



Andrew Hull

## Bnl Lecture A Perspective of TMI

"In terms of the amounts and kinds of radioactivity released and the resultant radiation dose to the surrounding population, from an environmental perspective the incident at the Three Mile Island Nuclear Power Station on March 28, 1979 has to be ranked as a relatively minor event." The speaker is Andrew P. Hull and he will present his views on "Three Mile Island as Seen From the Mainland: An Environmental Perspective," in the next Brookhaven Lecture at 8 p.m., September 26, in Berkner Hall.

According to Hull, the widespread popular attention given to the incident and the significance attached to it in many quarters, seem illustrative of the current gap (abyss) between popular perceptions and the views of the informed experts of many current technological risks, of which nuclear power is perhaps the most outstanding example.

Hull maintains that neither the average dose to the surrounding population nor even the maximum dose to any nearby individual seems extraordinary when compared to other sources of radiation exposure. He cites exposures such as background radiation and its variations within the US, or the annual average environmental radiation dose due to the routine operation of some power reactors a decade ago. The estimated risk of one additional fatal cancer attributable to the incident, in a population of over 2,000,000, seems trivial, Hull says, when compared to its expectation of about 325,000 cancer deaths from other causes, at currently prevailing rates.

In his lecture he will also discuss the uncertainty which prevailed during the incident. This uncertainty stemmed from a variety of factors, he says, including the difficulty in establishing the status of the plant,

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## The Miniature Marvel

A chip which is the programmable control and processing portion of a small computer is rapidly taking over the functions formerly handled by bulky and expensive computer hardware. Because it is small and cheap, this silicon "chip," known as a microprocessor, has widespread application and is being used for purposes which previously would not have been possible.

The microprocessor is typically  $\frac{3}{4}$ " x  $\frac{1}{2}$ " x  $\frac{1}{16}$ ", is edged with 40 connecting pins, and contains thousands of semiconductor logic elements. Once started, a microprocessor will step through a program stored in memory and will decode and execute each instruction. Instructions include such things as arithmetic and logic operations and movement of data. Several chips can be put together with a memory and keyboard to form a microcomputing system, or for special purposes, a single chip can be designed to be in itself a complete computer.

This miniature marvel is the latest evolution in the electronics field progressing from vacuum tubes, transistors and integrated circuits. It is a "hot" item today because it is so inexpensive and so small. For instance, Gerd Dimmler, who is Head of the Systems Group in Instrumentation, noted that in 1972 a complete computer, called a PDP 11/40, cost about \$20,000 and filled one-half of a relay cabinet. Today, thanks to microprocessors, the same work can be done by a microcomputer PDP 11, called an LSI 11, costing about \$1800 and consisting of three modules which fit into a space 16" long x 3" wide.

The market is flooded with a wide range of microprocessors made by different manufacturers. In designing a microprocessing system, once a certain type of microprocessor has been decided upon, it is necessary to stick with it as the different lines are not compatible. In addition, as there is a considerable quantity of associated equipment necessary for development of microprocessor systems, the total investment is considerable.

However, once the system is in operation, the big advantage of microprocessors is that if a program change is required, it can be done simply by putting in a new memory chip, modifying the memory chip, or, in some instances, by erasing the memory chip with an ultra-violet light and entering a new program. In any case, it isn't necessary to redesign the hardware.

At Brookhaven, microprocessors will be key components in the design of systems for ISABELLE, the National Synchrotron Light Source and the Inhalation Toxicology Facility.

### ISABELLE

ISABELLE will use microprocessors on a large scale for what one might call intelligent instrumentation. Many of ISABELLE's monitor and control points can be locally processed; an intelligent instrument could monitor these variables and

only communicate with its controlling computer when variables are to be modified or exceed present limits.

A typical example is the magnet power supply system. Each magnet power supply (there are 392) will have an embedded microcomputer which will perform a variety of control, monitoring and communication tasks. Although small in size and low in cost, the controller adds the local intelligence necessary for communication with its control computer, increases function and reduces the size of power supply circuitry. Major features include reference program generator, power supply fault checking, computer interface and power supply status commands. The reference program generator, for example, will compensate the field in ISABELLE's magnets so as to allow injection, acceleration and interaction of ISABELLE's particle beams.

Approximately 1,000 microprocessors will be the intelligent instruments of ISABELLE, working with about 15 large control computers. Without microprocessors, the problems would have been handled by one or two huge computers which would have had to move a lot of information around the system and, eventually, would have become completely saturated. John (Rusty) Humphrey is responsible for the overall development of the computer system and Robert Frankel is in charge of the microprocessor technology.

### Light Source

The control system for the National Synchrotron Light Source being developed under the direction of Bryan Culwick, makes extensive use of microprocessors. The central control computer system, dual Data General Eclipse computers, is connected to all synchrotron equipment via about 35 microprocessors. Each micro controls and monitors a block of equipment and is responsible for executing commands sent to it from the central computer and for independently monitoring the operation of the equipment assigned to it. This type of system is sometimes called "distributed intelligence."

Such a system has many advantages over a centralized system. Dedication of a



This object may be small but it's powerful. The microprocessor is revolutionizing computer technology.

micro to a limited range of equipment allows a simple system to provide rapid and exact service to that equipment. The local intelligence is used to make decisions about the operation of the equipment and exceptional conditions are reported to the central system without the need for repetitive scanning on its part. This permits the central computers to concentrate on high level correlation of machine activities and service to accelerator operators.

The microprocessor systems used are based on the Intel MULTIBUS®, support for which is provided by many manufacturers. Complete commercial system units for the MULTIBUS are purchased and assembly requires no more than the plugging in of boards and selection of some options. Current systems use 8080 microprocessors in the form of single board computers, but other processors (8085, Z80, 8086) are available in the MULTIBUS configuration and multiprocessor systems can be used. Each micro is connected to the central computers by a four-wire link which can be several thousand feet long.

