and tested at BNL this week. By reaching 6.5 tesla (T) at a temperature of 4.5 kelvins (K), the high field, dipole magnet has exceeded design specifications, which called for a magnetic field of 6.3 T at a temperature of 4.5 K.

The magnet was completed this month as a result of a collaboration involving three national laboratories — Brookhaven, Lawrence Berkeley and Fermilab. The project, handled by the Magnet Division of the Accelerator Development Branch of High Energy Facilities, and headed by Erich Willen, marks the culmination of a year's work.

Not only has the magnet exceeded expectations in terms of design specifications, but the project was finished about two weeks earlier than planned.

The new magnet has been modified from previous models designed and constructed at BNL. It now has a single aperture within an iron yoke, uses stainless steel collars to hold the coils in place and uses a new high-current-density niobium tin superconductor.

By the end of the summer, the Magnet Division expects to complete four such magnets, each one 4.5 meters long. Work has already begun on prototype full length (16-meter) magnets. — Maurice DuBois Jr.

Science Quiz

Two Cultures

1. In recent scientific developments, a word with a literary origin has assumed enormous significance. The literary origin is James Joyce's *Finnegan's Wake*. The word is **a)** snark **b)** sark **c)** narc **d)** quark.

2. The word in the previous question is used in **a)** the theory of elementary particles **b)** the theory of the propagation of electromagnetic waves **c)** the study of the impact of heroin on the central nervous system **d)** the theory of the propagation of gravitational waves.

3. Johann Wolfgang von Goethe was not only a distinguished man of letters; he was interested in a number of other fields, government and science among them. His interest in science was sufficiently great to induce him to formulate a theory of **a)** the origin of the universe **b)** parapsychology **c)** light and color **d)** *son et lumière*.

4. A painter who was a pioneer in the study of anatomy, dissecting cadavers and making sketches of muscles, was **a)** Amerighi da Caravaggio **b)** Rembrandt van Rijn **c)** Andreas Vesalius **d)** Leonardo da Vinci.

5. The 1925 Scopes trial dealt with the issue of whether Darwin's theory of evolution could be taught in the public schools of the state of Tennessee. A play about that trial had the title **a)** *Inherit the Wind* **b)** *The Wind in the Willows* **c)** *Trial by Jury* **d)** *Twelve Angry Men*.

6. A Russian literary work in which one of the main characters is engaged in scientific farming is **a)** Dostoyevsky's *Notes from the Underground* **b)** Tolstoy's *Anna Karenina* **c)** Lysenko's *The Tomato Eaters* **d)** Gorky's *The Lower Depths*.

7. A piano piece that might come to mind at the sight of a full moon was written by **a)** Bach **b)** Beethoven **c)** Brahms **d)** Bizet.

8. A second piano piece that might come to mind at the time of a full moon was written by **a)** Ernest Chausson **b)** Claude Debussy **c)** Gabriel Fauré **d)** Francis Poulenc.

(Answers on page 3.)

From 21 ASTOUNDING SCIENCE QUIZZES! by Grace M. Spruch and Larry Spruch. Copyright © 1982 by the authors. Reprinted by permission of Harper & Row, Publishers, Inc.

Cafeteria Menu

Week Ending June 28

Monday, June 24

Spinach egg drop soup	(cup)	.65
	(bowl)	.85
Kielbasa & sauerkraut		2.10
Braised beef liver & onions w/1 veg.		2.10
Hot Deli: Baked ham	(bread)	2.10
	(roll)	2.30

Tuesday, June 25

Lentil soup	(cup)	.65
	(bowl)	.85
Chicken finger basket		2.35
Salisbury steak & 1 veg.		2.15
Hot Deli: Veal patty Parmesan	(bread)	2.10
	(roll)	2.30

Wednesday, June 26

Old-fashioned cabbage soup	(cup)	.65
	(bowl)	.85
Swiss steak jardinière & onions w/ 1 veg.		2.30
Western-style chili on rice		2.15
Hot Deli: BBQ chicken breast	(bread)	2.15
	(roll)	2.35

Thursday, June 27

Beef noodle soup	(cup)	.65
	(bowl)	.85
Corned beef & cabbage		2.15
Spanish macaroni & 1 veg.		2.15
Hot Deli: Top round of beef	(bread)	2.10
	(roll)	2.30
Special: Top your own baked potato		1.25

Friday, June 28

Seafood chowder	(cup)	.65
	(bowl)	.85
Shrimp & fries		2.35
Sweet 'n sour pork on rice		2.20
Hot Deli: Chicken patty club	(bread)	2.10
	(roll)	2.30

Peter Horton

WINNER'S CIRCLE: Nicholas Cipolla, (center) Rigging Supervisor, Plant Engineering Division, suggested that timers be installed on the lights in Building 912 because the light switches were inconveniently located and all the lights were usually turned on. As a result, five controllers were installed in 40 zones of the building. The controllers are programmed to turn the lights on and off according to scheduled need, but they can be overridden if necessary. The controllers are estimated to save $6,000 per year in electricity, yielding Cipolla $600 for his suggestion. With him at the award presentation are (from left) Jack Hennessy, Manager of the Site Maintenance Division, and Alfred Mahlmann, Manager of Plant Engineering. At back are Karen Adelwerth and Susan Foster, Personnel, who run the BNL Suggestion System.

