

BNL Lecture The CO₂ Mystery

In the last 10 to 20 years, the effects of burning fossil fuels have become more evident with one exception: carbon dioxide concentration in the air. A station on an Hawaiian volcano which measures atmospheric CO₂ has been reading half the concentration scientists expect to be found in the air. Where is the rest of the CO₂ going?

In the next Brookhaven Lecture "The Bering Sea: From PROBES to ISHTAR," on Wednesday November 16 at 4:30 p.m. in Berkner Hall, oceanographer Terry Whitlege, Department of Applied Science, will discuss the CO₂ mystery in the context of two ongoing projects. As a result of projects PROBES (Processes and Resources of the Bering Sea Shelf) and ISHTAR (Inner Shelf Transport and Recycling), Whitlege and his colleagues have confirmed that the carbon is being removed from the atmosphere by planktonic plant life, not by the open ocean as previously thought.

"Project PROBES focused on the biological processes that were conducive to the large catches of finfish and shellfish in an area of the Bering Sea between the Aleutian and Pribilof Islands which fishermen call the 'Golden Triangle,'" explains Whitlege. "We found that there wasn't a special biological efficiency in the Bering Sea, but rather an extra wide shelf that provided a large area of suitable habitat."

ISHTAR, the latest project, is again looking at the Bering Sea, and examining the lower portion of the Arctic Ocean, the Chukchi Sea. Whitlege will report on the comparison to date of material found at the Yukon River mouth with that found in the deeper Bering Sea. He will be illustrating his

talk with slides of both scientific interest and scenic appeal.

Whitlege served as principal investigator of PROBES nutrient dynamics and distribution research from July 1976 through February 1983. As well, he set sail on five PROBES cruises from May 1978 to July 1982. Whitlege has had papers on his PROBES studies published in *Nature*, *Deep-Sea Research*, and other journals and monographs.

Whitlege came to BNL in 1975 from the University of Washington where he received his Ph.D. in oceanography. He was promoted from associate to full oceanographer in 1977, and served as acting head of the Oceanographic Sciences Division from 1982 to 1983.

Dinner will follow the lecture in Room A at Berkner, and will cost \$7.50. Reservations should be made by calling Ext. 3541 before 5 p.m. that day.



Terry Whitlege



Vale Myles and Margaret Bogosian

Patently Knowledgeable

Brookhaven has a lot of bright scientists who get a lot of bright ideas in a number of different areas. To protect their ideas requires a patent office familiar not only with the law, but with technical know-how in scientific fields. In the persons of Margaret Bogosian and Vale Myles, BNL has such a patent office.

Under the prime contract, BNL is obligated to report all inventions to DOE. The BNL Patent Office guides the inventions through disclosure and, where applicable, up to the granting of the patent, a process which takes about two years.

To start the process, Bogosian and Myles must determine whether an application is worth filing. They do this by assessing its importance to ongoing research, its commercial interest and novelty, and by conduct-

ing a prior patents search. They then send a disclosure of the invention to DOE, together with a recommendation as to whether an application should be filed.

If DOE gives the green light, the BNL Patent Office files a patent application and, later, prepares legal briefs to respond to any U. S. Patent Office questions concerning the patentability of the invention. In legal lingo, this response is called "prosecuting the patent application." Last year, the BNL Patent Office made 53 disclosures and filed 19 patent applications. However, as both Bogosian and Myles point out, numbers are not that important. What is important, is the quality of the application. As Myles puts it, "to have value in a licensing program, the patents must be drafted and prosecuted so that they will stand up in litigation."

Bogosian handles patents for inventions in the life sciences and chemical engineering. Her legal career includes work at the National Institutes of Health in Washington, D.C., seven years on the staff of Hoffman-LaRoche, Inc., and from 1978 until she came to BNL in 1981, Legal Counsel for the Research Foundation of the City University of New York. Her education includes a B.A. (Pre-med studies), two years at the Columbia University College of Pharmacy, and a J.D. degree from Fordham University School of Law.