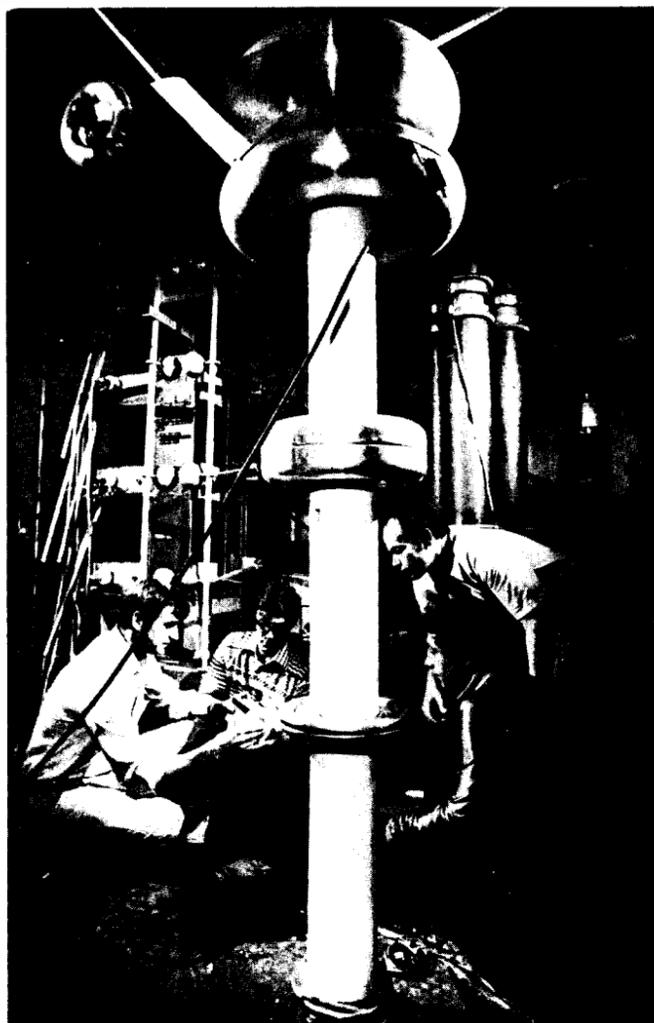
Microprocessor programs replace almost all the local logic which required hundreds

(Continued on page 2)

## NRC Commissioner Visits BNL



During an afternoon tour of some Laboratory facilities on Sept. 10, Commissioner Richard T. Kennedy (center) of the Nuclear Regulatory Commission, and his aide, John Stephens, were briefed at the AGS by Associate Director R. Ronald Rau. Accompanying the Commissioner were Walter Kato, Associate Chairman for Reactor Safety, Mrs. Kennedy and DNE chairman Herbert Kouts. In the morning Dr. Kennedy heard presentations on the Laboratory's nuclear programs. This was his first visit to Brookhaven.



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Three Soviet scientists visited BNL for two weeks this month as part of a US/USSR program of scientific and technical cooperation in the field of superconducting power transmission. They were here to take part in experiments on high voltage dielectrics. Gathered around high voltage test equipment are (left to right) Andy McNerney, BNL; Aleksander A. Panov, from the V.I. Lenin All-Union Electrotechnical Institute; and Sergei G. Gosteev and Victor A. Goncharov, both from the Krzhizhanovsky Power Engineering Institute.

— photos this page by Humphrey

## Semester Students



Five more students arrived at the Lab this month to participate in the Brookhaven Semester Program. Seated is Michael Ward, Norfolk State, who is working in DNE. Standing, left to right, is Reva Robinson, Bishop State, and Allen Burkes, Alcorn State, both assigned to DNE; Marilyn Tobias, Alcorn State, DEE; and Michael Mann, Norfolk State, Physics. Besides working with advisors in their assigned departments, the students also take courses taught by BNL staff. This is the 23rd semester of a continuing program involving BNL and a consortium of predominately black colleges. The Semester Program provides students with educational opportunities that may not be available at their campuses. —photo by Humphrey

## Microprocessors (Cont'd)

of integrated circuit chips in previous designs, and which lacked the flexibility and reliability of the microprocessor systems.

## Inhalation Toxicology

The Inhalation Toxicology Facility requires a system which monitors and controls the equipment and handles all the experimental information. To do this, the Systems Group of the Instrumentation Division uses from 30-35 microprocessors of the PDP11 power, each programmed for a specific function. There is nothing that can be identified as a "central computer." One cluster keeps track of the data base which will have a storage capacity equivalent to about 100,000 typewritten pages of experimental information on animals under test. Using a keyboard, experimenters can recall any information needed and display it on TV sets. Another cluster controls the air, temperature and pollutants in the chambers. One microprocessor handles all the messages that the system wants to tell the operator, for example, if a valve is stuck, or if there is an error in another chip.

The microprocessors are used not only to provide services, but to monitor their own systems. For instance, one chip will do nothing but make sure that all power supplies are operating. Another will monitor the power and temperature of two drawers full of electronic equipment that are in a hermetically sealed area and not otherwise accessible. According to Gerd Dimmler, this system could not have been built several years ago because it would have meant a houseful of hardware.

## Applied Math

The Applied Mathematics Department's hardware development efforts have been dependent on microprocessor technology for some time. Include are projects supportive of in-house maintenance activities, monitors to help in the evaluation of the performance of computers, development of customized terminals for remote access to the computers, and the design and development of a class III computer. In each area, the microprocessor, because of its

small size, low cost and programmability has demonstrated its usefulness and flexibility in handling diverse system functions and tasks.

A hardware monitor employs two Intel 8085 microprocessors to monitor internal signal exchanges within the large computers at the Central Scientific Computing Facility. This information will furnish the department with a measure of how efficiently the computers' resources are being utilized. Another system, the Synchronous to Asynchronous Controller (SAC) uses the Intel 8080. SAC is programmed to communicate with CDC 6600 computers through telephone lines from a remote location in the language of the computer. It can accommodate a variety of peripheral gear and could be configured as a remote job terminal, a graphics station, or part of a distributed processing system.

Perhaps the department's most enterprising venture is in looking at the feasibility of building a class III computer. The Motorola 10800 bit-slice microprocessor family is being considered as a means to implement the architecture of the system. Microcode, which is the microprocessor software, is being designed and when executed will emulate a 6600. Every instruction in the 6600's repertoire has its own microcode. This microprocessor system will perform jobs at faster speeds, at lower cost and will occupy less space than the original design.

The applications for microprocessors are increasing daily. Probably the best known to the average citizen is the pocket calculator which is now used by just about everybody. Among many other consumer product applications are video games, washing machine timers and microwave ovens. Microprocessors will soon be a standard feature in autos to control ignition timing, fuel mixtures, etc. The powerful micro has revolutionized computer technology and it is difficult to keep up with its advances. Lab employees who are interested in learning more about microprocessors are welcome to attend the recently formed Microprocessor Club, which meets on Tuesdays from noon to 1 p.m. in the Biology Dept. library.