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-3829
BNL-NUREG-51784
An Evaluation of the Stability Tests Recommended in the Branch Technical Position on Waste Forms and Container Materials. Final Report. B.S. Bowerman, K.J. Swyler, D.R. Dougherty, R.E. Davis, B. Siskind, R.E. Barletta

NUREG/CR-3865
BNL-NUREG-51792
Evaluation of the Radioactive Inventory in, and Estimation of Isotopic Release from, the Waste in Eight Trenches at the Sheffield Low-Level Waste Burial Site. D.R. MacKenzie, J.F. Smalley, C.R. Kempf, R.E. Barletta

NUREG/CR-4067
BNL-NUREG-51842
Summary of Barrier Degradation Events and Small Accidents in U.S. Commercial Nuclear Power Plants. V.L. Sailor, J.J. Colbert

NUREG/CR-4069
BNL-NUREG-51844
Analyses of Soils from an Area Adjacent to the Low-Level Radioactive Waste Disposal Site at Sheffield, Illinois. P.L. Piciulo, C.E. Shea, R.E. Barletta

BNL-51847
Polymer Research at Synchrotron Radiation Sources. T.P. Russell, A.N. Goland — Editors

BNL-51855
Hydrogen Degradation of Pipeline Steels. Summary Report. J.R. Holbrook, H.J. Cialone, P.M. Scott

NUREG/CR-4152
BNL-NUREG-51858
An Independent Safety Organization. W.Y. Kato, E.V. Weinstock, J.F. Carew, R.J. Cerbone, J.G. Guppy, R.E. Hall, J.H. Taylor

BNL-51862
Leaching Mechanisms Program. Annual Report. Prepared by: D.R. Dougherty, M. Fuhrmann, P. Colombo

BNL-NCS-51800
Nuclear Structure References Coding Manual. S. Ramavataram, C.L. Dunford

NUREG/CR-3909
BNL-NUREG-51805
Solidification and Leaching of Boric Acid and Resin LWR Wastes. Topical Report. H. Arora, R. Dayal

T-Shirt Time

Looking for a memento from your 1985 summer at Brookhaven? "Brookhaven National Laboratory — Summer '85" T-shirts will be available to all employees, students and guests for only $5, including tax. These white with blue print T-shirts are 50% cotton and 50% polyester. They are available in unisex adult sizes: small (34-36), medium (38-40), large (42-44), extra-large (46-48); and unisex children's sizes: small (6-8), medium (10-12), and large (14-16). T-shirts must be ordered on or before July 12 and each order should be accompanied by cash or a money order made payable to "Renee Flack — T-shirts '85". No personal checks please. Orders and payments can be mailed or brought to Renee Flack, Affirmative Action Office, Bldg. 460, Ext. 3316. Allow two weeks for delivery.

Winner's Circle

Ronald Ondrovic, Senior Contracts Specialist, Division of Contracts & Procurement, was awarded $25 for his suggestion that spelling checker programs be used for documents produced on Micom 2000 and 2001E word processors. While Micom offered such a program for its 2001E, Ondrovic found an independent software company that had written one for the older Micom word processor. His suggestion was discussed at a Micom User's Meeting, thereby increasing secretaries' awareness of spelling checker programs and their availability.

Carole Kerr, Administrative Assistant, Medical Department, received $25 for suggesting that the surface at the main gate be made skid resistant. The road was saw cut, so that the guards directing traffic and drivers who stop at the gate would be safer when the road is wet from snow or rain.

Inside Info

Gertrude S. Goldhaber was honored by a special convocation at Munich University on June 10 for her contributions to nuclear physics. The occasion was the university's "Renewal" of her Ph.D. degree, which she received there 50 years ago.

Mary-Faith Healey, Contracts and Procurement Division, has just become a Certified Professional Contracts Manager. This is a certificate awarded by the National Contracts Management Association in recognition of a high level of professionalism in the field. Healey is the first one in her division to obtain this certification. Requirements are to earn a bachelor's degree, have at least two years' experience in contracts, complete eight contract-related courses and pass a six-hour exam. Healey has been in Contracts and Procurement for seven years and is currently a Contracts Administrator.

Viruses (Continued)

the viruses apart. Ozone is a powerful oxidant: It just rips at both the protein and nucleic acid."

The electrophoretic gels revealed few identifiable protein or RNA bands: The molecules had been broken down into such small subunits that they quickly passed through the gel. Under the electron microscope, considerable damage to both protein coats was seen. The destruction caused by ozone appears to be irreversible; with chlorine, there is some question as to whether the rotavirus can be revived by treatment with the enzyme trypsin.

"Ozone has been suggested to be a better disinfectant than chlorine," comments Vaughn, "but the U.S. has a 60-year tradition of using chlorine. Regardless, our studies show that rotaviruses are extremely sensitive to either treatment, so a treatment plant would not need a tremendous disinfection capability to get rid of them."

