BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

*Thirty-One Years After the Fact*

# Declassified Top Secret Document Reaffirms BNL Analysis of Windscale Reactor Accident

"Top Secret" was the classification stamped on a certain 1957 letter issued from the British Prime Minister's office. The letter ordered that a particular report be withheld from publication, extra copies of it shredded, and the printers told to destroy the galleys.

Under the Official Secrets Act in the United Kingdom, documents may be suppressed for at least 30 years if such secrecy is considered to be in the national interest. So, 31 years ago, this "top secret" suppression of a U.K. government paper had unexpected repercussions at BNL.

The covered-up paper in question was the first full report of the Windscale accident — a 16-hour uranium fire at a British nuclear power plant in 1957, in which an estimated 20,000 curies of iodine were released over the countryside.

On January 1 of this year, the original report by the U.K. Atomic Energy Authority was made public — 31 years after the fact. In it, the causes of the accident had been found to be both major design faults and lack of experience among technical staff.

Yet, for political reasons, Prime Minister Harold Macmillan's white paper to the British Parliament in October 1957 had reported a different scenario. The "most likely cause of the accident," the White Paper suggested, was supposed to have been the stored energy release that took place during the annealing of the reactor.

Mort Rosen

Donald Schweitzer

It was this suggestion, which cast doubt on the safety of the annealing process of the graphite Windscale reactor, that led to the involvement of BNL, and, especially, Donald Schweitzer, in the case.

Schweitzer, now Head of the Department of Energy Radioactive Waste Management Division, Department of Nuclear Energy (DNE), came to the Lab in 1955. At that time, the Brookhaven Graphite Research Reactor, operating since 1950, had been running into efficiency problems.

During the uranium fission process in a graphite reactor, some neutrons are absorbed by the graphite. This causes the graphite moderator to change dimensions and also to accumulate stored energy, known as Wigner energy. These changes reduce efficiency and eventually bring the reactor to a standstill.

Said Schweitzer, "The way to remove the dimensional changes and Wigner energy was to shut off the reactor, then heat the graphite to above the operating temperatures. This process is called annealing. But in 1955, techniques were limited — it was becoming more and more difficult to remove the stored energy."

Schweitzer, as part of a team in DNE's forerunner, the Department of Nuclear Engineering, worked out a new set of techniques for annealing. The process was carried out frequently, at temperatures lower than those used in the past, and was completely successful. The annealing problem had been solved.

Then came the white paper in the U.K., citing annealing as the cause of the runaway 16-hour reactor fire. "Suddenly, the process of annealing was in the news as a possible danger," said Schweitzer.

Since several of the research reactors in the U.S. at the time were air-cooled and graphite-moderated, similar in type to the Windscale reactor, they needed regular annealing. The Atomic Energy Commission (AEC), recognizing the expertise of Schweitzer and his team, asked them to investigate the situation in depth.

"The British had two sets of papers out," remembered Schweitzer. "One set was theoretical, and the other described experiments done on a very small scale to prove the theory."

Schweitzer's job was to review these papers for the AEC. He started on the theoretical set and found much that was unclear. In addition, the scaling concepts used in the experimental work were questionable.

Then, again at the request of the AEC, he re-did the British experiments. "But we insisted on full-scale engineering experiments," he said. "We had a 24-hour-a-day program going for six months, and we put out a whole series of reports that still stand, showing that annealing could not have caused the accident."

All this activity concluded in a series of U.S. and U.K. Gas Compatibility

(Continued on page 2)

# *Scharff-Goldhaber to Be Honored At Colloquium and Dinner*

The Nuclear Structure Colloquium and testimonial dinner in honor of Gertrude Scharff Goldhaber, Physics, has been rescheduled for Thursday, April 14.

Gertrude Scharff-Goldhaber

The Colloquium will take place from 3-5 p.m. in the Seminar Room of the Physics Department, Bldg. 510. After the three Colloquium talks, cocktails and hors d'oeuvres will be served from 5:30-6:30 p.m. in the Berkner Hall lobby. At 6:30 p.m., the testimonial dinner will commence in Berkner Hall, Room B.

Sponsored by Brookhaven Women in Science, these events will pay tribute to Scharff-Goldhaber for her contributions to nuclear physics and to advancing the cause of women in science.

The Colloquium speakers will be:

- **Raymond Sorensen,** Chairman of the Department of Physics at Carnegie-Mellon University, who will talk about the "History of Research in Nuclear Structure."

An expert in the field of nuclear band structure, Sorensen has come to Brookhaven before, as a summer researcher in 1963, 1964, 1974 and 1985. In 1980, he helped Scharff-Goldhaber organize an International Conference on Band Structure and Nuclear Dynamics at Tulane University, and they were two of the editors of the conference procedings.

- **Gertrude Scharff-Goldhaber,** who will speak on the "Historical Perspective of the Variable Moment of Inertia and the Interacting Boson Approximation Models, Including Pseudomagic Nuclei." She was a pioneer of the variable moment of inertia model, which describes the shapes of rotating nuclei over a wide range.

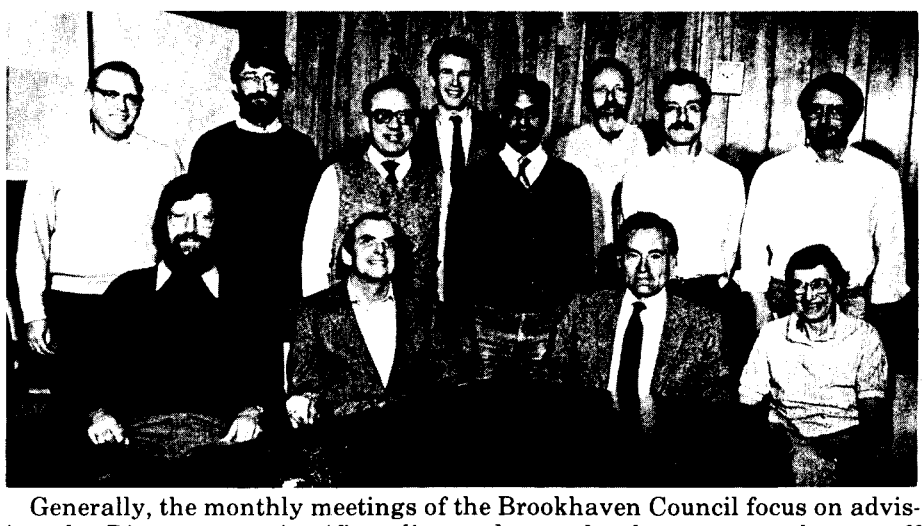
After first coming to the Lab as a visiting associate physicist from June 1949 to February 1950, Scharff-Goldhaber joined the BNL staff in June 1950. She moved up the ranks, from Associate Physicist to Physicist in 1958 and to Senior Physicist in 1962. She retired in 1977, but continues her association with the Lab as a research collaborator.