## Tour Features S &amp; EP Division

For this weekend's mini tour, members of the Safety and Environmental Protection Division will be on hand at the Exhibit Center to discuss general activities of that division. These include environmental monitoring, health physics, industrial hygiene, occupational safety, waste disposal, and basic and applied research. A slide show on the people and equipment involved will be presented.

Visitors will also view "Brookhaven's Quest" and tour the Exhibit Center.

## BNL Lecture (Cont'd)

the inability of its monitoring system to measure the concentrations of radioactivity being released and the delays inherent in establishing it from field measurements, as well as the involvement of many governmental agencies with no clearly defined leadership or single source of authoritative information.

Earlier this year, before TMI, in defending the safety record on nuclear power, nuclear proponent Ralph Lapp said that it had not even had a "fender bender." Hull says, "I believe he would now have to allow that it has had a near 'total'. But it has been one from which everyone walked away with hardly a scratch, and from which many valuable lessons have been learned about the necessity for the prompt evaluation and decisive management of technological failures with large potential adverse consequences."

Andrew Hull is a Certified Health Physicist who, for most of his career, has been associated in one way or another with nuclear reactor operation. Since he joined the Lab in 1961, he has been Supervisor of Environmental Monitoring, a function of the Safety and Environmental Protection Division. Before coming to Brookhaven he was associated with the Reactor Survey Group at Oak Ridge National Laboratory and from 1958 was Supervisor of Health Physics at Industrial Reactor Laboratories in New Jersey.

Hull has been an active member of the Health Physics Society for many years and is currently chairman of its Public Information Committee. In addition, he serves as the Society's official representative to the Intersociety Radioactive Substances Subcommittee. He is also a Fellow of the American Public Health Association and was elected last year to the Association's Governing Council. Because of his expertise in the field, Hull is frequently asked to speak at public information meetings to present the scientific viewpoint on the environmental effects and significance of radiation releases.

A buffet supper is served at 6:30 p.m. at the Brookhaven Center before the lecture. Many find it convenient and it is a pleasant way to meet members of other departments. Reservations for the buffet should be made in advance by calling Ext. 3541 before 5 p.m. on the day of the lecture.

## 170 Attend Linac Conf.

A highly successful conference on linear accelerators held last week at Gurney's Inn at Montauk was attended by 170 people from the U.S., Canada, Western Europe, the Soviet Union, Japan and the Peoples Republic of China. It contrasted with the first conference held in 1961 at Brookhaven, attendance at which totaled 20. Six of that original group were present at last week's conference.

The conference content differed from earlier ones. In 1961, efforts were aimed at the problems of high energy physics. Now, many new applications have arisen in such fields as medicine, radiography and fusion. A Boston corporation is building a linac to produce isotopes. Almost a thousand electron linacs have been industrially produced for use in medicine and radiography.

Papers presented at the conference dealt with many new and sophisticated design ideas that have been evolved and tested. Particularly interesting is a scheme called the RFQ (radiofrequency quadrupole) in which an accelerating field is used to focus a beam of particles. This opens up regions of energy that were previously inaccessible. First proposed in the Soviet Union, the idea is being developed at Los Alamos.

In the middle of the week, the conference was suspended for a day. About half of the conferees journeyed to BNL for a tour of the accelerator facilities, and others went off on fishing trips. One of the visitors from Japan caught a 20-pound striped bass, which was served at dinner.

The next linac conference will be held at Los Alamos in 1981.

## NYIT MBA Courses

If there is sufficient interest, this fall, credit courses toward a Master of Business Administration will be offered to BNL employees by the New York Institute of Technology. Classes will be held at the Lab immediately after working hours.

The following courses are planned:

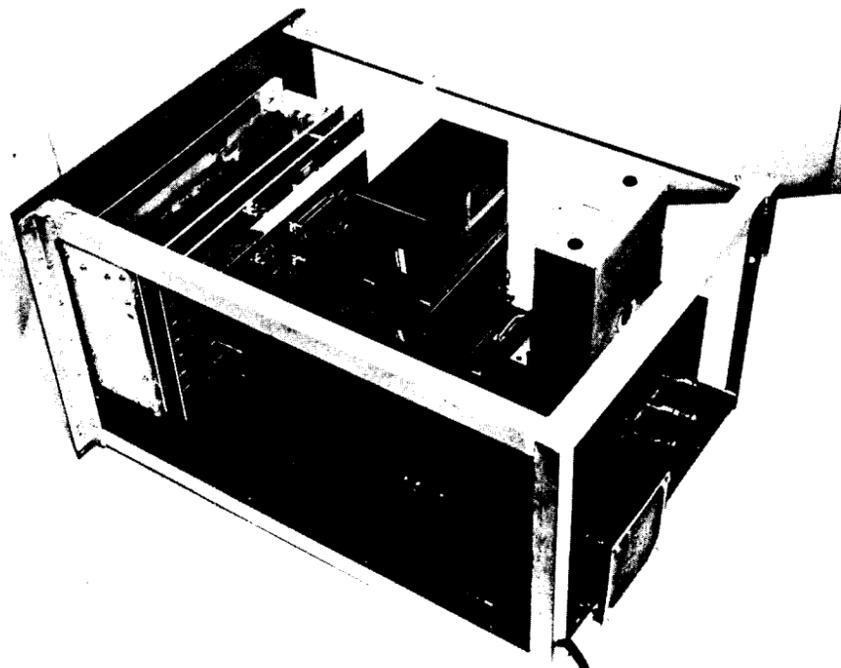
0121	Quantitative Methods
0108	Marketing Management
3511	Accounting I (prerequisite, also available to undergraduates)

The methods and marketing courses are \$255 each and the accounting course is \$240; related school fees are also assessed. Employees may take advantage of the Laboratory's Tuition Refund Program, or may be eligible for Veteran's assistance. Information on both may be obtained from the Personnel Office, Ext. 4262.

If the minimum student enrollment requirement is met, the courses will start in approximately two weeks. Contact Renee Flack, Ext. 3316, as soon as possible for more information and registration forms.