Vaughn will be initiating a similar study with human hepatitis type A virus this summer and has recently received a BNL exploratory research grant to study the effects of organic pollution on production of interferon, a potent antiviral agent naturally produced by cells.

— Marsha Belford

CREF Values

May	60.81	June	61.71
July	60.35	August	66.91
September	66.75	October	66.70
November	65.69	December	67.04
January	72.01	February	72.38
March	72.35	April	71.97

May $75.52

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Pool Reopens

The swimming pool will reopen on Monday, July 1, at 11:00 a.m.

Schedule:

Monday through Thursday

11:00 a.m. to 1:30 p.m. employees only
1:30 p.m. to 3:00 p.m. children's lessons
3:15 p.m. to 9:30 p.m. employees/families/guests

Friday

11:00 a.m. to 1:30 p.m. employees only
1:30 p.m. to 3:00 p.m. children's lessons
3:15 p.m. to 4:30 p.m. children's pool special
4:30 p.m. to 9:30 p.m. employees/families/guests

Saturday and Sunday

1:00 p.m. to 6:00 p.m. employees/families/guests

Entrance Fees:

Daily Admissions: $1.25 employee
1.25 family member
1.75 guest

Season Tickets: (3 months) $20.00 individual membership
25.00 family membership

For those who would like to buy season tickets before opening day, they will be sold in the Gym Recreation Office between 11:00 a.m. and 2:00 p.m. on Friday, June 28. Subsequent sales will be conducted at the pool during open hours. Season tickets are sold to employees and immediate family members only.

The swimming pool is closed on all Laboratory holidays.

Guest Rules (applies to all recreation facilities):

One Guest - An employee is allowed to bring one guest per visit without special permission or prior arrangement. The guest must be accompanied by the employee.

Two to Five Guests - Advance arrangements for two to five guests must be made at the Recreation Office. No more than five guests per employee are ever permitted. When such an arrangement is made, the Recreation Office issues an admission card stating the sponsor's name and life number, the number of guests permitted, the date of visit, and the facility to be visited. Guests must be accompanied by the employee, who will be requested to show the admission card at the main gate and at the swimming pool ticket desk.

Tennis

The courts will be open on Saturday, June 22, as the match between BNL and Miller Place has been postponed.

Arrivals & Departures

Arrivals

Margaret H. Hedrick ..... Staff Svcs.
Denise C. Monteleone ..... Biology
Richard K. Perline ..... DNE
Arline F. Willsey ..... Tech. Info.
John G. White, Jr. ..... AGS

Departures

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

Druscilla Acerra ..... C&P
Mario A. Geracitano ..... Plant Eng.
Ralph E. Jackson ..... Reactor
John J. Pastore ..... S&ES
Louis J. Teutonico ..... DNE
James P. Wicksted ..... Physics

-BERA News-

Children's Swim Lessons

Registrations are now being accepted for children's swimming lessons to begin on Monday, July 1. Application forms are available in Personnel and at the BERA Film Service Office in Berkner Hall.

Rifle & Pistol Club

The BNL Rifle & Pistol Club will hold its summer outdoor pistol matches on June 26 through September 11. The matches will be at the outdoor range each Tuesday at 5:15. For information call Joe Gatz, Ext. 3582, or Pat Stone, Ext. 3605.

Softball

Week of June 10

League I
Scram 5 — Cool 'n Gang 4
Ravens 17 — Moles 8

League II
Dirty Sox 13 — Faze II 6
AMD 8 — Magnuts 7
Lights Out 8 — Medical 7

Makeup game from June 5:
Faze II 8 — Medical 5

League III
No Names 6 — TNT 5

League IV
Who cares 12 — Farmbusters 3
Mole-Esters 7 — Kidz-R-Us 3

League V
No Feedback 13 — Foul Ups 12
Mudville Sluggers 26 — Underalls 4

Theater Group

The next meeting of the Theater Group will be on Wednesday, June 26 at the Brookhaven Center. Socializing starts at 7:30 p.m. in the Tap Room, and the business meeting at 8 p.m. in the North Room. On the agenda is the election of officers and the payment of annual dues of $3. The business meeting will be followed by readings from "The Actor's Nightmare," and other short plays.

1984-85 Bowling Champs

PURPLE LEAGUE: Four-of-a-Kind — Bob Jones, Mary-Grace Meier, Sharon Moore and Ed Meier.

RED & GREEN LEAGUE: Sandbaggers — (from left) Bob Jones, Ken Riker, Ed Meier, Denny Klein, Charlie Bohnenblusch and Ken Asselta.

PINK LEAGUE: Lickety Splits —(from left) Sharon Moore, Denise Monteleone, Louise Chinn and Mary-Grace Meier. Not present when photo was taken, Barbara Jones.

WHITE LEAGUE: Gropers — (from left) Sandy Asselta, Ken Asselta, Sharon Smith and Gene Hassell. —photos by Rosen

Quiz Answers

1. d. The term was taken by Murray Gell-Mann, the quark's co-postulator, from Joyce's line, "Three quarks for Muster Mark." A snark is a chimerical animal created by Lewis Carroll for *The Hunting of the Snark; sark* is a word we thought we made up, but it turns out to be a Scottish word for shirt; and *narc* is the street word for a narcotics agent.