- **Richard Casten,** BNL Senior Physicist, who will address "Recent Research in Nuclear Structure."

An experimental nuclear physicist, Casten came to BNL in 1971 and attained his present rank in 1982. He studies symmetries and phase transitions in nuclei, with emphasis on the role of proton-neutron interactions, and performs his research at the High Flux Beam Reactor.

*To register for the Colloquium, call Rae Greenberg, Ext. 3743, by March 24. To attend the dinner, send a check for $20 payable to Brookhaven Women in Science and a note indicating your dinner selection (prime rib or chicken Kiev) to Greenberg, Bldg. 510A, also by March 24.*

# Brookhaven Council Convenes


Peter Horton

Generally, the monthly meetings of the Brookhaven Council focus on advising the Director on scientific policy and procedural matters, such as staff appointments and tenure recommendations. At the March meeting, however, a photo was also on the agenda.

Krsto Prelec (seated, second from right), Alternating Gradient Synchrotron (AGS) Department, was recently elected Council Chairman, to preside over the 16-member body elected from the tenured scientific staff for three-year terms. Suresh Srivastava (standing, center), Medical Department, continues to serve as Council Secretary.

Other Council members pictured include: (seated, from left) Stephen Schwartz, Department of Applied Science (DAS); Charles Goldstein, Applied Math Department (AMD), representing SIM — the Safety & Environmental Protection and Instrumentation Divisions, and AMD; and Jane Setlow, Biology Department; (standing, from left) William Studier, Biology; Gerry Bunce, AGS; Wolfgang Wulff, Department of Nuclear Energy (DNE); Thomas Koetzle, Chemistry Department; John Axe, Physics Department; Jerome Hastings, National Synchrotron Light Source Department; and Peter Haustein, Chemistry. Not pictured are Richard Casten, Physics; Hugh Isaacs, DAS; Laurence Littenberg, Physics; and Morris Reich, DNE.

# Charting the Energies That Bind Electrons

Gwyn Williams sees scientists as explorers. If they had been born 200 years ago, he believes that today's scientists would have been exploring new lands. To satisfy their quest for new discoveries in the modern world, they explore through science, and Williams has created a navigational chart to guide them along.

The electron binding energy chart that Williams has compiled can be looked upon as a navigational chart to steer those who use synchrotron radiation to new developments in science. First published in the summer of 1983 and soon to be published in *Synchrotron Radiation News*, this information is a valuable and handy reference guide for researchers in both chemistry and physics worldwide.

The chart created by Williams, a Physicist at the National Synchrotron Light Source (NSLS), gives the energy levels of electrons for all the elements in the periodic table.

The energy levels quoted are called binding energies because they represent the energy required to remove an electron from a particular atom. Such information can be obtained using x-ray light, such as that produced at the NSLS.

Knowledge of electron binding energies is useful for identifying a compound composed of several materials and for tuning a spectrometer to a certain level, tasks that Williams had to do in his previous position at the light source in Madison, Wisconsin. When he needed to know these energies, however, he found that there was nowhere to look them up even though they had been measured. Usually researchers kept individual records of the binding energies that they needed specifically for their experiments.

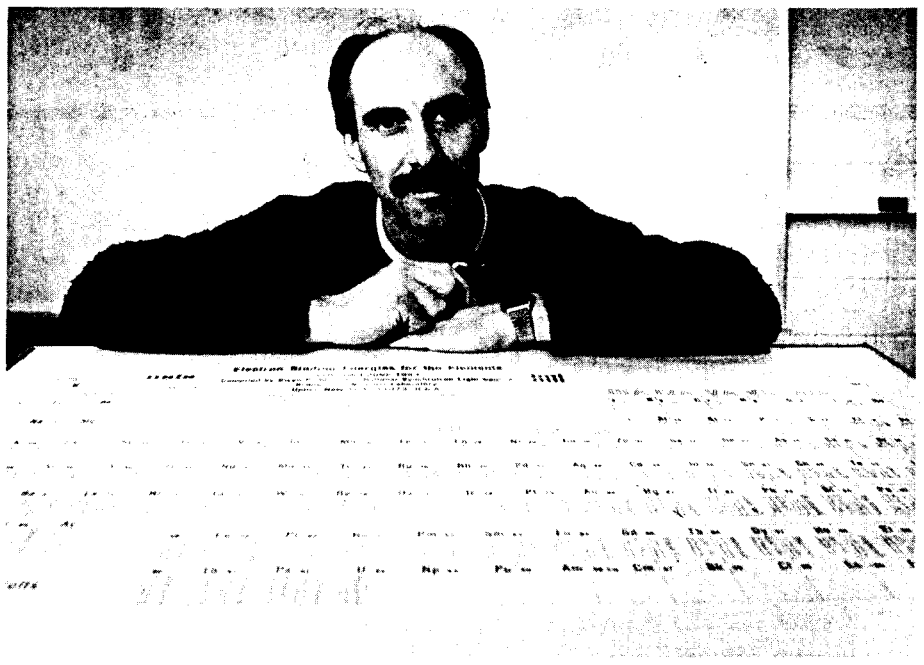
It was at Madison that a colleague gave Williams a handwritten chart in periodic table form consisting of the binding energies in which he was interested. This gave Williams the idea to chart the binding energies of the whole periodic table.

Williams began compiling his chart, using mainly individual papers from researchers. Often, however, those data on elements and their electron energies were incomplete or inaccurate, so Williams was required to do a lot of research on his own.

Williams, who came to BNL in 1979, spent several years obtaining references, drafting and finally publishing the chart, while he was also working on other projects. The artwork was created by the Illustration Group of the Photography & Graphic Arts Division.

The chart was first presented at the Third National Conference on Synchrotron Radiation Instrumentation, in September of 1983. There, Williams distributed a fair amount of the 10,000 charts that were printed. Since then, he has personally sent thousands all over the world to various researchers and institutions. In addition, the information has been published, to his knowledge, in four reference books.

In the past, researchers needing these figures would have had to spend hours searching through individual papers. "It's absolutely amazing that something as straightforward as the binding energies of electrons in atoms was never compiled before," Williams said.