## CREF Values

January	\$40.90	February	\$39.47
March	41.60	April	41.61
May	40.58	June	42.12
July	42.57	August	\$44.50



One of the 392 power supplies planned for ISABELLE. The entire unit is 12 3/4" high, 19" wide and 24 1/4" deep. The controller package (at left of unit), which will be imbedded in each power supply, takes up about 10% of the space.

# BROOKHAVEN BULLETIN

Published weekly for the employees of  
**BROOKHAVEN NATIONAL LABORATORY**

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## Letters To The Editor

To All Employees:

We would like to express our heartfelt gratitude for all your warm support and understanding during our recent bereavement.

Mrs. John Halada and family

To The Editor:

Thank you to the Lab Firemen and Lab Security for their life saving help for Sonny Densieski after a car accident August 10th on William Floyd Parkway. Thanks also to all the BNL employees and friends for many cards and visits.

The Densieski Family

## Women In Science

BNL Women in Science is an association which has been formed to provide an interdisciplinary network for women in science and related professions. Its aims are to provide a forum for the exchange of professional and technical information; to promote the advancement of women in the professions; to provide mutual support; and to raise the consciousness of individuals to the problems of career oriented women.

All women who are sympathetic to these stated aims are invited to come to the next monthly meeting of the association on Wednesday, September 26, from noon to 1 p.m. in Room A, Berkner Hall. This will be a working meeting at which officers will be elected. Dues for the coming fiscal year, beginning October 1, are \$2 and will be collected before the start of the meeting. For further information, call Vickie McLane, ext. 2902, or Harriet Fadem, ext. 4853.

## Drivers Note

If you rent cars for official or personal use and don't recognize this label, you are missing out.

A/A 298900					
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RESERVE AVIS 800-331-1212

Check with the Travel Office for more information.

## Arrivals & Departures

### Arrivals

Felix Betancourt	Energy & Env.
Richard A. Ferrieri	Chemistry
William J. Foyt	Physics
Dershin Gan	Energy & Env.
Thomas J. Killian	Physics
Herbert L. Kinney	Director's Ofc.
Harold Klein	Contracts & Proc.
Chuen-Ching Lin	Nuclear Energy
Paul Marnell	Energy & Env.
Sylvia Mouzakes	Staff Services
Larry E. Ruff	Energy & Env.
Govind R. Vinjamuri	Energy & Env.

### Departures

Florence T. Dunne	Physics
Robert W. Judd	Ph. & Gr. Arts
Robert P. Lenz	Biology
Tadashi Matsubara	Chemistry
Thomas P. Radus	Chemistry
Nancy O. Sautkulis	Biology
Kim L. Shiplet	Medical
Thomas N. Tudron	Physics

## Free Compost

If you are the type of gardener who turns over your garden every fall, this year you can dig in free leaf compost from the Brookhaven Town Ecology Site. According to Frank German, Biology, a two to three inch layer of compost will add organic material for next year. Just be sure to dig it under (but not deeper than six inches) or it will dry up and blow away during the winter.

The Brookhaven Town Ecology Site is located at Pine Road in Coram, and is open to Brookhaven Town residents seven days a week from 9 a.m. to 4 p.m. Remember to bring a shovel. For more information, call Sid Jungreis, Medical, Ext. 3688, who has been using the Town's free compost for years.

## Handball

Looking for exercise? You are invited to join a group of handball players who play during lunch, outdoors against one wall. For information, contact Jerry Bennett, Ext. 4082 or Sy Holtzman, Ext. 3600.

## Bowling

### Green League

The Phoubars, a new team, took eleven from the Pinball Wizards. The Light Source another new team, took eight from the Trouble Shooters. The Blue Jays and the Old Timers II just about split as the Blue Jays took six. The Sparks could only salvage five from the Freon Loaders. W. Kristiansen had a 200, J. Carroll 213, and B. Sells a 214.

### Purple & White League

Jim Griffin rolled a 565 series with high game of 219. Bob Brown started the night with a 214 and rolled a 564 series. For the ladies, Sharon Smith had a 546 series with 168/196/182 games.

Other good games were Bob Callister 211, Ed Meier 209, Nate Carter 206, Fred Usack 201, Pat Manzella 191, Jean D'Alsace 176, Kathy Griffin 172.

### Red League

The Designers took This Isa Team 11-0. E. Sperry grossed 628 and A. Pinelli 608. The Old Timers had the best night in the Red with 2945 pins (1043 game) and took 8 from the Strangers. J. Roesler (210) had 650 gross pins and W. Reams (202) 622 gross.

The 76'ers won 8-3 over the Sandbaggers. C. Bohnenblusch had 618 gross wood, J. Petro 603 gross and J. Morris a 203 game. The Freon Loaders split 6-5 with the Sparks. F. Stahman grossed 612 and R. Marlow had a 215 game.

### Pink League

The first night was typical, a lot of moaning and groaning but some managed to rise above the "first night" blues to come up with some good games. High for the night was Pat Jencius with a 177 and a 461 series. Renee Flack had a 171, Marge Stoeckel 169, Renie Rosati 167, Millie Connelly 166 and Marie Grahm 165.

## Softball

### Final Standings

#### League I

	Wins	Losses
Blue Jays	12	1
Phoubars	11	3
Six Pax	9	5
Sweathogs	9	5
Ravens	7	6
Source I	4	10
Strikers	3	11
Old Timers	0	14

#### League II

	Wins	Losses
*Titans	12	2
*DEE Generates	12	2
Dirty Sox	9	5
Roga	8	5
AMD Bombers	7	6
Cardinals	5	9
Charlie Browns	1	13
Source II	1	13

\*Playoff for championship won by the Titans.

#### League III

	Wins	Losses
Moles	13	2
Big Sticks	11	4
Nuke Powers	7	7
Binary Bombers	6	8
Ice Pops	4	11
Medical	2	11

## French Actor On Stage At Berkner Next Week

On Tuesday, September 25, the French actor and director Eric Eychenne will appear in a one-man theatrical production at 8 p.m. in Berkner Hall. *Le Cercle Français de BNL*, sponsors of this event, are asking that non-members donate \$2 (students \$1) towards the expenses of this presentation, which will be in French.

M. Eychenne will enact some of the vignettes of seventeenth century French court life described by the author Jean de la Bruyère (1645-1696) in "*Les Caractères ou les mœurs de ce siècle*." This work is a masterpiece of French literature, using a remorselessly satirical style to depict the characteristics or manners of the time.