2. a. Just as protons, electrons, and neutrons, being constituents of atoms, are more "basic" than atoms, so quarks are considered to be more "basic" than protons or neutrons, each of which is presumably composed of three quarks. Quarks have not actually been found; many physicists who believe they exist think they cannot be found because they cannot be isolated.

3. c. *Son et lumière,* often seen on French tourist ads for public monuments, means "sound and light" (shows).

4. d

5. a. *Inherit the Wind* was written by Jerome Lawrence and Robert E. Lee. *The Wind in the Willows* is a classic for children by Kenneth Grahame, *Trial by Jury* is a Gilbert and Sullivan operetta, and *Twelve Angry Men* is a film directed by Sidney Lumet.

6. b. The character is Levin, who resembles and apparently speaks for the author. *The Tomato Eaters* is a title concocted by us for this quiz, but Lysenko was real: he was a geneticist who claimed plants could inherit acquired characteristics — which, if true, would have been invaluable to agriculture. Lysenko had Stalin's support in his "research." Many of the leading geneticists in the U.S.S.R. were imprisoned, and Soviet genetics was set back for years. Although physicists under Stalin had to subscribe formally to a certain amount of nonsense — they were to reject the uncertainty principle, a fundamental tenet of quantum mechanics, for example — physicists as a group and physics itself did not suffer.

7. b. The piece is "The Moonlight Sonata."

8. b. "Claire de Lune" is Debussy's famous piece.

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 Employment Manager, Ext. 2882.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees.

2274. LABORER - 2 openings (7/29/85 - 10/13/85). Plant Engineering Division.

2275. DRIVER - 2 openings (7/29/85 - 10/13/85). Plant Engineering Division.

2276. LAMP CLEANER - (to 9/29/85). Plant Engineering Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

2277. PROJECT ENGINEER - Requires a BSEE or equivalent and a minimum of five years' experience in the design of high current, high voltage power supplies. Knowledge of analog control of S.C.R. regulated supplies and servo system design is required. National Synchrotron Light Source Department.

2278. TECHNICAL POSITION - Requires AAS degree in electronic technology or equivalent and background in complex electronic and electromechanical equipment, including vacuum systems. Will construct, repair, modify and operate equipment and facilities at the Tandem Van de Graaff Accelerator. Work schedule includes a rotating shift part of the time. Physics Department. Reposting of Job No. 2081.

Autos & Auto Supplies

TIRES - (2) L78-15, snow, $70; (2) L78-15, reg., $25; (1) J78-15, reg., $20; (2) G78-14, snow, $35. Tony, Ext. 7772.

71 CHEVY IMPALA - V8, a/c, a/t, good cond., 82k mi., $600. Ext. 2673 or 744-8632 after 6 p.m.

79 JEEP CJ7 RENEGADE - 304, a/t, p/s, p/b, a/c, excel. cond., many extras, $6,200. 286-3865.

WHEEL - Honda Accord, $12; (4) 185/70, SR14, WW Bridgestone tires, $25 each, or (4) for $80; (4) P195/75, R14, WW Uniroyal tires, $25 each, or (4) for $80. Bob Doering, Ext. 4474.

76 MONTE CARLO - 72k, a/c, p/s, p/b, $925; 1975 pop-up camper, sleeps 8, needs work, $400 or best offer. Ext. 2119.

80 CHEVY IMPALA WAGON - a/c, am/fm, cassette, p/s, p/b, small V8, reliable, $3,500. Ext. 2435 or 3188.

78 CHEVETTE - one owner, excel. cond., 35k mi., $3,000. Ext. 2302 or 2301.

75 OLDS CUTLASS - station wagon, just inspected, good running, $750; 75 Olds station wagon, just inspected, good transp., $650. 289-0012.

80 OLDS STARFIRE SX - 4 cyl., low mi., white/-saddle int., hatchback, $2,600; 82 Camaro, 8 cyl., T-tops, am/fm stereo cassette, many extras. 289-9238 eves.

80 CHEVROLET - excel. cond., one owner, one driver, standard, 4 dr., hatchback, gas saver. 281-5532.

78 HONDA MOTORCYCLE - 750k, garaged, fairing, radio, mint cond., $1,500 firm. Ed, 929-6798.

83 HONDA ACCORD LX - 2 dr., hatch, many extras, 26k mi., $7,800. Carol, 399-6129 after 7:30 p.m.

75 MGB - conv., am/fm, new top, 84k mi., good cond., $2,600. John, Ext. 7671.

77 VW SIROCCO - running cond., needs some work, $1,300. 654-5583 after 6 p.m.

82 FIREBIRD - alarm, am/fm cassette, a/c, tinted windows, p/s, spoiler, mags, 36k mi., (a cream puff), $7,500. 475-2946.

TRAILER - 19', Tandem wheels, sleeps 6, stove, shower, bathrm., good shape, $2,100 neg. Ext. 2964.