Mort Rosen

**Gwyn Williams with the electron binding energy chart that he compiled.**

So why did no one ever do it? One reason may be that it takes some courage to back one researcher's data and not another's. Williams remarked, "One makes many enemies that way." However, he has not been criticized for his efforts. In fact, he has received many letters of praise.

Williams keeps an active file of suggested revisions by other researchers and plans to issue a revised version in the near future to correct about a half dozen numbers. The world's data base on electron binding energies is kept in Gwyn Williams' office, and it is the information source for researchers who need to know about current developments. For copies of the chart, contact Williams, Ext. 7529.

— Suzanne Cybart

*(Cybart is a student intern in the Public Affairs Office. She is from the Southampton campus of Long Island University.)*

# Cruising the Continental Shelf

Mort Rosen

All packed and ready to start — the group from the Oceanographic Sciences Division in the Department of Applied Science posed beside one of their two trucks just before most of them left on their latest research cruise on March 8. Atop the buoy is Kevin Wyman, and at ground level are (from left): Eva Schwarting, Peter Lane, Richard Wilke, William Behrens, Paul Kemp, Douglas Wallace, Paul Falkowski, Creighton Wirick and Charles Flagg. Not pictured were Zbigniew Kolber and Sharon Smith, the latter being already en route.

The group was about to join the research vessel, *R/V Cape Hatteras*, in North Carolina. On board, they are continuing their research on the Shelf Edge Exchange Project (SEEP). SEEP is an effort to quantify the extent to which materials produced on continental shelves are exported to the central oceans.

At the project's beginning in February, the group placed nine moorings across the continental shelf and beyond. These moorings contain sophisticated, self-contained instruments, such as battery-powered fluorometers, sediment traps, oxygen sensors and sensors for measuring currents, temperature and salinity of the ocean. On this trip, the expeditioners are measuring the fluxes of materials, both biological and other, that are produced on the continental shelf.

Particulate materials in the sea adsorb and concentrate energy-related pollutants. If these particles remain on the shelf for extended periods, they are likely to get into a food chain, leading back to man via fish and shellfish. If, however, the materials are rapidly swept off the shelf into the deep ocean basins, there is much less likelihood of the food chain being contaminated.

One of six cruises this year, the present data-collecting voyage is expected to last about two weeks. — Liz Seubert

## Windscale (cont'd)

Meetings in the early 1960's, when the British reviewed and responded to the BNL reports.

"They agreed with our findings, and set up a second set of experiments that confirmed our results," said Schweitzer. "And that ended the matter. They admitted that the first paper had been a mistake, but never attempted to clear up the whole situation.

"It was puzzling to me," he added, "especially when I talked with British scientific friends during the month I was over there. They also questioned the official British explanation. But though we were puzzled, none of us was aware of the existence of the original report."

BNL was never involved with the political reasons behind Macmillan's decision not to release the full story of the Windscale accident immediately. But, because of the cover-up of the real reasons for the Windscale reactor's failure, Schweitzer and his colleagues became leading authorities on many aspects of graphite reactors — expertise used again, for example, in U.S. assessments of the 1985 Chernobyl graphite reactor accident in the Soviet Union. — Liz Seubert

## Stony Brook Events

The following events are scheduled at the Fine Arts Center of the State University of New York at Stony Brook. Call 632-7230 for ticket information.

- **Israel Chamber Orchestra** — on tour celebrating Israel's 40th anniversary; Yoav Talmi, conductor; Jar van Nes, soloist, mezzo-soprano; Saturday, March 19, 8 p.m.
- **Harrington String Quartet** — winner of string division and grand prize in the Fischoff National Chamber Music Competition, will play Mozart's Quartet in D Major, Ives' Quartet No. 2 and Dvorák's Quartet in F Major, the "American," Wednesday, March 23, 8 p.m.

## Vehicle Inspections

Department of Energy Order 5632.4 states that vehicles shall be subject to inspection upon leaving the Laboratory, to assure that Laboratory property is removed only with proper authorization.

To ensure compliance with this requirement, the Police Group will soon initiate a program of random inspections of vehicles departing the site.

## Daffodil Day

To welcome spring and to support a worthy cause, BERA is participating in the Daffodil Days, an annual event of the Long Island Division of the American Cancer Society.

BNL's Daffodil Day will be next Wednesday, March 23, beginning at 11 a.m. in the Cafeteria lobby. BERA will sell a limited number of bunches of daffodils, each containing ten flowers, at $4 a bunch. So stop by while supplies last, to add a little sunshine to someone's day or brighten up your own.

## Spring on Sunday

At 4:39 a.m. Eastern Standard Time or 9:39 Greenwich Mean Time on Sunday, March 20, spring will arrive. This time marks the vernal equinox, when the sun crosses the plane of the earth's equator, making night and day of equal length all over the earth.

To celebrate spring, consider celebrating the 18th annual observance of Earth Day. The Earth Day festivities will begin with the ringing of the World Peace bell at the United Nations at 4:39 a.m. If you can't make it into Manhattan that early, you can join millions of people throught the world in two minutes of silent reflection or prayer for world peace at that time or anytime throughout the day.

# Inside Info

Four BNL scientists were among the 302 individuals elected Fellows of the American Association for the Advancement of Science (AAAS) at the AAAS's annual meeting last month. The four are Senior Biophysicist **Richard Setlow,** BNL's Associate Director for Life Sciences; and Senior Physicists **Per Bak, Michael Tannenbaum** and **Harvey Wegner,** all of the Physics Department.

Formed in 1848, the AAAS currently has some 132,000 members and approximately 300 affiliated scientific and engineering societies and academies of science. A Fellow of the Association is described as a member whose efforts on behalf of the advancement of science or its applications are scientifically or socially distinguished.

In becoming AAAS Fellows, the four honorees were cited as followed:

• **Per Bak:** "For contributions to solid state physics, particularly the theory of modulated structures, quasicrystals, and critical phenomena, and for work on dynamical systems theory."

• **Richard Setlow:** "For research on DNA repair in prokaryotic and eukaryotic systems and on the biological effects of UV-induced cyclobutane pyrimidine dimers."

• **Michael Tannenbaum:** "For giving experimental proof that Muons obey Fermi-Dirac statistics, and for studying pointlike features of high energy proton-proton interactions and, recently, relativistic nuclear collisions."

• **Harvey Wegner:** "For pioneering the construction of the Brookhaven Tandem Van de Graaff Accelerator Facility for the study of heavy ion physics and its recent interconnection to the 30 GeV Proton Alternating Gradient Synchrotron, making possible heavy ion physics at relativistic energies."

