

Solid State Physicists Win DOE Awards

In the Department of Energy's annual Materials Sciences Research Competition, BNL solid state physicists in the Physics Department have come up winners. Under the category of solid state physics, for "outstanding scientific accomplishment," Doon Gibbs, David Moncton, Jakob Bohr and Kevin D'Amico were recognized for their synchrotron x-ray scattering studies of the magnetic structure of holmium. For "sustained outstanding research," Kelvin Lynn was a winner for his work on developing positron uses for solid state physics.

For outstanding scientific accomplishment in the category of metallurgy and ceramics, Michael Knotek, now chairman of the National Synchrotron Light Source Department, was a member of a winning group from Sandia National Laboratory, for work done there on stress corrosion cracking of ceramics.

The purpose of DOE's competition is to identify individual scientists from the national laboratories who have conducted outstanding research and to provide recognition of their accomplishments. All entries are for research supported by the Division of Materials Sciences of the Office of Basic Energy Sciences. The competition is subdivided into three categories: metallurgy and ceramics, solid state physics, and materials chemistry.

X-Ray Scattering Studies of Holmium

The theory of magnetic x-ray scattering was proposed in 1970, but the technique never became a useful tool for studying the magnetic properties of solids largely because x-ray sources then available were not sufficiently intense. Now, intense x-ray beams from synchrotron sources make it possible to attempt new kinds of experiments and perhaps discover new physics.

Doon Gibbs, David Moncton, Jakob Bohr and Kevin D'Amico did their experiments with holmium at the



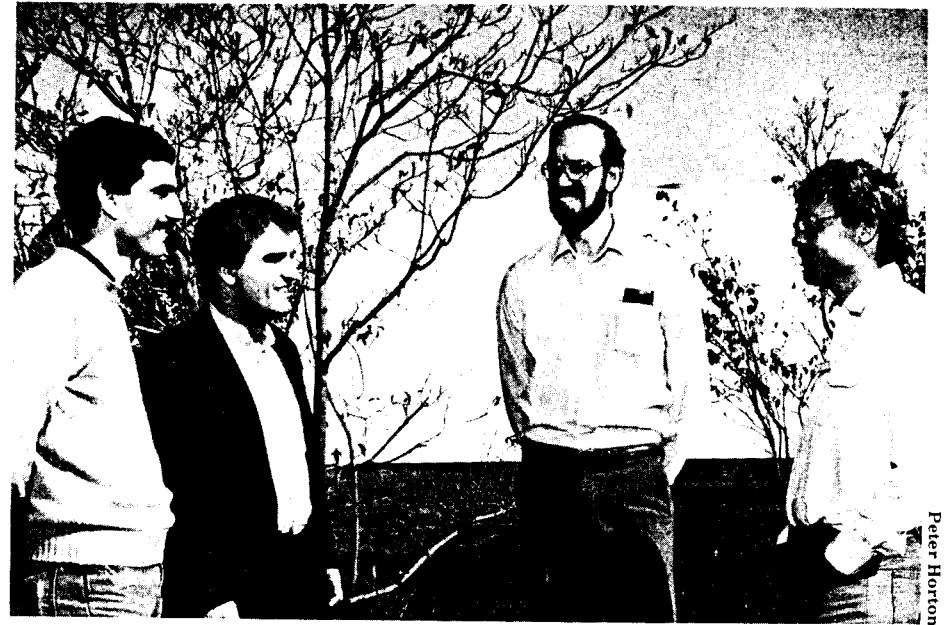
Kelvin Lynn stands behind the positron beam built at the High Flux Beam Reactor.

Stanford Synchrotron Radiation Laboratory. Their work represents the first application of high flux wiggler beamlines to magnetic structure studies by x-ray scattering and has led to a qualitatively new understanding of rare earth magnetism. It also opens the way for future synchrotron radiation studies of the magnetic structure of two- and three-dimensional materials and, in particular, small volume materials such as films, artificial superlattices and surfaces.