77 PLYMOUTH GRANDFURY - wagon, 4 dr., p/s, p/b, a/c, am/fm, orig. owner, $1,500. 286-2525 or 286-8552 after 6 p.m.

75 FIAT 128 - 4 spd., am/fm, good engine, (2) new tires, needs work, best offer. Ext. 3714.

63 CHRYSLER - hardtop, good cond., runs very well, $500. Sauter, Ext. 3783.

81 VW VANAGON - excel. cond. Ext. 4635 or 751-2860.

76 FORD PINTO - hatchback, rebuilt eng. and trans., am radio, runs well, owner leaving country, $800. Denise, Ext. 3063.

82 CHEVROLET CELEBRITY - 4 dr., a/t, a/c, p/s, p/b, tilt, cruise, excel. cond., $5,600. 732-6712.

CAR STEREO - am/fm cassette, w/2 speakers, like new, $25. Frank Rumph, Ext. 5107 or 588-3565.

75 PONTIAC LEMANS - 79k mi., $1,600, avail. July 10. Ext. 4490 or 280-9724.

74 OPEL MANTA - good car, many extras, 93k mi., very clean, $700. Ext. 2528.

74 CHRYSLER NEWPORT - 4 dr., high mi., $300 or best offer. 727-5912.

83 MAZDA 626 - 4 dr., a/t, a/c, stereo, 43k mi., excel. cond., new brakes, new exhaust, silver. Ext. 3067.

79 CHEVY MONZA - V6, 4 spd., hatchback, new brakes, tires, clutch, good cond. $2,500. Ext. 2841.

78 HONDA MOTORCYCLE - CB 550, 4 cyl., 5 spd., low mi., excel. cond., $695. 467-8563.

79 YAMAHA 650 - Special, 7k mi., excel. cond., $1,000. 286-2173.

78 FORD LTD - station wagon, new eng., trans., paint, mint cond., $2,000. Ext. 2334 or 399-3415.

80 DATSUN 210 - 5 spd., 63k mi., excel., $2,500. Bud, Ext. 3083 or 878-1915 eves.

72 VOLVO 164E - slight damage at headlight, $750 or best offer. 928-6457.

84 DODGE 600 - conv., garnet/white, every option, excel. cond., $12,000. Tallon, Ext. 4547 or 473-3987.

73 FORD MAVERICK - 4 dr., $300. 281-2443, between 6 and 7 p.m.

79 YAMAHA 650 - Special, 10k mi., new tires and battery, excel. cond., $1,100. Ext. 2223 or 929-6421.

69 FORD WAGON - good running cond., $300, neg. 281-5565 after 5.

79 KZ 400 MOTORCYCLE - like new, 5k mi., $600. 473-5289.

85 MERCEDES 500 SEL - loaded, low mi., all leather int., met. brown. 941-4999.

TIRES - (2) radial, GR7814, (2) snow, (2) reg., GR7815 all GM rims. Ext. 3312.

RADIAL TIRES - (4) w/w, (2) reg., (2) snows, LR78, 15", good cond., large strips, $110. Willie, Ext. 2333 or 732-3002.

RIMS - (4) Crager, (3) usable rubber, (1) blowout, make offer. Ray, Ext. 3536 or 289-7615.

72 DODGE DART - 4 dr., a/t, a/c, p/s, p/b, am/fm stereo, 20 mpg, good cond. Sandy, Ext. 3369 or 286-1022.

68 CHRYSLER NEW YORKER - just tuned, $175. 363-7032.

84 PLYMOUTH TURISMO - 2.2 litre, tinted windows, stereo, low mi., like new, $5,600. 563-2847 after 5 p.m.

78 CHEVY VAN C-30 - 1 ton, low mi., excel. cond., $2,700. 563-2847.

ROOF CARRIER - sturdy, also fits VW Beetle, $10. 286-9158.

70 DODGE WINDOW VAN - 318, a/t, long wheel base, trailer hitch, new trans., $750. Ray, 289-7615 or Ext. 3536.

79 TOYOTA CELICA GT - hatchback, a/t, 48k mi., excel. cond., $3,800. 286-4150.

78 NOMAD TRAVEL TRAILER - tandem wheels, sleeps six, fully self-contained, excel. cond. Ext. 4459 or 751-2095.

81 DATSUN 200SX - 5 spd., am/fm, 79k mi., good mech. cond., orig. owner. Cosmore, Ext. 2253.

65 CHEVY PICKUP - w/new tires, runs great, $800 or best offer. Tracy, Ext. 4421 or 475-8603 eves.

75 IMPALA WAGON - excel. running cond., good tires, high mi., $700. Ron, Ext. 3238 or 744-1194 eves.

80 RENAULT LE CAR - very good cond., 45k mi., $1,600. Jerry, Ext. 5506 or 732-4701.

81 HONDA PASSPORT C70 - moped, elec. start, 3 spd. trans., good cond., nearly new tires, $300. Ext. 2180.

80 VOLVO 245 GL - wagon, 4 cyl., a/t, p/s, 50k mi., clean, $6,995. 363-5090.

73 DODGE MOTOR - slant six, low mi., also trans., $250; tow chains, all sizes, $1 per ft. 732-3338.

67 FORD FALCON WAGON - w/new tires, excel. work car, $400; rims, spoke, chrome, 15x7, like new, $85 for set. Gary, Ext. 2848 or 473-5776.