•

**Jerry Cadwell,** an Engineer in the Technical Support Organization of the Department of Nuclear Energy, and **Douglas Humphrey,** Senior Technical Supervisor, Photography and Graphic Arts Division, are the BNL team whose educational videodisc won a first place award in a national competition.

The winning disc, "The Authorized Classifier," was chosen from among a record number of entries at the annual Nebraska Videodisc Symposium, the nation's premiere conference for designers of interactive videodiscs, in October 1987. Cadwell and Humphrey prepared the disc in cooperation with Allen Communication, Utah, for the Office of Classification in the Department of Energy.

Designed for training classifiers — the people who assign classification categories to documents and information — the disc is totally "user-friendly." Most of the commands are given by touching the appropriate "signpost" label on the screen itself, so no previous keyboard knowledge is needed. This lets trainees interact with the video presentation at their own pace and return to any previous part of the program at will. The disc is currently being used nationwide.

•

For the second year in a row, a child of a BNL employee has taken fifth place in the Westinghouse Science Talent Search. This year, in the 47th annual Westinghouse competition, **Brian Conrad,** the 17-year-old son of **Cheryl Conrad,** Department of Nuclear Energy, won a $10,000 scholarship for his own mathematical concept of "inverted continued fractions."

Continued fractions are a standard part of number theory, and, by altering standard definition, Brian came up on his own with inverted continued fractions. As his main result, he found that every real number can be expressed as an inverted continued fraction of a certain type.

Brian, a senior at Centereach High School, will pursue mathematics as a career — the same career his twin brother Keith, who also entered the Talent Search, is considering. While Brian has not made his final decision about which college he will attend, he has been accepted by Harvard University.

Brian was encouraged with his project by one current and one former high school mathematics teacher: They are, respectively, his father Steven, who teaches at Rosalyn High School and has already had two of his students make the Westinghouse top ten, and his mother Cheryl, who has her bachelor's degree in mathematics and taught for three years before having the twins.

•

The Duracell Battery Corporation sponsors a contest in which high school students must invent useful, energy-efficient devices run only by battery. In this year's contest, **Soahn Kuehner**, son of **Alan Kuehner**, Safety & Environmental Protection Division, took third place, out of a field of about 700 entrants, winning a $500 scholarship.

Soahn Kuehner, a junior at William Floyd High School, devised an aid for the deaf, to warn of loud noises, such as a police siren, a smoke detector or a baby's cry. His battery-powered invention is worn on the wrist and uses a microphone and transducers to convey the sense of such sounds to the wearer.

# Bowling

**Red/Green League**

K. Asselta bowled a 234/202/602 scratch, C. Bohnenblusch 222, E. Sperry 219, J. Morris 212, C. Scarlett 205, J. Connelly 200, L. Jacobson 200.

**White League**

High games were bowled by Jim Petro 213, Joe Ferrante 200, Ben Belligan 200, Pat Oster 192, Kathy Griffin 191, Pat Manzella 184, Nancy Erickson 184, Pam Spencer 180.

**Purple League**

Dick Adams rolled a 217, Tom Sperry 204, Sharon Smith 197, Mary Grace Meier 197, Caryl MacDougall 191.

**L.I. Industrial Tournament**

After two weeks, the BNL bowling team is in seventh place out of sixteen teams. Mike Guacci bowled a 231, Ed Sperry IV 211, Ron Mulderig 209/203, Ed Meier 208.

**Scotch Doubles**

The Scotch Doubles Bowling Tournament, open to all, will be held Sunday, March 20, starting at 1:30 p.m., at Port Jeff Bowl. This is strictly a fun affair, and, participants need not be bowlers. The cost is $24 per couple, which includes bowling, prizes and buffet, Applications can be obtained at the BERA Sales Office or by calling Maria Apelskog, Ext. 3138.

# PC Users Group

The PC Users Group will meet on Thursday, March 24, at 2 p.m., in the Applied Math Seminar Room, Bldg. 515. Michelle Skorka and Keith Jones of Gold Hill Computers, Inc., will present Gold Works, a PC-based tool which offers the power and functionality of high-end expert system tools, combining frames, rules, integrated forward and backward chaining, and object programming for expert system development and delivery.

## The Upton Nursery School Presents: Music for the Whole Family

Children's entertainer Viki Diamond will perform at BNL on Sunday, March 20, in a concert sponsored by the Upton Nursery School. Diamond, who first delighted audiences at the Lab over ten years ago, provides entertainment for the entire family. Her songs and stories, accompanied by guitar, autoharp or hammer dulcimer, will begin at 2 p.m., in the Recreation Building.

The concert is open to the public. A donation of $3 per family is suggested.

Those attending the performance can be introduced to the teaching staff of the Upton Nursery School, a cooperative nursery school open to children of BNL employees and BNL visitors. At the concert, applications will be distributed for September enrollment in the school's classes for three- and four-year-old children.

# Time to Vote for BERA Board

Elections for two new members to serve on the BERA Board will take place during the week of March 21. They will replace outgoing Board members Lois Maracia and Richard Schiedet.

The candidates are:

• **Robert A. Brown,** an Administrative Services Assistant in the Medical Department

• **Martin J. Leach,** a Meteorology Associate in the Department of Applied Science

• **Lawrence Musso,** a Patrol Officer in the Safeguards and Security Division

• **Jean D. Ramirez,** an Administrative Services Assistant in the Department of Nuclear Energy.

Those eligible to vote in the BERA Board election include employees of BNL, AUI and DOE, as well as all other permanent on-site employees.

Ballots may be cast as follows:

| Date | Time | Place |
|---|---|---|
| Monday, 3/21 | 11:45-1:15 | Cafeteria |
| Tuesday, 3/22 | 11:45-1:15 | Cafeteria |
| Wednesday, 3/23 | 11:45-1:15 | Cafeteria |
| Thursday, 3/2 | 1:00-2:30 | Barclays Bank |
| Friday, 3/25 | 9:00-3:00 | Barclays Bank |

Absentee votes for employees who will not be on site during voting week will be accepted if a signed memo is sent with candidate selections to the Recreation Office, Bldg. 185. Memos must be received no later than 5 p.m., Thursday, March 24.

# Aerobic Dance Club

Don't let the change of seasons spring up on you. Be ready for summer by getting in shape this spring, with the Aerobic Dance Club. Join Instructor Pat Campbell for classes in:

• Stretch — Classes involve a choreographed program of exercises that concentrate on stretching and strengthening various muscle groups.