With the x-ray ring of the National Synchrotron Light Source now operating, the group has just begun magnetic x-ray scattering studies of the rare earth metal erbium and also plans a variety of experiments on different materials in the next year. Construction is nearly completed on an apparatus for doing magnetic x-ray scattering experiments from surfaces.

Positrons

For the past six years, Kelvin Lynn has been involved with the development and use of variable-energy posi-



From left are Kevin D'Amico, Jakob Bohr, David Moncton and Doon Gibbs, collaborators on synchrotron x-ray scattering studies of the magnetic structure of holmium.

trons for the study of surfaces. Positrons were discovered in 1930, but it wasn't until 1974 that beams were developed with enough intensity to be useful for experiments. Further improvements in beam intensity and vacuum conditions were made in successive years, much of that work done by Lynn, and now the field has taken off.

Why? Positrons have proven to be useful tools in the study of solid materials, both at interfaces between materials and at material surfaces.

Under Lynn's direction, the Physics Department has built three positron beam lines, the most recent one installed at the High Flux Beam Reactor. Although each beam has unique characteristics, they all function in essentially the same way. A

radioactive source sits on one end of an ultra-high vacuum system and emits positrons as it decays. (A positron is the anti-particle of an electron. When they meet, they annihilate.) The positrons come out at high speeds, hit and penetrate a crystal, and diffuse back to the surface before they have a chance to annihilate. Then they are re-emitted from the surface and are guided by electrostatic or magnetic fields toward a sample of interest.

Since 1979, research with positron beams has resulted in over 50 scientific publications for Lynn and his colleagues. His work has had great impact on the understanding of the positron, as well as providing new methods to study bulk materials, interfaces and surfaces.

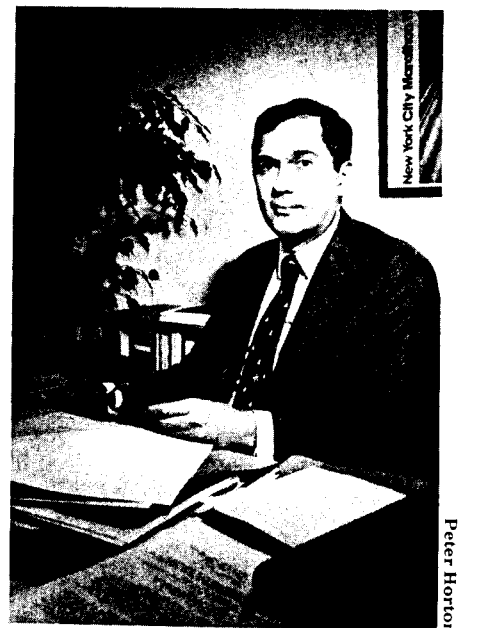
BNL Lecture Looking at Likelihoods

In the next Brookhaven Lecture, Robert Bari, Department of Nuclear Energy, will address a subject very much in the news on Long Island. He will talk about "Probabilistic Risk Assessment," a method for determining the likelihood of adverse health effects from the operation of nuclear power plants, on Wednesday, November 13, at 4:30 p.m. in Berkner Hall.

As well as health effects, this method also identifies potential plant damage modes and thus provides a means for improving the plant design or its operation. According to Bari, overall risk assessment relies on input from several disciplines of technology. These include probability and reliability analyses, plant subsystem behavior and interactions, human performance, physical analyses of accident consequences, analyses of the impact of external phenomena such as earthquakes, meteorology and radiological health effects.

In his lecture, Bari will survey past and current practices of probabilistic risk assessment and will give some specific examples of technical accomplishments at BNL in this field. He will also discuss future directions and applications.

Robert Bari is Associate Chairman in the Department of Nuclear Energy, responsible for engineering and risk assessment programs. In these programs, 60 staff members perform technical assessments of a broad range of issues in the area of nuclear power plant safety and licensing. Bari



Robert Bari

joined the BNL Physics Department in 1971 and left in 1973 to take a teaching post. He returned to BNL in 1974 and became a member of the staff of the Nuclear Energy Department. He has a Ph.D. in physics from Brandeis University. Among other professional activities, Bari has been an Associate Editor of Physical Review.