Myles is a newcomer to the Lab (he arrived a month ago), but no newcomer to the patent business. For over 25 years he worked as Patent Counsel and Patent Attorney in various divisions of the General Electric Co. He received his J.D. degree from George Washington University and a B.S. in electrical engineering from the University of Nevada. He also spent two years with the Army Signal Corps as an instructor at European installations. He handles patents with engineering content.

In addition to the pursuit of patents, Bogosian and Myles review all Lab publications before distribution, so that no invention is disclosed prematurely. Bogosian, as Patent Counsel, has a number of other responsibilities, which include working with industry and DOE on licensing agreements regarding commercialization of anything patented by BNL; administering the "intellectual property" aspects of Lab R&D subcontracts; reviewing licensing arrangements between software vendors and BNL, and contracts with industry regarding proprietary research.

Workshop Helps Independent Inventors

The world is full of good ideas, but getting those ideas to market is often a baffling and fruitless process for an inventor. And many inventors, as they are well aware, don't have the knowledge to put the package together.

To try and become better informed, over 250 independent inventors gathered at BNL on October 28-29 for a two-day session on "From Idea to Product: Making It Happen." Leaders of discussions and some 16 workshops tackled such areas as legal protection, sources of capital and Federal programs to aid the inventor.

This was the first National Innovation Workshop held in the New York City and New England areas. Speaker Ann Eskesen, president of the Innovation Development Institute, defined innovation as "the process of taking an idea for a new product through research, development and demonstration, into commercial application." And inventors, she said, should focus on the market from the earliest point in their creation of a new product. Too often, she said, they had a good idea and no knowledge of, or access to, market resources.

"The country is teeming with daring self-starters," said Christopher Lehman, president of Venture Magazine, in the opening address. He stressed the importance of entrepreneurs in a healthy economy. Because they are self-employed, he said, they are free to initiate new ideas, take the risks and reap the rewards. Lehman said that his magazine's survey of entrepreneurs showed that they have many characteristics in common: they

are first born, are early risers, have held many jobs before graduating from high school, have a compulsion to prove themselves, believe education important only in relation to a product or service when it is of a technical nature, and have high energy levels.

He maintained that the government is encouraging the start-up of small businesses by such means as a reduction in the capital gains tax and proposals for further tax relief. Ann Eskesen also urged the audience to seek funding from the Small Business Innovative Research Program (SBIR). This program results from legislation which requires Federal agencies with big R&D budgets to give more money to small companies to assist them in

the development of products and processes.

Tom O'Hare, Associate Chairman for Energy Base Programs at DAS, was the person who initiated the conference in this area, and BNL as the site. Pat Towey is credited with pulling all the conference arrangements together. "In fact, she was the key to a successful meeting," said Bill Marcuse, head of BNL's Office of Research and Technology Applications. Marcuse prepared the program and said he was well pleased with the response to it. The workshop was sponsored by the Departments of Commerce and Energy, as well as by several local institutions and companies.



At the National Innovation Workshop, BNL's Bill Marcuse and Ann Eskesen, president of Innovation Development Institute, listen to one of the inventors who was seeking information.



David Schweller (left), Manager of the Brookhaven Area Office, recently presented to BNL Director Nicholas Samios, a DOE Award of Excellence. The Lab qualified for the award because of its outstanding safety performance in 1982. BNL reduced its lost time rate to three-quarters of the average of the three previous years.



Over 150 theoretical physicists gathered in Berkner Hall on October 21 & 22 for the Twenty-Second Eastern Theoretical Physics Conference. Laurence Trueman (left), Chairman of the Organizing Committee, said the purpose of the meeting was to disseminate knowledge of recent developments in theoretical physics and to stimulate communication among theoretical physicists. Thus, a broad range of talks, covering all areas of theoretical physics, was delivered, including an opening discussion of "Supersymmetry in Low Energy Physics" by Yoshio Nambu (center), University of Chicago. Instituted in 1961, the conference is held annually at a different eastern location. In organizing this first BNL meeting, Trueman was assisted by representatives of the three areas of theoretical physics done here: James Davenport (condensed matter), William Marciano (high energy) and John Milener (nuclear). Next fall, the session will be chaired by Gordon Fleming (right), at Pennsylvania State University.