## New York Train Trip

The Hospitality Committee is planning a group railroad trip to the city on Wednesday, October 3. Departure will be at 7:55 a.m. from the Patchogue LIRR station. Round-trip fare for adults is \$2.45, children under six years ride free.

Reserve a ticket by sending your fare through the U.S. mail to P.O. Box 322, Upton, New York 11973, no later than **Thursday, September 27**. Make checks payable to "Brookhaven National Laboratory." Your tickets will be given to you on the train. Refunds will be made only if cancellations are received by the Friday preceding the scheduled trip.

## Cooking Exchange

Join the International Cooking Exchange on Wednesday, September 26, for a journey to Pennsylvania Dutch Country through their food. Find out how shoo-fly pie got its name and how many sweets and sours the "houstraus" really do serve.

Come learn and have fun with us from 12:30 to 2:30 p.m. in the Recreation Building. Admission is 75¢, and babysitting is provided at 25¢ per child.

If you would like more information about the Cooking Exchange, call Wendy Green, 878-8952, or Bunny Pietrzak, 751-1866.

## IBEW Meeting

Local 2230, I.B.E.W. will hold its regular monthly meeting on September 27, 1979 at 8 p.m. in the Knights of Columbus Hall, Railroad Ave., Patchogue. There will also be an afternoon meeting at 2 p.m. for shift workers in the Union Office at 31 Oak Street, Patchogue. On the agenda will be regular business, committee reports and the President's report.



## League III Champs

The Moles, Chemistry's softball team, are the 1979 League III champs. Front row (left to right) Rich Conklin, Rich Ehrenkauffer, Gary Wolk, "owner" Jerry Hudis with trophy, Jim Grandi, Alex Horwitz. Standing (from left) Co-captains Dave Comstock and Doug Hof, Ray Kutzman, Dick Seebeck, Connie Koehler, Bob Quick, Art White, Paul Roman, Don David, George Holmes, Steve Eiseeman. Not present for the picture were Don Malloy and Bob Lade.

At right, Chemistry Dept. chairman, Jerry Hudis, sports a Moles T-shirt presented to him as "owner" of the ball club.

## Football

**Sept. 10**  
Slow Pokes 32 - Falcons 13  
Roga 27 - Sweathogs 14

**Sept. 13**  
Roga 34 - Falcons 19  
DEE-Generates 21 - Slow Pokes 13

## Cafeteria Menu

### Week Ending September 28, 1979

<b>Monday, September 24</b>	
Potato leek soup	(cup) .35
	(bowl) .45
Roast turkey w/stuffing, cranberry sauce & 1 veg.	1.50
Western omelet & 1 veg.	1.35
Hot Deli - Roast beef	(on bread) 1.40
	(on roll) 1.50
<b>Tuesday, September 25</b>	
Split pea soup	(cup) .35
	(bowl) .45
Chinese pepper steak on rice	1.45
Poached fillet & 1 veg.	1.40
Hot Deli - Pastrami	(on bread) 1.35
	(on roll) 1.45
<b>Wednesday, September 26</b>	
Cream of spinach soup	(cup) .40
	(bowl) .50
Breaded flounder fillet w/fr. fr.	1.40
American chop suey	1.45
Hot Deli - Baked Virginia ham	(on bread) 1.35
	(on roll) 1.45
<b>Thursday, September 27</b>	
Beef barley soup	(cup) .35
	(bowl) .45
Meat cakes w/buttered noodles	1.40
Scalloped ham & potatoes	1.35
Hot Deli - Roast turkey	(on bread) 1.35
	(on roll) 1.45
<b>Friday, September 28</b>	
Fish chowder	(cup) .45
	(bowl) .55
Fillet fish Parisian	1.40
Barbequed spare ribs & 1 veg.	1.45
Fish fillet hero w/cole slaw & topped w/tartar sauce	1.40

## Classified Advertisements

### Placement Notices

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

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

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

Each week, the Personnel Office lists new personnel placement requisitions. The purpose of these listings is, first, to provide open placement information on all nonscientific staff positions; second, to give employees an opportunity to request consideration for themselves through Personnel; and, finally, for general recruiting purposes. Because of the priority preference policy stated above, each listing does not necessarily represent an opportunity for all candidates. As a guide to readers, the listings are grouped according to the anticipated area of recruitment, as indicated below. Except when operational needs require otherwise, positions will remain open for one week following publication date.

For further information regarding a placement listing, contact the Personnel Placement Supervisor, Ext. 2882.

**LABORATORY RECRUITMENT:** Opportunity for present Laboratory employees.

1114. SECRETARY - AAS in secretarial science or equivalent experience performing broad level secretarial assistance. Requires high degree of judgment and initiative as well as excellent communication skills. Will be responsible to coordinate office procedures, correspondence, and the filing and records systems for The National Center. Department of Energy and Environment.

1115. SECRETARY (part-time) - Requires an AAS in secretarial science or equivalent experience in performing office related duties including technical typing. Will be responsible for processing manuscripts, travel vouchers and other general secretarial duties. Medical Department.

1116. MESSENGER - Staff Services Division.

**OPEN RECRUITMENT:** Opportunity for present Laboratory employees and outside applicants.

1117. CHEMISTRY ASSOCIATE - Requires a BS/MS in chemistry or physics or equivalent experience in radiochemistry, machine shop practices, and high vacuum techniques. Will be involved with carrying out experiments on molecular beam apparatus and in making radiochemical preparations. Chemistry Department.

1118. DEVELOPMENT ENGINEER - Requires a Bachelor's degree in physics or engineering or equivalent experience. Background in programming, and data handling and analysis is required. Will work in the Solar Ground Coupling Research Group and be responsible for operation and maintenance of equipment and design of future experiments. Department of Energy and Environment.

1119. ELECTRO-MECHANICAL TECHNICIAN - Requires AAS degree or equivalent experience in construction, troubleshooting and testing of digital electronic equipment. Should have electronic wiring experience. Work involves the maintenance of computer controlled neutron spectrometer using position sensitive counters. Biology Department.

1120. TECHNICIAN (weekly or monthly) - Requires a thorough knowledge of electronics (bachelor's degree or equivalent). Will be responsible for maintaining and upgrading electronics for the Scanning Transmission Electron Microscope; operating the STEM for users and some photography work. Must be able to deal effectively with users and work with users and work with complicated and delicate equipment. Biology Department.