All those interested in getting together after the lecture are invited to go with the lecturer to a restaurant off site. If you want to be part of this group, call George Rabinowitz, Ext. 7637.



Reed Corderman, seated at the desktop computer keyboard, built a modulated molecular beam mass spectrometer system that measures the purity of gases. Because the system is unusually sensitive to volatile impurities (it can detect about one part per million), it is in great demand by a number of companies that manufacture silane for semiconductor uses. Here, Corderman, who is in the Metallurgy and Materials Science Division of DAS, measures a sample of silane made by the Linde Division of Union Carbide. From left are Daniel Keierleber, Bonnie Lutz, Robert Bradley, Patrick Taylor and Susan Nycz, all from Union Carbide. Corderman originally built the mass spectrometer system for a Brookhaven research project on photovoltaics. Silane is a key ingredient in making hydrogenated amorphous silicon, which is used in thin-film photovoltaic devices. Impurities in silane, such as chlorosilanes and oxysilanes, adversely affect solar cell performance.

Steinberg Wins With Best Idea

Meyer Steinberg, head of the Process Sciences Division of DAS, is \$10,000 richer today. He won a first place award, for the most original idea, in the Fuller International, Inc. Quest Contest. Fuller makes cement production equipment and promoted the contest to find new ideas for the use of cement.

Steinberg's idea was to use Portland cement for reducing sulfur emissions from fossil fuel burning power plants by directly injecting the cement into the boilers of the plants. He says that cement's principal advantage over limestone, for this purpose, is that it is very reactive toward sulfur dioxide at higher temperatures. Steinberg believes that this application of cement would solve the "acid rain" problem caused by the burning of fossil fuels containing sulfur in utility and industrial boilers.

The company received 540 entries from 24 countries. The award was



Meyer Steinberg

presented at a dinner in Allentown, Pa., on October 18.

Mort Rosen

New ID's To Be Issued

New identification cards are about to be issued to all employees, and the first step in that process is picture-taking. Starting November 12, two teams will make the rounds of departments and divisions and take photographs of employees. ID cards will be made on the spot.

Besides your photograph, the card will show your name, life number, level of security clearance, and expiration date of card. It includes a magnetic strip, which will be encoded when new readers are installed, to allow those persons, so authorized, access to secure areas. This will eliminate the need for both an identification and access card.

The first group to be processed includes individuals with life numbers (BNL employees and persons with visiting appointments) and AUI employees. The second group will be those having guest or research collaborator appointments, U.S. Government employees on site, employees of

SAGA Food Service, Barclay's Bank, Gulf Service Station, Teacher's Federal Credit Union, GTE and BERA attendants. Employees who terminate will be responsible for returning their ID cards to the Safeguards and Security Division.

In the beginning, card expiration dates will be staggered from one to five years. After that, all renewals will be for five years. On each renewal, card holders will be photographed again.

Retired employees may apply for new ID cards at Police HQ (Bldg. 50) after January 1.

Car Stickers

Applications for 1986 car stickers will be ready by the first of the year. With the application, car owners will now be required to attach a copy of the vehicle's registration. Car stickers will be limited to three vehicles per person and a copy of registration for each vehicle must be included.

Science Quiz

Going Public (Continued)

8. The person whose name is associated with bringing about the social and political acceptance of birth control was a) Emma Goldman b) Emma Lazarus c) Flora Gibson d) Margaret Sanger.

9. A government agency which has as one of its concerns the abatement of noise is the a) EPA b) OPA c) IND d) BMT.

10. Brookhaven National Laboratory, on Long Island in New York, is administered by a) a congressional committee b) a board of directors composed of the presidents of several large technical corporations c) a consortium of universities d) nine old men.

11. Project Plowshare dealt with a) the free distribution of modern farm implements to third world nations b) increasing the world food supply by the use of radioactive materials in the soil c) the eradication of diseases such as smallpox by the distribution of vaccines through the World Health Organization d) the peaceful uses of atomic energy such as blasting canal beds with atomic bombs.