77 VW RABBIT - good cond., w/new tires, f/m, $1,400. Harvey, Ext. 3758 or Sally, 821-1726.

80 DATSUN 310 - hatchback, w/new brakes, tires, muffler system, no rust, good cond. Ext. 2995 or 286-9606.

78 HONDA 750K MOTORCYCLE - garaged, radio, mint. cond., $1,500, firm. Ed, 929-6798.

FAIRING - Vetter, quicksilver, complete w/mounting hardware, brand-new cond. Frank, Ext. 3120.

Boats & Marine Supplies

26' PACEMAKER - 1968, SF, 318 cu. Chrysler, f/w cooled, sleeps 4, stand-up head, stove, 110W/12 ref., VHF, DF recorder, excel. cond. Don, Ext. 5329 or 878-2215 eves.

21' SAILBOAT - sleeps 4, w/tilt-up trailer, excel. cond. 924-0848.

ESKA OUTBOARD - 7 HP, used several seasons, good cond., $250. 744-9429 eves.

16' STARCRAFT - w/45 HP Chrysler on Shoreline tilt trailer; full canvas, ready to go, $1,500. 957-7159.

MARINE MANIFOLDS - and risers for Mercruiser, Chevy block, fresh water use, $150. Ext. 2434.

8' SAILING DINGHY - fiberglass, $275. Joe, 369-0432.

WINDSURFER - 1984, Hi-Fly 343, excel. cond., $475. Ext. 7971 or 286-1358.

14.2' CAPRI SAILBOAT - 1984, Catalina, fiberglass, fully rigged, w/trailer, excel., $2,250. Otto, 472-0339.

18' GLASS CRAFT - Tri Hull, 95 HP Merc., elec. start, 2 tanks, Gator tilt trailer, w/13" wheel, $1,600. Ext. 2333 or 732-3002.

24' CHRYSLER - sleeps 2, w/115 HP, Evinrude, power trim & tilt, new rug, good cond., $1,900. Jim, Ext. 7772.

SAILBOAT HULL - Sea Snark, no sail or mast, make offer. Ray, Ext. 3536 or 289-7615.

ANCHOR - for 25' to 30' boat, 80' nylon line, excel. cond., $30; foldaway plastic boarding ladder, 5 steps, like new, $15. Ext. 3589.

18' AL BOAT - 1981, 30 HP Chrysler, 1981 galv. trailer, motor & trailer excel., $1,600 firm. 727-7666 days.

SEA SNARK SAILBOAT - ready to sail, car topper, $300. Carl, 744-6967.

14' FIBERGLASS BOAT - 30 HP Johnson, (1) dilly trailer, boat and motor in good shape, $650. Ext. 2021.

Miscellaneous

CUSHIONS - outdoor, from redwood set, new cond., not used outdoors, $5 ea. 744-9429 eves.

SEWING MACHINE - portable, good cond., $35. Ext. 4240 or 286-0295.

GIRL'S BIKES - 20" Sweet Thunder, excel. $25; 16" convertible bike, $15; 16" B&W portable TV, $25; Atari w/tapes, $20; clock radio $10. Ext. 2119.

FOLDING BED - rollaway, 30" wide, new cond., $25. Ext. 4240 or 286-0295.

TRUMPET - student model, $75; canopy bed, $75. Jim, Ext. 3372.

SALUKI PUPPY - adorable, to good home w/fenced yard, $350. Lee, Ext. 7286 or 821-3963.

BOOKCASES - 68x31x11-½, (5) shelves, walnut finish, $40; 48x25x8-⅛, (4) shelves, walnut finish, $20. Inan, Ext. 3370.

GE AIR CONDITIONER - 15,000 BTU, 220V, rarely used, $150; executive swivel chair, brown vinyl/-mat. combo., good cond., $75. Ext. 7686 or 878-0897.

DESK - wood, one drawer, $15; blender, $8; Moulinex food processor, $15; Ross 10 spd. bicycle, $25 or best offer. Naomi, Ext. 3188.

AIR CONDITIONERS - (2), window, Norge, 24,000 btu, $250 ea. Carol, Ext. 2895 or 475-8640 eves.

SEARS KENMORE COMPACTOR - walnut, changeable panels, works well, $175; Keystone projector, 8 mm, w/8 mm editor, $30; squash racket, $5. Ext. 7652 or 758-9197.

SLIDE PROJECTOR - Argus, model 550, w/remote control and screen, $35. Joe, Ext. 4439.

FREEZER - Delmonico, white, upright, good cond., holds 225 lbs., $50; GE refrigerator, 2 dr., white, good cond., $50. Ext. 7678.

FABRIC - polyester, 60 in. wide, assorted colors and lengths, $2/yd. Pat, Ext. 2452.

COLLIE PUPPIES - champ-sired, sable/white males, partially housebroken, shots, outgoing and beautiful, $250. 924-3756.

STEREO EQUIPMENT - Marantz, 15 watt receiver, $40; Marantz speakers, $75; Fisher speakers, $25; Pioneer turntable, $40. Sheryl, Ext. 4400 or 689-7725.