—photos by Reben

Patents Awarded

John W. Andrews, Department of Applied Science, was issued U.S. patent #4,390,008 for his invention of a hot water tank for use with a combination of solar energy and heat-pump desuperheating.

Various efforts have been made to conserve the amount of purchased energy needed to heat water. The more popular method is the use of solar energy. Another method involves heating water by bringing cold water into a heat exchange relationship with superheated gas leaving the compressor of a heat pump, i.e. desuperheat. Both methods, however, are most effective for only a fraction of a year.

One object of Andrews' invention is to provide, at least for climates where the annual heating loads exceed the annual cooling loads, a hot water system in which solar heat and the heat obtainable from desuperheating are made compatible so as to provide the greater fraction of the hot water load from non-purchased energy for all months of the year.

Another object is to use solar energy in conjunction with the heat obtainable from desuperheating in a way that reduces the amount of solar collector area required to heat water by solar energy alone.

U.S. Patent #4,392,080 was issued to **Alfred W. Maschke**, Accelerator Department, for developing a means and method for focusing and accelerating parallel beams of charged particles. His apparatus is comprised of planar arrays of electrostatic quadrupoles. The quadrupole arrays may be made up of electrodes which are shared by two or more quadrupoles. Such quadrupole arrays are particularly adapted to provide beams approaching maximum brightness

and to focus beams having essentially any desired total current without increasing the strength of the focusing forces.

This novel linear accelerator does not require a preaccelerator. Also, for a given current, it may operate at a higher frequency than previously achievable.

Chiang Y. Yang, a former BNL employee, and **Robert A. Rapp**, a former employee who now does consulting work for the Laboratory, were awarded U.S. Patent #4,392,928 for developing a method of doping a semiconductor.

The valuable electronic properties of semiconductors are a result of precisely controlled amounts of impurities, or defects, which are introduced into the crystal structure of the semiconductor material. The processes by which these impurities are introduced are generally referred to as semiconductor doping.

The invention by Yang and Rapp is capable of providing a high degree of control of the concentration of the impurity. Also, their method does not require large amounts of energy to vaporize or melt bulk quantities of the impurity.

An interface is established between a solid electrolyte and a semiconductor to be doped. The electrolyte is chosen to be an ionic conductor of the selected impurity, and the semiconductor material and electrolyte are jointly chosen so that any compound formed from the impurity and the semiconductor will have a free energy no lower than the electrolyte. A potential is then established across the interface so as to allow the impurity ions to diffuse into the semiconductor.

An Invention Ripe for Marketing

Gwyn Williams pulls out a desk drawer. "Here is the world's supply of sun meters," he says.

He reaches in and grabs a handful of cards, a bottle and a disk. All of them do the same thing — they measure sunlight.

The reason Williams has cornered the market on these devices is that, first, he invented them, and second, he's their sole manufacturer.

Williams has never sold any devices, so he hasn't made a cent on his invention. But he didn't invent the sun meter to make money. He did it so he could go sunbathing and not get burned.

A physicist at the National Synchrotron Light Source, Williams is a native of England. "Europeans are very obsessed with sunbathing," he says. "In England, there is almost no sun, and people actually fly away in search of it."

He was in France on vacation when he got very badly burned. He recalls, "Being a physicist, I figured there must be some way to monitor one's exposure to sunlight, just as there are devices to monitor other kinds of radiation exposure."

He looked around for something already on the market and found nothing. So for years, he experimented with different ideas and finally came up with one that worked.

Williams' Tanchek, as he likes to call the device, is a strip of paper with a special coating. The coating is sensitive to ultraviolet (uv) radiation, which is the component in sunlight that causes skin to tan and eventually burn. Exposure to uv radiation causes the coated paper to change color. It starts at green, and as the exposure builds, goes to olive green, then brown, dark purple, lilac and finally red. To get an accurate exposure reading, the colors can be matched with a color chart.

Sunbathing is mostly a hit and miss affair. People estimate their exposure based on their judgments of wind, haze, cloud cover and reflectivity of surroundings. Other factors

also affect exposure. For example, sunbathing in the spring is particularly hazardous for two reasons: the uv-absorbing ozone layer in the atmosphere is at a minimum, and human skin generally has little protective melanin built up. And even though the body does provide a pain warning of tissue damage, by then it's too late.