12. The conferences in which scientists from all parts of the world get together to discuss matters relating to disarmament bear the name a) Pugwash b) Hogwash c) Pugnose d) Oshkosh.

13. The National Bureau of Standards, which determines the national standards of weights and measures and carries on research toward the improvement of standards and methods of measurement, was established in about the year a) 1800 b) 1850 c) 1900 d) 1950.

14. The amount spent on research and development in this country, as a percentage of the gross national product, is roughly a) .025% b) .25% c) 2.5% d) 25%.

15. CERN is the acronym for a) the multinational nuclear research laboratory located in Switzerland b) the organization of concerned scientists who believe that technology has been permitted to run amuck c) the group of scientists that has been monitoring the freedom of scientific inquiry in different countries d) the Council of European Reactor Nations.

16. Archimedes devoted his considerable talents to the defense of his country. During the war with the Romans, he allegedly a) set the enemy ships on fire by focusing the sun's rays on them with mirrors b) deciphered the enemy code which revealed

the Romans' battle plans c) figured out which materials to use for the construction of warships for optimum maneuverability d) constructed underwater craft that could attack enemy ships.

17. The metric system was introduced during the rule of a) Louis the Fat b) Napoleon Bonaparte c) Charles the Simple d) Charles the Bold.

18. The establishment of land-grant colleges, which many believe to be one of the most far-reaching acts of the federal government, originally was a) to offer programs in engineering, agriculture, and home economics b) to teach farmers the elements of mathematics so that they could figure out how much land they had been granted c) to teach surveying d) to utilize for educational purposes land that U.S. Grant had wrested from the South.

19. At the conclusion of the Second World War, American scientists who wanted a forum on science and public affairs founded a journal. The name of that journal is a) *New Scientist* b) *The Physical Review* c) *Daedalus* d) *The Bulletin of the Atomic Scientists*.

20. The cover of the magazine in the previous question carries a picture of a) the peace symbol b) a clock with hands indicating a few minutes before midnight c) weapons being beaten into plowshares d) a dove with an olive branch in its beak.

21. A wide-ranging critic of American society, whose targets include the American medical profession and health practices, writes under the name a) Ivan the Critical b) Ivan the Terrible c) Ivan Illich d) Ivan Skivitsky Skivar.

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

Danish House Tour

Those who missed seeing the Danish House during the summer, will have a last chance to do so on November 21, before the house is closed for monitoring. From 10 a.m. to 4 p.m., this prefabricated, energy efficient house of Danish design will be open to the public. No reservations are required. On hand to answer questions will be representatives from Hosby International, the company that built the house; the Danish Consulate; the Danish Building Export Council; as well as U.S. representatives of Danish manufacturers. Visitors are asked to park at the Brookhaven Center and take a shuttle bus to the house.



Peter Horton

(Standing) PRECP Scientific Director Jeremy Hales, Battelle-Pacific Northwest, oversees (from left) PRECP Research Manager Paul Michael, BNL; Douglas Sisterson of Argonne; Peter Daum of BNL; and George Slinn of Battelle-Pacific Northwest as they map out the winter PRECP field work in the Syracuse area.

What's in Snow

Planning of the winter season's acid rain studies was completed two weeks ago during a PRECP program meeting. PRECP, PRecessing of Emissions by Clouds and Precipitation, is a six-year, \$33-million program funded by the U.S. Department of Energy, which is being carried out by BNL, Argonne National Laboratory and Battelle-Pacific Northwest Laboratory. PRECP was established to uncover the relationship between the amount of pollution discharged at the source and the amount of acid rain that ultimately falls on a receptor area. Forty meteorologists, chemists and data analysts worked out the details for their one-month field trip to the Syracuse, New York, area beginning January 13.