PIRATE CHESTS - oak, copper bound, cedar lined, 14"x14"x24", $10. Walt, 298-8601.

POWERVERTER - new, still in box, Model P.V. 5508, w/battery charger, ouput 550 watts, 115V AC, 6 HZ, input 12V DC, $100. Carol, 878-0885.

TV - 17" color, Toshiba, just serviced, $80. Ext. 7130 or 929-8323.

WET SUIT - farmer John and top, O'Neil light weight, size small 36-38, $25. Ext. 7652.

AIR CONDITIONER - GE, 7300 btu, excel. cond., $125. 473-2473.

WOOD FRAMES - oak, 16x20, $8; plastic display frames, assorted sizes, $5 ea. Susan, Ext. 4267.

GRAND PIANO - 6', Yamaha, satin walnut, 7 yrs., perfect, $7,200. Ext. 2865 or 286-5879.

MOVING SALE - double bed, $40; (2) twin beds (can convert to bunks), $70 pr.; folding bed, $10; bookshelf, $8; dresser, $20; end tables, $5; much more. Debbie, Ext. 3063 or 751-8371.

CAMPING STOVE - Coleman, 2 burner, $10. Al, Ext. 7588.

CLOTHES DRYER - dorm size refrigerator, never used; baseboard heater; kitchen appliances; dining room table and chairs; beds; dressers; airline kennel. 289-9724.

STEREO RECORD PLAYER - portable Zenith, $20. Walt, Ext. 7154.

SOFA - Chippendale-style, gold brocade, good cond., $350. Jean, Ext. 3298 M-Th, or 878-2172.

POOL TABLE - 88"x 49", $350; walnut desk, 60 x 30, $150; sofa bed, $200; walnut wall unit, $200. 744-5578 after 4 p.m.

GOLF CLUBS - one set, very good shape, $85. Ext. 2021.

SINGER POWER SEWING MACHINE - 96-10 head; kitchen sink, avocado, 21" x 24", best offer. 286-4650.

REFRIGERATOR FREEZER - 10.5 cu. ft., 10 months old, $180; 13" color TV, $120. Ext. 3234.

POOL TABLE - good cond. 325-0447 after 6 p.m.

BOOK - child's handcrafted quiet time book, call to see sample; sleeper sofa, queen size, $50. Bonnie, Ext. 4525.

B&W TV - 19", good cond., $30. 363-7032.

FLOUR MILL - stone, Bosch kitchen machine, w/slicer, shredder, wirewhips, dough hook, blender, all for $280. Ext. 3107.

STROLLER - 1984 Cosmos, dark blue, excel. cond., basket & body, orig. cost $150, asking $95. Beth, 475-4370.

BEDROOM SET - double dresser w/mirrored hutch, (2) night stands, double/queen headboard, 2 yrs. old, Colonial, $500. Ann, Ext. 4078.

TABLE - 42" round, butcher block, 4 cane breur chairs, $120; gold La-z-Boy rocker, $40. Ext. 2266 or 331-9264.

PUMP & WATER TANK - Sears shallow well, 3/4 HP, good cond., $70. John, Ext. 3292 or 286-1348.

SOFA BED - Bassett, queen size, well made, excel. cond., $349, negotiable; chairs to match avail. Ext. 2160 or 273-5574 after 6 p.m.

PIANO - w/bench, console cable, excel. cond., $200; Frigidaire air cond., 6,000 btu, $125. 744-0119 eves.

KEROSENE HEATER - $35; exercise bicycle w/rowing, $75; fireplace bi-fold glass doors, $25. 744-0119.

LAWN MOWER - 21", self-propelled mulcher, excel. cond., $175. Ext. 3392 or 475-8330.

Yard Sale

E. PATCHOGUE - 248 Durkee Lane, June 29-30, 11-5 p.m., giant moving sale, furniture, appliances, TV, clothes, toys, ping-pong table, rugs. 289-9724.

Free

TWIN BED - mattress and foundation, good, clean cond. Ext. 7505.

PUPPIES - Lab/Benji mix, (1) cream, (1) black, in need of loving homes. Miriam, 473-5060 after 6 p.m.

BUNDLED NEWSPAPERS - 6 ft. high; garbage can of kindling wood, you pick up in Yaphank. Ext. 4761 or 924-3556.

Car Pools

STONY BROOK - van, needs riders. Paul, Ext. 2476 or Sidney, Ext. 4125.

PORT JEFFERSON - ride wanted to/from, 7 a.m., 4 p.m., for summer student. Corinne, Ext. 5064.

HOLTSVILLE - urgently need ride from Birchwood Glen Apts. (opposite IRS) to and from Lab, I will share gas expenses. Jody, Ext. 2907 or 654-9094 after 6 p.m.

Real Estate

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

For Rent

ST. JAMES - 1 bdrm. apt., l/r, full bath, lg. kit., carpeted, priv. ent. $425 util. incl. 862-6970 eves.

ROCKY POINT - 2 bdrm. house, 1-½ baths, w/w, all appl., walk to beach/stores, 10 min. to Lab, unfurnished, 2 adults, no pets, $675 + util. 744-3792.