1121. EXPERIMENTAL MACHINIST - Experienced all-round machinist for non-production work in research and development shop. Project assignments from raw material to final assembly, with demonstrated ability and imagination in all phases of machine shop work. Experience in job print interpretation, layout and machine set up required. Central Shops Division.

### Autos & Auto Supplies

75 FORD VAN - V8, a/t, AM/FM, pwr windows, custom int, alarm, air horns. 752-9764.

70 HORNET - good running cond, 2 dr, bl/gold. \$700. L. Green, Ext. 2949.

78 PONTIAC BONNEVILLE - ps/pb, a/c, AM/FM stereo, low mi, good gas mi, exceptional cond, must see. 728-0338.

68 GTO PONTIAC - 4 spd, fair cond. 399-0586 after 8 or weekends.

TIRES - 4 WW steel belted radials, half used, good cond, HR78-14 Goodrich. \$50. 981-1692.

72 PINTO PARTS - tires very good, body parts fair. Ed, Ext. 4122.

75 HONDA TRAIL BIKE - 175 cc, 1200 mi, excel cond. \$500. R. Greene, Ext. 4100, 589-8691.

73 DODGE COLT - 2 dr htdp, a/t, a/c, radio, extras, 41,000 mi. \$1250. Mike, 781-5816.

69 PONTIAC BONNEVILLE - all pwr, a/c, new tires, cruise control, tape deck, needs muff. B. Azara, Ext. 2050.

74 DATSUN - PL620, pickup, 30 mpg, cap, FM stereo 8-trk, 55,000 mi, good cond. \$2200. Jeff, Ext. 2907, 878-8214.

75 KAWASAKI KZ400 - excel cond, 9500 mi. \$900. Ext. 4749, 286-8448 eves.

71 MACH I - 351 ci eng, 4 spd, many new parts, good cond. \$1200. Ext. 2022, 277-9749 after 5.

64 VALIANT - runs well, \$250. Ext. 4666.

RIMS - (2) 15", 5 hole for Ford vans, pickups w/usable tires. \$15 ea. Dick, Ext. 3273.

69 TRIUMPH MOTORCYCLE - 650cc, mint, compl rebuilt, low miles. \$1500. Rich, Ext. 4100, 589-8691.

CHEVY ENG PARTS - 1966 & 1970, also a/t 6 cyl Nova. Ron, Ext. 4028, 669-5428.

79 HONDA XL-250 - 1900 mi, 4 mos old, luggage rack, 2 bell helmets, dirt/street. \$950 firm. 289-5738.

73 CHEVY PICKUP - C20, rebuilt eng, h.d. tires, w/cap. \$2200. Tom, Ext. 2959.

YAMAHA 360 - 77 leftover, 3 mos old, 500 mi, full warranty, 75 mpg, 2 helmets, mint cond. Ext. 4701, 757-5991.

75 HONDA XL-175 - 8000 mi, helmet. \$450. Bill, Ext. 4605, 281-0557.

72 CHRYSLER NEWPORT - 2 dr, many extras, 80,000 mi, runs well. Asking \$1175. Ext. 4492, 286-0384.

78 HONDA XL-125 - on-off road, excel cond, less than 500 mi. Asking \$750. Bob, 286-8116.

76 HONDA CB-500 TWIN - dbl overhead cam, 7500 mi, excel, extras. \$1200. Bill, 475-2842.

72 BUICK RIVIERA - blue, a/c, all pwr, excel cond. \$1600, must sell. Ext. 2290.

75 CAPRICE CLASSIC CONV - 45,000 mi, AM/FM stereo, ps/pb, new tires, car in excel cond. Ext. 3173.

77 AMC GREMLIN - good cond, 6 cyl, AM radio, roofrack, snows incl. \$2450. 878-4268.

125 CC SUZUKI - some parts missing. \$75. John, Ext. 3354.

73 HONDA CIVIC - Hondamatic, r/h, extra set of snows. \$1000. Ext. 2332.

68 VW BEETLE - eng & parts, front end accident. Bob, Ext. 2902, 286-0407.

72 PEUGEOT 504 - needs brakes & exhaust. \$300. P. Grand, Ext. 2038.

75 CHEVY VAN - 6 cyl, std trans, AM/FM 8 trk, very good, extras. Asking \$3000. Richie, 924-6133.

L60-14 TIRES - (2) Indy profile, Micky Thompson, super wide. \$20. Vinnie, Ext. 3664.

74 PLYMOUTH TRAILDUSTER - 4 w/d, 4 spd. \$3000. Otto, Ext. 4406, 732-2319.

TIRES - (1) Goodrich belted G78-15, \$8; (1) Uniroyal steel belted radial L78-15, \$8. 331-2779.

70 CHRYSLER 300 - reg gas, all pwr, good running cond, \$500; 76 Chevy van, std, reg gas, 8 cyl. Doreen, Ext. 2456.

78 HONDA CVC CIVIC - 5 spd hatchback, excel. \$4450. W. Ross, Ext. 3897, 261-1703 after 6.

### Boats & Marine Supplies

OLYMPIC SUNFISH - white, brand new sail, great cond. \$650. Ext. 4328, 286-3509.

27' I/O SPORTSCRAFT - fiberglass, flying bridge, depth finder, refrig, stove, head, new 350 eng, new int, real clean. \$5800. Ext. 3451.

MERCURY OUTBOARD - 20 hp manual start, not working, good for parts, make offer. W. Sanchez, Ext. 3848.

BOAT TRAILER PARTS - wheels, axle, winch. \$10 ea. Joe, 286-9260 eves.

19' BAYLINER 1973 - 120 hp Volvo I/O, 75 Shoreline trailer/elec winch, full canvas, very good. Best offer over \$3000. Ext. 2611, 751-3702.

HOBBIE 16 - striped sails, many extras, excel cond. \$1950. 286-8847.

### Yard Sales

SETAUKET - 458 Pond Path (exit off Nichols Rd), Sept 22, 9-5, household items, furn, kit cabinets & more. S. Davis, Ext. 2913, 751-5829.

BELLPORT - 937 S. Country Rd, Sat, Sept 22, 10-4, something for everyone. Ext. 3521.