Williams' Tanchek takes the guess work out of sunbathing because it works under any atmospheric conditions.

His device may be simple to use, but it's not a casual invention. There is science behind it. The sensitivity of the paper closely matches skin response to uv radiation. Also, it is most sensitive to the particular range of uv radiation that causes sunburn, but is still sensitive to the wavelengths that cause skin browning. So while the device is primarily designed to warn of sunburn, it also indicates how much tanning will occur.

Williams has patented his device in England and in the United States. It was "a long and expensive process," but he did it "because of encouragement from my friends in case the invention really took off."

Since the Tanchek is made of the same material as latex wall paint, Williams says it costs pennies to make. He thinks it would be a great giveaway for businesses catering to sun-seekers.

As for marketing the device himself, Williams has no interest in doing that. He had briefly gone into partnership with a few people who wanted to market the device, and he and his wife once spent hours assembling thousands of Tancheks. But the device has never been put on a store shelf.

Says Williams, "I'm not a basement inventor who's always tinkering around with ideas. I needed a sun monitor, I couldn't buy it, so I invented it. I've used it for myself and, later, for my children. That's what I started out to do in the first place."

— Mona S. Rowe



Gwyn Williams with an assortment of Tancheks, a sun meter device he invented.

Peter Horton

WIS Lecture

Robin Leonard, epidemiologist in the Medical Department, will speak on "Normal Variations in Human Populations: A Study in Genetic Epidemiology" at the next meeting of the Women in Science. The dinner meeting will be held from 5-8 p.m. on Monday, November 14, in Room A, Berkner Hall.

Leonard was a postdoctoral fellow and an instructor in the Department of Epidemiology at Johns Hopkins University before joining the Medical Department staff last April. She holds a Ph.D. in human genetics from the Medical College of Virginia.

All interested employees are invited to attend. The cost of the dinner is \$7.50. Reservations should be made by sending a check, payable to BNL-WIS, to Nancy Fallon, Bldg. 535A, before Thursday, November 10.

Notice

Because of the holiday on Friday, November 11, the Bulletin will not be published that day. The next issue will appear on November 18.

BROOKHAVEN BULLETIN

Published weekly for the employees of BROOKHAVEN NATIONAL LABORATORY

BERNICE PETERSEN, Editor
MONA S. ROWE, Assistant Editor
ANITA COHEN, Reporter

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

Eat and Run

If lunging into the refrigerator for a snack is the only intersection of diet and exercise in your life, then you should run, not walk, over to the North Room of the Brookhaven Center on Monday November 14 at 5:15 p.m. for some more nutritious food for thought. There and then, Dr. Ashok Vaswani, a Medical Department endocrinologist specializing in clinical nutrition, will address the relationship between diet and exercise in a lecture sponsored by the Aerobic Dance Club.

Vaswani plans to discuss how the functioning of your cells and tissues is affected by diet and exercise, separately and combined. Changes occur with sporadic, vigorous, and intensive exercise depending upon what kind of fuel you feed your body. For example, Vaswani will talk about the hows and whys of carbohydrate loading by athletes before competition.

For more information on this lecture, call Liz Soenarjati, Aerobic Dance Club president, at 878-9520.

Play Readings

The Theater Group will meet at 8 p.m. on Friday, November 18 in the North Room of the Brookhaven Center.

The program for the evening will include prepared readings from "Crimes of the Heart" and "Mornings at Seven." Anyone (member or not) who is interested in preparing a role for this reading, should contact Kurt Fuchel on Ext. 4116, or Penny Baggett, Ext. 5154, as soon as possible.

All who are interested in theater, are welcome to come and listen to the presentations from these fine plays.

Astronomy Club

On Friday, November 4 at sundown, the Astronomy Club will meet for a regular observation night. The telescope is now installed in its permanent location and will be used for the first time tonight. Active members and interested persons are invited to attend.