According to PRECP Research Manager Paul Michael, who heads BNL's Atmospheric Sciences Division of the Department of Applied Sci-

ences, the collaborators will be sampling the air, clouds and precipitation in and around Syracuse to study how winter conditions affect acid rain. They are particularly interested in how efficient snow is in incorporating pollutants. "The Syracuse area was selected as the site because it has high enough pollution and snow to be interesting," says Michael.

About 30 researchers will be in the field at any given time. Aircraft equipped with special instruments will be used to measure the composition of air in and around clouds. Samplers will be employed on the ground to collect snow, and the chemical content of snow will be analyzed. The sample locations were selected to take advantage of the greater snow fall induced by Lake Ontario and by the terrain that rises north and east of Syracuse.

Reports Available

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

BNL-51450
Safeguards Instrumentation — A Computer-Based Catalog. Second Edition. C. Auerbach.
NUREG/CR-2815
BNL-NUREG-51559
Vol. 1 Rev. 1
Probabilistic Safety Analysis Procedures

Guide. Sections 1-7 and Appendices. R.A. Bari, et al.

NUREG/CR-2815
BNL-NUREG-51559
Vol. 2 Rev. 1
Probabilistic Safety Analysis Procedures Guide. Sections 8-12. M. McCann, et al.

NUREG/CR-3485
BNL-NUREG-51710
PRA Review Manual. A. El-Bassioni, et al.

NUREG/CP-0066
BNL-NUREG-51901
Proceedings of an International Workshop on Historic Dose Experience and Dose Reduction (ALARA) at Nuclear Power Plants. Held at BNL May 29 - June 1, 1984. Prepared by: J. Horan, et al.

BNL-51910
Localized Electrochemical Corrosion of Nickel Based Alloys. O. Oyeleye, et al.

BROOKHAVEN BULLETIN

Published weekly for the employees of BROOKHAVEN NATIONAL LABORATORY

BERNICE PETERSEN, Editor
MONA S. ROWE, Associate Editor
ANITA COHEN, Reporter
MARSHA BELFORD, Reporter

35 BROOKHAVEN AVE., UPTON, N.Y. 11973
Telephone (516)282-2345

Arrivals & Departures

Arrivals

Carol S. Archer Mfg. Info. Sys.
Edwin P. Cancel Plant Eng.
Caroline A. Grimshaw DAS
Jaromir A. Maly DNE
Krzysztof Morstin S&EP
Jurg Schefer Biology

Departures

This list includes all employees who have terminated from the Laboratory, including retirees:
Thomas F. Burns DNE
Louis A. Morris Central Shops

Answers to Quiz

8. d. Emma Goldman was an anarchist, who, incidentally, was jailed in 1916 for publically advocating birth control. Emma Lazarus was the poet whose sonnet is on the base of the Statue of Liberty. Flora Gibson is a name invented for this quiz.

9. a (Environmental Protection Agency). OPA was the Office of Price Administration. IND and BMT *should* be concerned with noise abatement — they are New York City subway lines.

10. c. "Nine old men" was the phrase applied by some of the justices of the Supreme Court at the time President Franklin D. Roosevelt tried to "pack the court."

11. d. The name "Plowshare" comes from the words of the prophet Isaiah: "And they shall beat their swords into plowshares, and their spears into pruning-hooks; nation shall not lift up sword against nation, neither shall they learn war any more."

12. a. The conferences are named after the site in Nova Scotia where the first one was held.

13. c. Actually in 1901.

14. c. *Roughly* 50 billion dollars out of 2,000 billion, the bulk going to development.

15. a. *Conseil Européen pour la Recherche Nucléaire*.

16. a

17. b. All were rulers in France. Nicknames were evidently a more convenient method of identification than numbers, for some purposes. The nickname for Charles the Simple apparently referred to his inability to deceive.

18. a. The act was passed during Lincoln's administration.

19. d. *New Scientist* is a British journal, semipopular in its coverage. *The Physical Review* is the primary outlet in the United States for research publications in physics. *Daedalus* is the journal of the American Academy of Arts and Sciences.

20. b. The minute hand is moved ahead or back as a function of international events relating to disarmament.