• Aerobic Dance — Classes emphasize cardiovascular improvement through vigorous, choreographed exercise.

Classes in aerobic dance will be held on Tuesdays and Thursdays, while stretch classes will be held on Mondays. All classes run from 5:15 to 6:15 p.m. Participants may take any or all of these classes.

The fee for each ten-week session (M, T or Th) is $30, payable at registration, which will precede the first classes and be held in the North Room of the Brookhaven Center, as follows:

• Stretch — Monday, March 28.

• Aerobic Dance — Tuesday, March 29, and Thursday, March 31.

For more information, call Bill Leonhardt, Ext. 2378; Elinor Norton, Ext. 3455; or Janet Sillas, Ext. 2345.

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# Basketball

**Scores as of March 10**

**First Game**

| Celtics 57 | | Runaways 44 | |
|---|---|---|---|
| J. Gaeta | 17 | P. Johnson | 20 |
| M. Fulkerson | 12 | R. Jackson | 7 |
| P. Ratzke | 8 | B. Doty | 6 |
| P. Browne | 7 | S. Gilbert | 4 |
| O. Aliefendioglu | 7 | J. Desmond | 3 |
| C. Edwards | 6 | T. James | 2 |
| | | R. Moran | 2 |

*Three Point Shots:* Aliefendioglu, Gaeta, Johnson (2)

**Second Game**

| Hollywood 42 | | Penetrators 47 | |
|---|---|---|---|
| G. Mack | 17 | R. Tonkyn | 12 |
| B. Gunther | 9 | R. Domenech | 11 |
| L. James | 7 | T. Abbott | 9 |
| E. Meier | 5 | T. Comstock | 9 |
| D. Nordstrum | 4 | J. Cyr | 2 |
| | | M. Piraino | 2 |
| | | G. Smith | 2 |

*Three Point Shots:* Abbott, Domenech (2)

**Third Game**

| Longshots 65 | | Knicks 78 | |
|---|---|---|---|
| T. Mayo | 22 | W. Cummings | 25 |
| F. Malone | 16 | Q. Harrison | 11 |
| J. Garrison | 9 | T. Mendez | 11 |
| F. Thompson | 8 | G. Thompson | 11 |
| J. Wells | 8 | M. Lawrence | 9 |
| S. Springston | 2 | L. Walcott | 7 |
| | | T. McGill | 2 |
| | | M. Williams | 2 |

*Three Point Shots:* Thompson

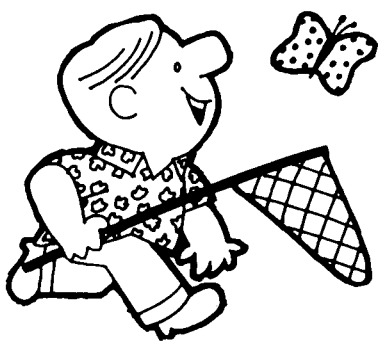
# Arrivals & Departures

**Arrivals**

**Bert M. Haug** ..... Accel. Devel.
**Octavian Iancea** ..... Central Shops
**Fred E. Izzo** ..... Plant Eng.
**Renee M. Moadel** ..... Chemistry
**Avril O. Singh** ..... AGS

**Departures**

**None**



**Leap into spring!**

# Cooking Exchange

The coming of spring will be celebrated by members of the Cooking Exchange Committee, as they demonstrate party food recipes at the next Cooking Exchange meeting on Wednesday, March 23, from 12:30 to 2:30 p.m., in the Recreation Building.

All Brookhaven employees and their families may attend the meeting, for which there is a $2 per person charge, to defray the cost of ingredients and for copies of the recipes. Babysitting is provided at 50¢ per child.

# Cafeteria Menu

## Week of March 21

**Monday, March 21**

| | | |
|---|---|---|
| Tomato rice soup | (cup) | .75 |
| | (bowl) | .95 |
| London broil w/gravy & 1 veg. | | 3.05 |
| Fried chicken livers w/1 veg. | | 2.85 |
| Seasonal fresh fruit plate (lite-weight) | | 2.25 |
| Hot deli: Baked ham | (bread) | 2.75 |
| | (roll) | 2.85 |
| | (hero) | 2.95 |

**Tuesday, March 22**

| | | |
|---|---|---|
| Beef noodle soup | (cup) | .75 |
| | (bowl) | .95 |
| Crusty herb-fried chicken w/1 veg. | | 2.85 |
| Skinless baked chicken w/1 veg. (lite-weight) | | 2.85 |
| Baked fresh fish w/lemon butter & 1 veg. | | 2.95 |
| Hot deli: Italian meatball hero | | 2.95 |

**Wednesday, March 23**

| | | |
|---|---|---|
| Cream of broccoli soup | (cup) | .75 |
| | (bowl) | .95 |
| Yankee pot roast w/1 veg. | | 3.05 |
| Eggplant parmigiana w/garlic toast | | 2.75 |
| Chicken chow mein over rice (lite-weight) | | 2.85 |
| Hot deli: Roast breast of turkey | (bread) | 2.75 |
| | (roll) | 2.85 |
| | (hero) | 2.95 |

**Thursday, March 24**

| | | |
|---|---|---|
| Chicken gumbo | (cup) | .75 |
| | (bowl) | .95 |
| Veal parmigiana w/1 veg. | | 2.95 |
| Fried fish amandine w/1 veg. | | 2.95 |
| Triple-dip salad plate (lite-weight) | | 2.25 |
| Hot deli: Corned beef sandwich | (bread) | 2.75 |
| | (roll) | 2.85 |
| | (hero) | 2.95 |

**Friday, March 25**

| | | |
|---|---|---|
| Deluxe Manhattan clam chowder | (cup) | .75 |
| | (bowl) | .95 |
| Roast loin of pork w/1 veg. | | 3.05 |
| Spanish beans & rice w/1 veg. | | 2.85 |
| Fresh baked fish w/1 veg. (lite-weight) | | 2.95 |
| Hot deli: Fried fish on a bun | | 2.85 |

# Classified Advertisements

## Placement Notices

The Laboratory's placement policy is to select the best-qualified candidate for an available position, with consideration given to candidates in the following order of priority: (1) present employees within the department and/or appropriate bargaining unit, with preference to those within the immediate work group; (2) present employees within the Laboratory as a whole; and (3) outside applicants. In keeping with the Affirmative Action plan, selection decisions are made without regard to age, race, color, religion, national origin, sex, handicap or veteran status.