Fashion Parade

The Hospitality Committee's fall Tea and Sherry Party at the Brookhaven Center will feature a fashion show. The clothes will be provided by Sheri Lynn's of Rocky Point and the Hospitality Committee will provide the models. The party will start at 3:30 p.m. on Thursday, November 17 and end about 5:30 p.m. The fashion show will probably get under way about 4:15 p.m. Along with the tea and sherry, breads and dips will be served. Women employees, and wives of employees, guests and visitors are invited.

Babysitting will be provided free of charge at the gym. For very young children, please bring a car bed or playpen. Also bring one or two toys for each child to play with and put the child's name on each toy.

NYC Train Trips

The Hospitality Committee is planning two group railroad trips to the city in the next two weeks.

One is a special on Saturday, November 12, leaving at 8:31 a.m. Round-trip fare is \$5.00 and must be received no later than Wednesday, November 9. Reservations will be accepted on a first-come, first-served basis.

The second is a regularly scheduled trip on Wednesday, November 16, leaving at 7:55 a.m. The round-trip fare is \$3.50, and must be received by Thursday, November 10. Refunds will be made only if cancellations are received by the Monday morning preceding the trip.

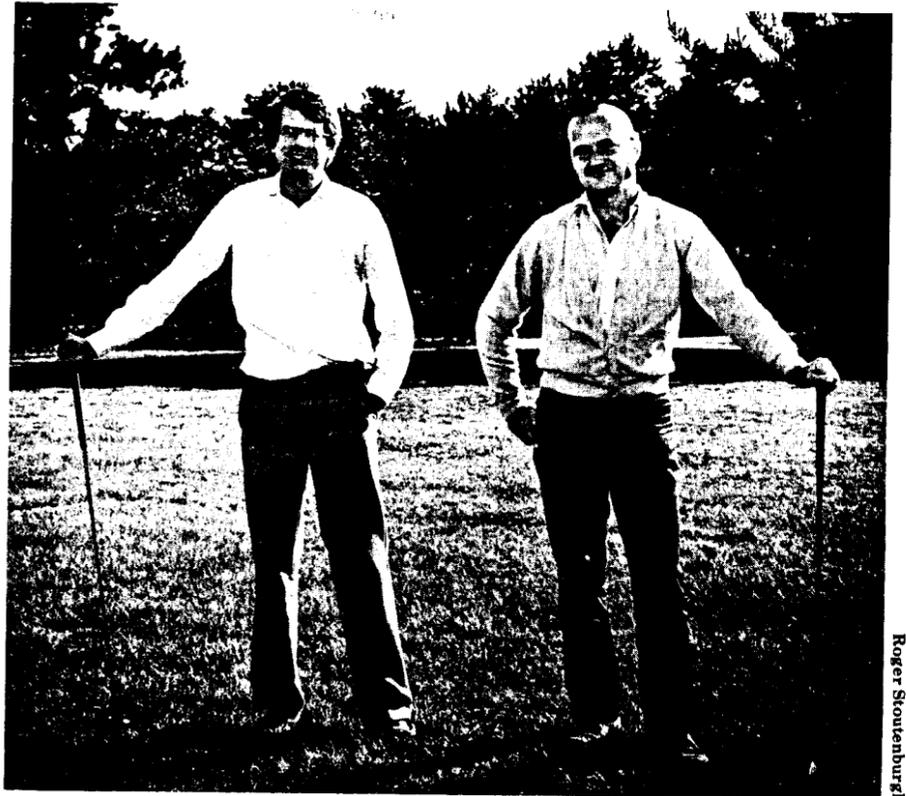
Children under five years ride free on both trips. All departures are from the Patchogue LIRR station. To reserve a ticket send your fare through the U.S. mail to BNL, P.O. Box 322, Upton, New York 11973. Checks or money orders should be made payable to BNL. Do not send cash. Put the date of the trip, your telephone number and BNL life number on the check. Tickets will be given to you on the train.

Trips to the city for the remainder of this year are as follows:

Wednesday	Saturday
November 16	November 12
November 30	November 26
December 7	December 10
December 21	December 17

Concert Reminder

The Rogeri Trio will give a concert on Wednesday, November 9, at 8:30 p.m. in Berkner Hall. On the program will be Beethoven's Trio in C Minor, Op. 1, No. 3; the Charles Ives Trio; and Dvorak's G Minor Trio, Op. 26. Tickets will be available at the door.