21. c. Ivan the Terrible was the first Russian ruler to bear the title tsar. Ivan Skivitsky Skivar is the hero of a song popular with scout troops (among others). Ivan the Critical is someone who doesn't exist but probably should.

Winter is Coming

All Laboratory vehicles have been prepared for the winter season: heaters have been checked, and antifreeze has been added. The Automotive Maintenance Shop requests that no water be added to cooling systems except in emergencies. If such an emergency occurs, notify the shop so that antifreeze can be added to ensure continued protection.

—BERA News—

Coming Up

The Concord String Quartet will perform at Berkner Hall on Friday, November 22, at 8:30 p.m. Concertgoers will hear works by Beethoven, Mozart and Henze. Tickets may be purchased at the door. Prices are \$9 for general admission, \$6 for students and those over 65, and \$5 for those under 18.

Tickets Available

A number of Islanders hockey and Metropolitan Opera tickets are still available for sale at the BERA Sales Office in Berkner Hall. Take your pick from the lists below:

Islanders	
Tuesday, December 3	Winnipeg
Tuesday, December 17	Buffalo
Thursday, December 26	Hartford
Saturday, January 4	Chicago
Tuesday, January 7	Minnesota
Thursday, January 9	Pittsburgh
Saturday, January 25	Chicago
Tuesday, January 28	Toronto
Saturday, February 1	Pittsburgh
Tuesday, February 11	Vancouver
Tuesday, February 18	Washington
Saturday, February 22	Detroit
Tuesday, March 4	Montreal
Tuesday, March 11	Calgary
Saturday, March 15	N.J. Devils
Tuesday, March 25	St. Louis
Saturday, April 5	N.J. Devils

Metropolitan Opera	
Friday, December 13	L'Italiana in Algeri
Saturday, December 28*	Parade
Tuesday, January 21	Romeo et Juliette
Friday, February 21	Simon Boccanegra
Tuesday, February 25	Francesca da Rimini
Tuesday, March 11	Falstaff
Friday, April 4	Don Carlo
Saturday, April 26*	Don Carlo

*Evening
Call Louisa Barone, Ext. 3347, for price information and other details.

Cooking Exchange

An American Thanksgiving will be the theme of the Wednesday, November 13, meeting of the International Cooking Exchange.

Meetings are held from 12:30 to 2:30 p.m. in the Recreation Building. Babysitting is available for 50¢ per child. Call Sara Morse, 286-1712, for more information.

Bowling

Red/Green League
C. Bachsmith rolled a 231, S. Dimaiuta 225/220/613 scratch, T. Holmquist 219, A. Natoli 219, E. Sperry IV 217, G. Meinken 204.

White League
High games were bowled by Ted Erickson 204, Ben Belligan 200, Vito Manzella 197, Mary Austin 182, Pat Manzella 174, Denise Monteleone 173, Karen Jacobs 172, Mary Scheidet 171/168.

Pink League
Sandy Asselta had a 197, Sharon Smith 196/213/588 scratch, Kathy Kissel 192, Renie Rosati 184.

Party Reservations

Laboratory organizations and BERA activity groups interested in reserving the Recreation Building for holiday parties are invited to send representatives to a meeting in the Personnel Conference Room on Wednesday, November 13, at 1:30 p.m.

Reservation dates will be given to those attending the meeting in the order determined by a drawing, which will be held at that time. Subsequent reservations, if dates are still available, may be scheduled by calling the Recreation Office, Ext. 2873, before Tuesday, November 19.

NOTE: Because the Upton Nursery School is in session, the Recreation Building will not be available for parties of more than 50 people until Friday evening, December 14.

Brookhaven Center

Reservations for parties at the Brookhaven Center may be arranged by contacting Jean Byrne, Staff Services, Ext. 2553.