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

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

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

**LABORATORY RECRUITMENT** - Opportunities for Laboratory employees only.

2813. CLERICAL POSITION - Will provide varied clerical support in the Publications Section. Responsibilities will include processing technical papers, assisting with customers' inquiries, handling orders, deliveries and shipping, and billing. IBM/PC data entry experience helpful as is previous experience in publications operations. Technical Information Division.

2814. SECRETARIAL POSITION - Requires excellent secretarial and communication skills and an extensive knowledge of BNL policies and procedures. Will perform diverse administrative and technical secretarial duties for an Associate Department Chairman and the Surface Physics Group. Under minimum supervision, will type technical manuscripts (on MICOM word processor), arrange domestic and foreign travel, and maintain files. Previous IBM/PC TeX experience helpful. Physics Department.

2815. TOOL & INSTRUMENT MAKER - Group Leader (Chemistry Staff Shop) Central Shops Division.

**OPEN RECRUITMENT** - Opportunities for Laboratory employees and outside applicants.

2816. P&GA CLERICAL POSITION (temporary) -Under general supervision, will perform complex and diversified clerical functions. Requires two years' post high school training or equivalent plus relevant work experience at an advanced clerical level. Photography & Graphic Arts Division.

2817. P&GA SPECIALIST - Familiarity with scientific notation for preparation of technical documents containing mathematical equations essential. Previous experience on Texet Electronic Publishing System desired. Knowledge of typesetting and good English skills helpful. Photography and Graphic Arts Division (Reposting of Job #2741).

2818. METAL WORKER MAINTENANCE A - Will construct and install a variety of metal equipment needed in plant maintenance such as sinks, gutters, ventilating hoods, stands, hangers, etc. Performs layout, preparation, measurement, assembly and installation. Performs necessary brazing, welding, and silver soldering incidental to the job. Makes own templates, sharpens tools and performs maintenance incidental to operation of machines. Plant Engineering Division.

2819. EXPERIMENTAL MACHINIST - Requires a minimum of five years' prototype experience in all-around machining, proficiency in job print interpretation, layout and machine set-up. Demonstrated ability and imagination in all phases of machine work is essential. Central Shops Division.

## Autos & Auto Supplies

80 SUZUKI GS550L - orig. owner, oil cooler, caseguards, sissy bar, 12k mi., excel. cond., $750. Ext. 4446 or 654-3989 after 5 p.m.

88 VOLVO DL240 - 4 dr., silver, brand-new, extras, relocating, must sell, $15,000. Ms. Taylor, 744-1833, 9 a.m.-5 p.m.

82 DATSUN 200SX - 5 speed, a/c, loaded, 99k mi., excel. cond., asking $2,600. John, Ext. 7770 or 4480.

80 CADILLAC COUPE DeVILLE - red w/white roof, cruise, tilt, tape, excel. cond., $4,700. Ext. 7732.

UTILITY TRAILER - 4'x8', Shoreline, homemade rack & gate, crank tongue wheel, $750. John, Ext. 4153.

78 CELICA - sunroof, new tires, brakes, exhaust, battery, clutch, transmission, $1,600. Ext. 7975.

72 YAMAHA 650 - many extras, $300; 4x8 utility trailer, $50. Kevin, 281-8031.

77 MERC MARQUIS - 122k mi., luxurious int., runs well, body damage, $200. San, Ext. 4023, 5211 or 929-3721.

83 305 CHEVY V8 ENGINE - complete, low mileage, excel. cond., $1,000; 350 Chevy V8 engine parts available. Tom, Ext. 4084 or 878-1060.

8' SLIDE-ON CAMPER - light-weight, Winnebago, good cond., sleeps 4, $400. 472-0706 after 6 p.m.

73 VOLVO 164E - runs well, a/t, $350. 878-2179 after 6 p.m.

PARTS - for 72 Chevette & 76 Firebird, engine, trans., bucket seats, body. Nick, 585-2707 after 6 p.m.

84 RENAULT ENCORE - a/t, very good cond., $3,200. Javier, Ext. 3134 after 6 p.m.

85 COUGAR - p/s, p/b, p/w, a/c, tilt wheel, cruise, $7,500 neg. 878-8145.

TIRES - 3, Firestone Supreme all-season radials, P175/80R13, 2 excel., $20/each; 1 good, $5. 286-8119.

81 HONDA ACCORD - 2 dr., hatchback, am/fm, a/c, a/t, good cond., orig. owner, $2,700. Bob, Ext. 4446.

85 C10 PICKUP - 24k mi., rack, excel. cond. John, Ext. 4153.

WESTERN WHEELS - 4, cast aluminum, Cyclone II, 14x5.5, w/all parts & locks, 4-lug, best offer. Sue, Ext. 4931.

TRUCK TIRES - 4, Goodyear Vector, new, steel-belted radials, P235-75R-15, $300. John, Ext. 5152 or 281-2471.

86 CHEVY PICKUP - shortbed, 4x4, V8, a/t, all options, $10,995. 588-9459 after 5:30 p.m.

85 HONDA ODYSSEY - used 20 hours, mint cond., asking $1,900. Steve, Ext. 2310.

72 CADILLAC SEDAN - very clean in/out. John, Ext. 4988.

78 VW DASHER - grey, rebuilt engine, $1,400. 751-0042.

79 VOLVO - 4 dr. sedan, tan w/brown int., 117k mi., 4 speed, $3,000. Sue, 744-7517 or 548-7118.

84 PONTIAC FIERO - a/c, cruise, cassette, luggage rack, sunroof, 25k mi., $5,200. Chris, Ext. 4028.

84 FORD MUSTANG - am/fm tape, p/s, p/l, a/c, sunroof, alum. wheels, 61k mi., $5,900. Ext. 4846 or 363-6940.

49 DODGE - 4 dr. sedan, orig. rebuilt engine, driven daily, $3,000. Dennis, Ext. 4028 or Bill, 477-1554.

84 BUICK SKYHAWK - 4 cyl., 2 dr., a/t, a/c, p/s, am/fm cass., sunroof, new brakes, excel. in/out. Joan, Ext. 2266 or 331-9264.

82 PLYMOUTH RELIANT - runs well, 84k mi., $300. Tamara, 588-0068 after 5 p.m.

76 CHEVY C-30 PICKUP - new paint, no rust, trailer ready, cap. Joe, 981-2480.

82 FORD ESCORT - 4 speed, 88k mi., am/fm cass., new clutch, good cond., $1,100. Ext. 3079.

## Boats & Marine Supplies

20' IMPERIAL - 1984, cuddy, 140 h.p. I/O, excel. cond., low hours, full canvas, extras, $8,500. Dennis, 736-5736 after 5 p.m.