MIDDLE ISLAND - Woodville Rd, 1 block east TSS, Sept 22-23. H. Rhodus, 924-3522.

NO. PATCHOGUE - 132 Clinton Ave, Sept 22-23, 10-4. S. Norton, Ext. 4691, 475-5834.

MASTIC BEACH - 37 Commack Rd, Sept 22-23, 10-6, 2 family yard sale. Ext. 4289.

### Miscellaneous

STEREO HI-FI - Kenwood rcvr/tuner, Garrard changer, Designatron spkrs. \$200 compl. P. Michael, Ext. 2264, 941-9055.

26" LAWNMOWER - 6 hp riding. \$100. Steve, 654-0823.

GOLD WOOL RUG - w/foam pad, 10'x20', \$75; orange & brown rug, 12'x12', \$50; dinette set, white formica top, cast-iron pedestal & 2 chairs, very good cond, \$75. Maria, 331-3116.

WEIGHT LIFTING BENCH - heavy duty. \$12. Ronnie, 732-6712.

DINING SET - Contemporary walnut, Keller. 60 in. table, extra leaf, 4 chairs, 60 in. buffet, excel cond. \$295 or make offer. J. Ridgeway, Ext. 2452, 473-1154 eves.

LADIES BIKE - 10 spd Mossberg, med wgt, good cond. \$100. P. Oster, 286-1248.

LAWN SWEEPER - Parker 25", used twice. \$15. Dot, Ext. 4606.

WOOD BURNING STOVE - neat, attractive cast iron, 24 1/2" h, 36" w, 25" d, flue entry hole back top. 751-3062.

HI RISER - w/2 mattresses & 2 bolsters, \$50; dbl dresser w/lg mirror & night table, \$100; both excel cond. Ext. 4339, 698-7212.

SHOWER CURTAIN - window curtain, rug, bowl cover, blk lace, gold lining, perf. \$15. 281-6944 after 5.

HEADBOARD - brass plated, twin size, \$20; RAC timing light, \$10. Steve, Ext. 3469, 281-4371.

25" ZENITH COLOR TV - \$200; 40 channel Spark-O-Matic CB base w/antenna, \$150; Holiday Spa BIP memberships, 2 ea, \$500/both. Harry, Ext. 4722.

MIDLAND BASE STATION - 40 channel (peaked), w/22' ground plane antenna, both 9 mos old. \$200. Ext. 2303.

REAR-STEP BUMPER - new/unused, for truck or van, fits 37 1/2" frame or adapt. Ext. 3965.

PIANO - Hobart & Cable, walnut console, very good cond, \$430; washer & dryer, Frigidaire, top model, excel cond, \$290/both. 924-0581.

CB BASE - Navohoe TRC-440 w/big stick ant. \$75. John, 475-8680.

ACCUTRAK + 6 - programmable changer, remote Xmtr w/volume control, yr old, in orig carton. \$275. Phil, Ext. 7934.

PHASE SHIFTER - Morley PFV w/volume control, mint cond. \$80. Charlie, Ext. 3950.

CHILD'S RECORD PLAYER - GE, 3 spd, perf cond. \$10 firm. Ext. 3593

LADIES BIKE - 10 spd Mossberg, med wgt, good cond. \$100. P. Oster, 286-1248.

CLARINET - LeBlanc Vito, very clean. \$85. Jerry, Ext. 3334.

CHEST - 5'1, 36" w, 30" h, walnut wood, excel for storing dishes, towels, linens, etc. \$175. Ext. 4532, 277-4091.

30" GAS RANGE - Welbuilt harvest gold, good cond. \$20. Richie, Ext. 4254, 734-7342 after 6.

SKIS - children's sizes w/bindings. \$12. Jim, Ext. 3372.

WISE - heavy duty machinist's vise, 7" jaws. \$50. R. Wieser, Ext. 3080.

ADDING MACHINE - paper record SCM, Rem Rand, Monroe, good cond. \$10. Bob, Ext. 2819, 289-0357.

FISH TANK - 20 gal, compl set-up, stand, hood, light, extras. \$40. Ext. 3082.

DINETTE SET - 5 pc, chrome & formica, excel. \$75. Bob, Ext. 3309.

BICYCLE - lady's Raleigh. \$20. Ext. 2861/3106.

HALF FARE TICKET - American Airlines, good till Dec 1979. Best offer. Bill, 475-2842.

STUDIO MONITORS - 1 pr JEL 100, hardly used, guaranteed mint cond. \$325 firm. Ext. 4701, 271-2877.

FAKE BOOKS - brand new, over 1000 wongs. \$25 value for \$10. Dick, Ext. 3273.

DBL BED - matt, box spring, frame, like new, firm support. \$100. Maria, 331-3116.

SHOP DESK - Edsal brand receiving desk w/wall mounting brackets, new. \$30. 734-7584 after 6.

CAMERA - Exakta VX1000, BTL mtr prism, lenses: 50mmf2.8, 35mmf2.8, 200mmf3.9, 400mmf6.3, fisheye, 2x, 4x, extension tubes, bellows & case. \$199. Jack, Ext. 4255, 289-6708.

SOLID OAK FRAMES - custom made, 2" wide. \$4/lineal foot, also in maple. Ext. 4050, 929-6961.

### Real Estate

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

### For Sale

S. SETAUKET - 4 bedrm Jamestown ranch, bsmt, 3 Village Schools, den w/fp, 2-car gar, fenced, gas heat. \$46,500. Paula, Ext. 2253, 698-8950, 473-8433.

BROOKHAVEN HAMLET - prime area custom cape, 2 bedrms down, 2 up ready to finish, L/R w/fp, eik, fin bsmt, fenced, pool, low taxes, extras. \$40,500. Ext. 2043, 286-8923.

SETAUKET SOUTH - immediate occupancy, 3 bedrms, L/R, den, eik, 1 1/2 baths, 3 Village Schools, \$1300 taxes, 1/2 acre, gas heat, fenced & treed bkyd, above ground pool, more. Asking \$33,000. George, Ext. 3061, 751-0894.

BROOKHAVEN HAMLET - charming older home, S. Country Rd, 3 bedrms, window seats, 29' L/R, D/R, eik, 2 fp, screened porch, fin bsmt w/bar, 2-car gar w/extra rm, chicken coop, 0.6 acre, lg veg & flr gdn, very low taxes, 8.5% mtg. Ext. 2633, 286-1056.