WHITE MOUNTAINS, NEW HAMPSHIRE - 3 bdrm., 2 baths, new condo., priv. deck, f/p, heated pool, clubhouse, Jacuzzi, tennis courts, hiking trails, near all area attractions, weekly, $375. (914)232-4039.

RIDGE - Strathmore, 2 bdrm. condo., a/c, d/w, w/d, 2 miles from Lab, $625 plus util. Jim, Ext. 3372.

MILLER PLACE - 1 bdrm. apt., l/r, kitchen, full bath, private entrance, avail. immed., for non-smoker, no pets, $550 mo., util. included, except gas. 928-8892 after 6 p.m.

HILTON HEAD, SC - condo., 2 bdrms., 2 baths, sleeps 6, tennis, golf, pool, beach, $400 per week. Ext. 3147 or 585-9149 after 4 p.m.

MANORVILLE - small studio cottage, sun deck, secluded area, until Oct. 31. 878-8294.

E. NORTHPORT - 4-5 bdrms., 2 full baths, new appl., immed. occupancy, $1,000 month. 724-6497 eves.

ROCKY POINT - 2 bdrms., large kitchen, lounge, full basement, garden. Ext. 4516 or 744-8901 eves.

FARMINGVILLE - one bdrm. apt., $500 includes all plus cable. 732-2141 before 1 p.m.

MASTIC - 2 bdrm. apt., private entrance, util. incl. 281-6116.

For Sale

YAPHANK - 2 bdrm., 1-½ bath condo., full bsmt., new int., mint cond., pools, tennis, club house, $82,000. Henry, Ext. 4547 or 924-6688.

BAITING HOLLOW - ½ acre lot, Oak Hills, private community, wooded, beach rights, privacy, $49,500. Ken, Ext. 2008 or 928-5875.

RIDGE TOWNHOUSE - 3 bdrms., 1-½ baths, wood/coal stove, central a/c, w/all appliances, $78,900. Ext. 3541 or 924-4070.

LADY LAKE, FLA. - 2 bdrms., 2 baths, lg. l/r, d/r, w/w carp., TV rm., util. rm., encl. screened patio, w/40' raised flower planter, a/c, heat, ceiling fans, auto. attic exhaust fan, 1 acre, oak shade trees, garden area, extras, $62,500. 399-0652.

SETAUKET - No. of 25A, 3 bdrms, 2-½ baths, spacious ranch on quiet cul-de-sac, l/r, d/r, eik, large fam. rm., fireplace, 2 car gar., lovely back yard w/patio, close to SUNY, R/R sta., assum. mortgage, $169,900. Ext. 4425 or 751-6781.

STRATHMORE EAST, CORAM - W section, 3 bdrm. ranch, w/attached 1 bdrm. apt., mint, must see. 928-8071 eves.

MEDFORD - 3 bdrm. ranch, dining room, eik, 1/3 acre, $93k. 289-1783 after 6 p.m.

ADIRONDACKS - 6 acres, 600 ft. waterfront property, 20 min. from Lake George, fishing, boating, swimming, terms avail., owner will hold mortgage, $19,000. Pat, Ext. 3376 or 924-3674.

Wanted

TENNIS PLAYER - advanced beginner looking for lunchtime game. Ext. 4192.

DEHUMIDIFIER - good working cond., reliable. Tony K., Ext. 3499.

SMALL LOT - suitable for building, N. shore, west of Wading River. D. Canniff, 724-4268 after 5 p.m.

LIFEGUARD - for private beach club in Shoreham, current CPR and advanced lifesaving cert. required. 821-9212.

MICROMET FEEDER - for drinking water well system. 399-0652.

PIANO - good cond., reasonable price. 472-3985 after 3 p.m.

HOUSING - by Sept. 1, for responsible professional family, low rental and no lease, Eastern L.I. 369-1844.

DEHUMIDIFIER - used, in good cond., reasonable. 878-2239 or 878-9118.

PERSON TO SHARE HOUSE - Port Jefferson Village, non-smoker, $200/mo. util. included. Sherry, 331-1583.

HOUSE TO SIT - experienced, caring, responsible, free, any period between June 24 to Sept. 15. J. Allentuck, Ext. 2412.

BICYCLE - 10 spd., racing model, reasonable price, must be in good cond.; barbell weights, steel plates, reasonable price, will consider sets. Chris, 286-1348.

APT. TO RENT - 2-3 bdrms., for family of 4, W. Suffolk, near R/R and shops, reasonable. Saed, Ext. 4463 or 751-2422.

FRENCH HORN INSTRUCTOR - for college music student, any information appreciated. Susan, Ext. 4331 or Ext. 3001 eves.

RESPONSIBLE PERSON - to care for two children in our house. Harvey, Ext. 3758 or Sally, 821-1726.

HOUSE TO SIT OR RENT - visiting scientist needs accomodations, approx. July 26-Aug. 30. Ext. 3400.

RUNNERS - Weeple Day Fun Run, 5 mi., Sunday, June 23, 9 a.m., Belle Terre Community Center. 473-2594.

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

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