32' CHRIS CRAFT SEA SKIFF - 1965, hull, as is, $500. Bob, 654-3206.

16' TELEX-FLEX - steering cable, used one season, excel. cond., $60. Ext. 4446 or 654-3989 after 5 p.m.

16' MICHI-CRAFT SPORTSMAN CANOE - Styro pontoons & ribbing, motor mount, excel. cond., $700. John, Ext. 4153.

BAYLINER BOWRIDER - 1984, mint, 125 h.p. Volvo I/O, used 100 hours, fully equipped, $7,300. 424-6916 eves.

17½' GLASPAR - deep V, 65 h.p. Johnson, 18-gallon tank, all access., $1,500 Tom. Ext. 4030 or 654-5529.

14' DURANAUTIC - 20 h.p. Johnson, electric start, tuned 9/87, trailer, extras, $875. 929-8641.

BOAT TRAILER - galvanized, for 17' boat, good cond., $350. Ext. 7686 or 878-0897.

## Miscellaneous

ROTOTILLER - $175; refrigerator, electric stove, exerbike, freezer, bookcases, desks, chairs, lamps, all $10-35, must sell today. Rick, Ext. 3979.

STROLLER - folding, for 2 children, $30. Ady, Ext. 4531 or 331-3785.

ANNUALS - $10 per flat; azaleas, $5; geraniums, $2; hanging fuschia, $10; shrubs available; call for 1988 order form, order by 4/1. Ken, 744-0722.

CANNING JARS - collectible "antique", glass-top, canning, 34 total; 44 Mason jars complete w/screw caps & lids, no reasonable offer refused. 669-9234.

CONVECTION TURBO OVEN - Farberware; living room chair. 475-0509.

TWIN BEDS - 2, mattress & spring w/frames, almost new, $70/ea. Ext. 5076 or 744-4615.

BIKE - 20" boy's BMX type, Peugeot, good cond., $75; Atari 2600 w/about doz. cartridges, $50. Walter, Ext. 3499.

DINING ROOM SET - dark pine, table w/4 chairs & hutch, redecorating, $400. Doreen, Ext. 2456.

WELDER - Lincoln, portable gas, 2 cyl., 225 amperes, like new, early 80's, $1,500; assorted hand tools. John, 884-3228.

STEAM CARPET CLEANER - Steamex, professional, 600 psi, all accessories, $975. 928-9568.

SWIMMING POOL - 28' round, best offer, worth $1,000, asking $400. 924-9656.

SOFA - $75; matching loveseat, plaid herculean w/loose cushions, $50. 751-1884.

TABLES - chrome & glass, two 14"x14", $25 for both. Linda, 744-0722.

POLAROID AUTO 250 - w/case, flash, cable release, $35. Ernie, 588-4987.

FIREPLACE - free-standing, black, open front w/screen, $75. Bert, Ext. 2050.

SNOW BLOWER - Sears, 3½ h.p., single stage, 20" path, good cond., rebuilt engine, $75. 758-9743 after 6 p.m.

SCOOTER - 1984 Yamaha CA50L, 50 cc, new panels, needs some mechanical work, $300. 758-9743 after 6 p.m.

HOT WATER TANK - 80 gal., glass lined hydro-pneumatic pump, $50. Bob, 732-9517.

LIVING ROOM FURNITURE - couch, chair, 2 tables, curtains, stereo, assorted items, reasonably priced. 758-9743 after 6 p.m.

POTTED PLANTS - amaryllis bulbs, potted & budded, $2.50/ea. 727-8631.

CB BASE UNIT - 40 channel, upper & lower side band, ant., power mic., $225; drawing table, 72"x 42", hardwood top, steel frame, $225. Ext. 2274.

FIREWOOD - seasoned, local hardwoods, split, delivered, stacked, $125 per cord. John, Ext. 4153.

BEDROOM SET - blond, full headboard, night table, highboy, dresser w/mirror, vanity w/mirror, $350; microwave cart, $45, Karen, Ext. 4262.

IBM PC - 256K, two 360K floppies, color, Hayes modem w/Smartcom II, microspooler, mouse, $800. Elaine, Ext. 5329.

CAMERA - Pentex ME 35mm, wide angle lense, 2X lens electronic flash, case & gadget bag, $150. Ext. 4680 or 286—1331 after 5 p.m.

MOVING SALE - 7' Colonial sofa, occasional cabinet, table, chest, end table. Otto, 878-4063.

AQUARIUS COMPUTER - w/16K memory, data rec., printer, file form, etc., good starter system for beginner, $120 neg. Ernie, 588-4987.

CHAIN LINK FENCE - 75', black vinyl coated, w/rails, posts, gate, never installed, $300. Rod, Ext. 4428.

SCREENS & STORM WINDOWS - wood, 9 each, good cond., $35. Cliff, Ext. 3794.

LAWN MOWER - 20" cut, rear bagger, Sears, $80. Dan, Ext. 4987 or 698-7322.

MICROWAVE - Magic Chef, like new cond. w/factory installed door latch & output check. Ext. 2043.

WORKBENCH CHAIR - adjustable, stationery, $25. 744-5871 after 6 p.m.

SOFTWARE - Microsoft Basic for Apple MacIntosh Ver. 1.01, $50; Teach Yourself Peach text, $40. Susan, Ext. 4267.

SOFA - 81", dark brown leather, $25. Dave, Ext. 5178.

CHAIN - ½" proof-coil galvanized, $2.25 per foot. Bob, Ext. 5314.

STAMP REPLICAS - Gold Leaf, w/first day of issue stamps, 2 handsome albums, Ext. 3846 or 4493.

WINDOW - Caradco, insulated, double, 5" wide, 4' high, 4/4, good cond., $18. Rick, Ext. 3979.

ARTIST'S PAINT SET - oil, new, orig. $90, now $60. 286-1097.

GRANDFATHER CLOCK - triple chime movement, moving moon dial, $400. Joe, Ext. 2898.

SOFA & CHAIR - $100; chair & ottoman, $75; coffee & end tables, $100; blender, $20; punch bowl, $25. Ellie, Ext. 3395 or 325-1537.

POOL SUPPLIES - solar cover & reel, diving board, Pace chlorine tablets, granules. Ext. 4727.

B&W TV - 12", good cond., $10. Ext. 3079.

## Free

TWO GERBILS - 1 black, 1 brown, tame, male, tank w/top & access. 924-3756.

## Lost & Found

FOUND - 2 Volvo car keys, near Bldg. 725. Ext. 5786.