Singles Club

The BNL Singles Club is planning a ski trip to Lake Placid on January 24 to 26. Prices are: \$143 per person with four people per room, \$153 with three per room, and \$172 with two per room. These prices include the round-trip via motorcoach, two nights' accommodations, two buffet breakfasts, Saturday dinner smorgasbord, a cocktail party and discount lift ticket. The bus will leave BNL at 4 p.m. on Friday, January 24. A deposit of \$50 is due by November 15. For reservations, call Doris Terry, Ext. 2228.

The Singles Club will meet on Tuesday, November 12, in Berkner Hall lobby, at 12:20 p.m.

Astronomical Society

The public night at the observatory this month is scheduled for Friday, November 8, beginning about 6:30 p.m., with the following Friday as the rain date. Anyone planning to attend should call Bob Mills, Ext. 5043, or Rick Jackimowicz, Ext. 3803, during the preceding afternoon.

Volleyball

League I	W-L
Bumpers	6-0
Dinkers	5-1
UpFaGrabs	4-2
X-Rayted	2-4
Net Results	1-5
TNT	0-6
League II	
Phoubars	6-0
Nuts & Bolts	4-2
Cannonballs	2-4
Fossils	2-4
Chungas Revenge	2-4
Upton-Ups	2-4
League III	
Print-outs	6-0
The Buddys	4-2
Couples	3-3
ScrewBalls	3-3
Foul-Ups II	1-5
Light N'Lively	1-5

AMD Courses

Introduction to VAX/VMS 4.1 will be offered in three 1-1/2 hour sessions: Monday, November 18; Wednesday, November 20; and Friday, November 22, from 1:30 to 3:00 p.m. in the AMD Seminar Room, Building 515. The lecturer is Ronald Wittlock.

The course will cover terminal server features, dedicated nodes, directory use and maintenance, useful DCL commands and generic qualifiers, file transfer methods, command procedures and the use of the EDT editor. To register or for more information, please call Wittlock at Ext. 4112.

In Stormy Weather

The following radio stations have agreed to carry announcements regarding emergency closings and delayed openings at BNL:

Station	Area	AM	FM
WCTO	Smithtown		94.3
WBLI	Patchogue		106.1
WLIX	Islip	540	
WHLI	Hempstead	1100	98.3
WBAB	Babylon	1440	102.3
WLNG	Sag Harbor	1600	92.0
WALK	Patchogue	1370	97.5
WRIV	Riverhead	1390	
WRCN	Riverhead	1570	103.9
WSBH	Southampton		95.3

Cafeteria Menu

Week of November 11

Monday, November 11
Snack Bar Service
9 a.m. — 3 p.m.

Tuesday, November 12	
Lentil soup	(cup) .65 (bowl) .85
Pot roast of beef	2.40
Baked chicken w/ sweet potatoes	2.40
Hot Deli: Smoked ham	(bread) 2.35 (roll) 2.50

Wednesday, November 13	
Potato leek soup	(cup) .65 (bowl) .85
Spaghetti & Italian sausage	2.40
Fresh ham w/ sweet potatoes	2.45
Hot Deli: Roast beef garden club sandwich	2.45

Thursday, November 14	
Corn chowder	(cup) .65 (bowl) .85
Sweet & sour pork over rice	2.45
Breaded filet of sole	2.45
Hot Deli: Ham & cheddar melt	2.40

Friday, November 15	
Seafood gumbo	(cup) .65 (bowl) .85
Salisbury steak w/ roast potatoes	2.45
Fried seafood platter	2.45
Hot Deli: Tuna melt	2.40

Eating... counting... the United Way

For 20 years, Long Islanders have united to help people build better lives for themselves.

1 out of 3 Long Islanders use United Way services.

2 dollars per week = 7 treatments for a child with speech problems.

3 times 43 = 129 United Way agencies on Long Island.

4 dollars a week = 20 days of care for a child of working parents.

5 dollars per week = 5 nights' shelter for a homeless family.

6 home visits to an older person by a registered nurse = \$5/week.

7 days a week, people need United Way.

8 times 110,000 Long Islanders needed United Way last year.

9 dollars a week = almost 12 home visits to a stroke victim by a physical therapist.

10 times 2 = 20 years the United Way has been serving Long Island.