BELLPORT - south, prime location, 4-5 bedrms, 3 baths, den, oak fp, lg D/R, eik, veranda, gas heat, 2-car gar, 0.6 acre, walk to shops, beach, boat dock, golf, tennis. Mid-50's. Anne, Ext. 3404, 286-3764.

ROCKY POINT - ranch w/fin bsmt, 3 bedrms, L/R, D/R, fam rm, 1/2 acre, gar, prvt beach, nice residential area, 8.5% mtg, many evtras. Lee, Ext. 3911, 821-1810.

CENTEREACH - 3 bedrms, L/R, D/R, eik, bsmt, gar, OHW, new roof, 0.6 acre, 8 1/2% VA mtg, low cash over. Asking \$33,000. Ext. 3404, 981-1195.

MT. SINAI NORTH - 3 bedrms, 2 baths, cedar shake ranch, full bsmt, gar, s/s, gas h/w heat, secuded on 1/2 acre w/lots of trees, must be seen. \$50,000. Ext. 7995, 473-7030.

ROCKY POINT - .44 acre, very wooded & prvt, 3 bedrms, gar, 4 appl. \$38,500. Walt, Ext. 3006, 821-9223.

CENTER MORICHES - 3 bedrm Victorian w/gar & bsmt, 20 min from Lab, low taxes, assume 8 1/2% mtg, 3/4 acre business zones. Asking \$42,000. Sharon, Ext. 3793, 878-2591 eves.

SOUTH SETAUKET - 5 bedrms, 3 baths, fam-rm type kit, 2-car gar, w/w, central air, gas heat, prof landscaping, 3-Village SD. \$49,000. Ext. 4207, 698-1785.

YAPHANK - townhouse, 5 min from BNL, L/R, 3 bedrms, kit, dinette, full bsmt, gar, sale or rent. Betsy, Ext. 3389, 924-3721, 751-7096 after 6.

CORAM - 4 bedrm cape, eik, D/R, lg L/R, 2-car gar, fenced-in prop, 1/2 acre. \$38,900. Ext. 2951, 473-1585 after 6.

SHOREHAM - 4 bedrm colonial, 2 1/2 baths, 1 fenced acre, full bsmt, 2-car gar. \$58,500. Ext. 3040, 744-2821.

### For Rent

PORT JEFFERSON - Harbor Hills, 3 bedrms, 3 baths & fam rm, nicely furn, wooded lot, prvt beach, 2/80-2/81. \$500/mo. Ext. 4581, 473-3604.

E. PATCHOGUE - 2 bedrm apt, prvt ent. 235/mo + util. Walt, Ext. 2907, 698-0576.

WADING RIVER - 4 rm apt, walk-in pantry, elec, gas & hot water incl, prvt ent. \$275/mo. Ed, Ext. 2503, 331-9017.

VT. CHALET - beautiful furn, stone fp, woodland hiking & XC ski trail, near Bromley, Stratton, Magic Ski areas, antiques, rent weekends, weekly & half season. Ext. 3448, 757-5599.

WADING RIVER - 2 apts for rent, 4 rms & bath + gar; 2 rms & 1/2 bath; both util incl. Ext. 2898, 929-6293, 929-4662 weekdays after 3.

SHOREHAM - 9 min from Lab, cozy 3 bedrm ranch, 2 baths, 2-car gar, bsmt, all appl, a/c, economical gas heat, brick fp, avail Oct 15. \$420. Ext. 3707, 744-0007.

BAYPORT - apt in prvt home, L/R, bedrm, full bath, prvt ent. \$300/mo incl util. Beth, Ext. 3325.

BELLPORT VILLAGE - rent w/option to buy, charming 7 rm cape, L/R w/fp, lg eik, D/R, 3 bedrms, study, 2 baths, avail Oct 1. \$400 mo + util. Karen, Ext. 3626, 286-0428.

BELLPORT - waterfront, large 1 1/2 bedrm caretaker apt, w/util, \$400/mo. Responsible person(s) with substantial security, month to month. Baker, 286-0143.

### Wanted

GARAGE SPACE TO RENT - Nov to mid-April, to store summer car. Paul, Ext. 4045; Joyce, Ext. 3801, 289-5770 after 6.

OLD SWIMMING POOL LINERS - any cond, will pick up. Ernie, Ext. 3357.

BABYSITTER - Blue Point area, school age children, must have own transp. Ed or Carol, Ext. 4122/3341, 363-5170 after 6.

DOG SITTER - to occasionally care for lovable springer spaniel, will pay. John, Ext. 3698, 325-0363.

HOMES - for spayed & altered cats, also kittens, wormed & litter trained. JoAnn, 744-2821.

TENNIS & RACQUETBALL PEOPLE - Sat night party, Sept 22. Ed, Ext. 4122.

2-3 CORDS FIREPLACE LOGS - hard wood, half splits 30-36" long. GR5-8658 after 6.

BUNK BEDS - in good cond. Rick, Ext. 4664.

USED GYM EQUIPMENT - weights, barbells, benches etc. John, Ext. 4425, 744-4386.

HOUSE - California contemporary 3-4 bedrm ranch, Huntington area, near train, village, nice yard, safe street. Ext. 7799.

APT TO RENT - to professional couple, no pets, no children, preferably Wading River. 744-2644 after 5:30.

1 OR 2 BEDRM APT - Port Jefferson area. Jack, Ext. 3433, 473-2821.

HOUSE TO RENT - North Shore, preferably Shoreham area, 3-4 bedrms, 1 yr lease, option to buy considered. G. Williams, Ext. 3758.

HOMES - for adorable kittens, ready now. Ext. 2980, 289-0532 after 6.

MOTORCYCLES - bent or broken, any age or cond. Kevin, 281-8031.

RIDE - needed on weekends to NYC Fri and/or back to BNL Sun/Mon. Al, Ext. 4089.

BARTER IS SMARTER - better than money. Info, 363-7032.

### Car Pools

RONKONKOMA - near Colony Park Apts, join an existing car pool or start a new one. Joe, Ext. 4139.

PT JEFF STA/E. SETAUKET - 1 person to join already formed car pool. Bob P., Ext. 3784.

### Lost & Found

LOST - Opal pendant. Ann, Ext. 4262.

### Services

BABYSITTING - mother will babysit in my home part time or full time. Diane, 821-9125.