## Car Pools

LIE EXITS 20-36 - one member wanted, 8:30 a.m.-5:00 p.m., daily. Gus, Ext. 7982.

MORICHES - person wants to join. Dick Hahn, Ext. 4337 or 874-2380.

BOHEMIA/OAKDALE/SAYVILLE - needs 2 drivers. Frank, Ext. 2314.

BABYLON/BAYSHORE - needs 2 riders to form 4-person car pool, 8:30 a.m.-5:30 p.m. Mike, Ext. 2061.

## Real Estate

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

## For Rent

HAMPTONS - summer rentals, share Victorian house in the heart of the Hamptons. Leonid, Ext. 3761 or 718-646-8598.

MIDDLE ISLAND - 3 bdrms., 2 baths, eik, fp, 2-story, wooded 2 acres, avail. April 1, John, Ext. 3675 or 924-3528.

BELLPORT VILLAGE - 1 bdrm. cottage, couple preferred, no pets, non-smoker, references required. Ed, Ext. 2700 or 286-7539.

BAITING HOLLOW - 5 bdrm. contemporary, new, $1,500/mo. + util. 821-2002 or 331-7060 eves.

RONKONKOMA - new 1 bdrm. apt., l/r-kit. combo., full bath, priv. ent., w/w, cable, no pets, non-smoker, single occupancy, off LIE exit 59, $600/mo. Ray, Ext. 4428 or 467-8297.

SHIRLEY - new 1 bdrm. apt, w/w, new appliances, mature working woman, non-smoker preferred, $575/incl. all. 281-1840 after 4 p.m.

CLEARWATER, FL - 2 bdrm. condo, 2 baths, patio, tennis, pools, near golf, beach, schools, avail. May 1, rent neg. Jim, 732-3698.

HILTON HEAD, SC - sleeps 6, beach, pool, golf, tennis, March $320/wk., April $420/wk. 585-9149.

NORTH SHIRLEY - 3 bdrm. apt., 1 mile from Lab, excel. cond. (215) 758-3930, (215) 861-2666, or (215) 877-8064 after 5 p.m.

## For Sale

PORT JEFFERSON - Harbor Hills, 3 bdrm. ranch, 3 baths, wooded golf course setting, balcony, deck, patio, 2-car garage, 3-zone gas heat, $259,900. Ext. 3791 or 928-7154 eves.

PORT JEFFERSON - Harbor Hills, 4 bdrm. split ranch, d/r, eik, family room w/fp, brick patio, winter waterview, excel. cond., $199,000. Ext. 4483 or 473-3689.

RIVERHEAD - mobile home in adult park on Peconic River, 2 bdrms., 1½ baths, new carpeting & floors, new bath, $39,000. 369-2838.

HILTON HEAD, SC - 3 bdrm. condo, sleeps 8, 2 baths, washer/dryer, wet bar, 6 tennis courts, 3 pools, whirlpool, golf, ocean view, asking $89,000 or will rent. 929-8912.

LAKE GROVE - 3 bdrm. hi-ranch, possible M/D, custom-built, brand-new, must see, $179,000. 732-7695.

PATCHOGUE - large 1 bdrm. coop, 2nd floor, w/w, new kitchen, appliances, d/r, l/r, lots of closets, a/c, balcony, near all, immaculate, must see, $69,000. Ext. 2679 or 472-0392.

SHOREHAM - 3 bdrm. ranch, l/r, d/r, partially finished bsmt., detached 22'x24' 2-car garage, patio, a/g pool, city water, fenced ⅓ acre, SWR school district, $150,000. Judy, Ext. 5263 or 821-3290 eves.

SETAUKET - north of 25A, 6 rm. cape, 2 baths, 2-car garage, wooded area, 3 Village schools, asking $190,000. 751-1401.

BELLPORT - 4 bdrm. Colonial, 3½ baths, l/r, d/r, kitchen, pantry, sunroom w/jacuzzi, 3 screened porches, attic, 2-car garage, walk to village & bay, asking $675,000. 286-0269.

RIDGE - 3 bdrm. ranch, eik, cedar skylight, bath, newly finished bsmt. w/bar & w/w carpet, 1 acre, energy efficient, 5 min to Lab, $149,000. 924-7677.

SETAUKET - north of 25A, 3 bdrm. ranch, 2 baths, open l/r, fp in den, 2-car garage, patio, beautiful landscaping, hilltop setting. Ext. 7560 or 689-7494.

PALM COAST, FL - ¼ acre lot, Greenbelt backyard, approx. 3-5 miles to ocean, 24 miles to Daytona, water & sewage util., $3,995 & take over payments, $142/mo. over 7½ years. Tom Nolan, Ext. 5265.

SHOREHAM - 4 bdrm. cape, 2 baths, l/r, d/r, finished bsmt., garage, low taxes, $140,000. 744-7831.

MILLER PLACE - north of 25A, 3 bdrm. custom ranch, entertainment area, l/r, family rm., custom fp, 24'x26' 2-car garage, finished bsmt., more, $225,000. Ext. 3353 or 473-5786.

## Wanted

SMALL APARTMENT - for senior citizen, economical, Patchogue to Shirley area. Marion, Ext. 2902 or 281-5667.

GARDEN HOSE & DRIVEWAY - where I can wash my car on weekends, near Lab, will pay $3/wash. Ext. 2136.

BRICKWORK - repair brick stoop by door. Ext. 2914 or 286-3742 eves & wknds.

RENTAL - on Fire Island. Ben, 684-7326.

BASEBALL CARDS - any cond., young boy wants to start collection. 924-4070.

TRAINS - Lionel, American Flyer, accessories, any cond., brings good price. Carole, Ext. 7100 or 924-4097 eves.

HOUSE MATE - to share house in lovely area, walk to bay, female only, $375 + ½ util. Ext. 2145.

GOOD HOME - for 6-year-old cocker spaniel, black/brown, good disposition, great w/children. Donna, 331-9792.

SUMMER HOUSING - for visiting couple, furnished, 1-2 months, starting May or June. Tang, Ext. 3869 or 5186.

BABY CRIB - excel. quality & cond. only. Bob, Ext. 2350 or 732-9517.

HOUSE RENTAL - 2-4 bedrooms, starting June, summer or all-year, North Shore/Fork, prefer Mattituck-Cutchogue School District. Ext. 7657.

## On-Site Services

FRIENDLY GULF SERVICE - weekly special, replace front brakes, resurface rotors, repack bearings, metallic pads extra, $69.95. Ext. 4034.

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