Steve Heald (left) and Bob Mills — golf champs.

Roger Skousenburgh

Golf Standings

The BERA Golf Association (BGA) recently brought its 1983 golf season to a close with the completion of team and individual league playoffs.

The team league championship was won by Steve Heald and Bob Mills. They defeated Doug Mitchell and Al Wirszyla (Group 3 winners) in the final match. Other regular season winners were Joe Klemish and Ed Smith (Group 1), Bill Sampson and Lou Snead (Group 2), and Paul Mohn and Ralph Taylor (Group 4).

The individual league championship was won by Steve Heald over runner-up John Usher in a close match. Regular season winners in the individual league included Les Lawrence (Group 1), Jim Petro (Group 2),

and Otto Kammerer (Group 3).

Forty-eight golfers played in the final tournament of the year held at the Flagg Country Club. John Usher won low gross for 18 holes with an 83, and Bob Schuman and John Connelly tied for low net for 18 holes with a 73. Other winners were: George Korhut, low gross front 9 (40) and closest to pin; Ron Webster, low gross back 9 (42); John Brown, low net front 9 (35); and Tom Holmquist, low net back 9 (36). Les Lawrence won longest drive.

The year-round awards for best overall performance in the BGA tournaments went to John Usher, gross score standings, and Vinnie Racaniello, net score standings.

Cooking Exchange

Sally Lunn bread, old fashioned pecan bars, spoon bread, and other early American favorites will be demonstrated and sampled at the Williamsburg Feast on Wednesday, November 9.

This meeting, as all Cooking Exchange meetings, will be held in the Recreation Building between 12:30 and 2:30 p.m. The charge is \$1 per person and babysitting will be provided at 50¢ for each child.

For further information, call program chairperson Zuna Van Rooyen at 929-6961.

Bowling

Red/Green League

High games were bowled by K. Batchelor with a 266 scratch, 312 gross game, K. Riker 247, R. Larsen 232, J. Morris 204, E. Sperry IV 204, J. Connelly 203, J. Ferrante 202, L. Jacobson 201, E. Meier 200, L. Schairer 200.

White League

K. Riker rolled a 224, J. Griffin 222, B. Glasmann 204, J. Sheehan 202, T. Erickson 200, J. Thiede converted the 4/7/9.

Pink League

D. Johnson bowled a 203, K. Kissel 188, E. Jacobson 180, S. Asselta 179/179, R. Rosati 175.

Singles Club

The Singles Club is having a "Night at the Races" on December 2. The group will go to Roosevelt Raceway by bus from the Lab, have dinner at the Cloud Casino, watch the races and return by bus. All interested employees are welcome to come along. The total cost is \$26.50 per person. For more information and reservations call Chuck Watson at Ext. 5317.

Arrivals & Departures

Arrivals

Marsha Belford Director's Ofc.
Mary Ann Feist Mgt. Info. Sys.
Krystyna Rybicka DAS
Kenneth Testa Plant Eng.

Departures

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

Yves J.C. Bizais Medical
Jeffrey P. Houchins Biology
Anthony J. DiMauro Central Shops
Michael McKeown Physics
John G. White Personnel

Cafeteria Menu

Week Ending November 11

Monday, November 7

Corn chowder	(cup) .65
	(bowl) .75
Swiss steak jardiniere & 1 veg	2.05
Cheese omelet & 1 veg.	1.80
Hot Deli: Boneless barbeque rib	(bread) 1.85
	(roll) 2.00

Tuesday, November 8

Chicken rice soup	(cup) .65
	(bowl) .75
Beef & broccoli stir fry on rice pilaf	2.05
Savory baked chicken quarter & 1 veg.	1.90
Hot Deli: Turkey breast	(bread) 1.95
	(roll) 2.10

Wednesday, November 9

Pork & cabbage soup	(cup) .65
	(bowl) .75
Baked meatloaf & 1 veg w/mush-room gravy or barbeque sauce	1.85
Corned beef and cabbage	1.90
Hot Deli: Baked ham	(bread) 1.85
	(roll) 2.00

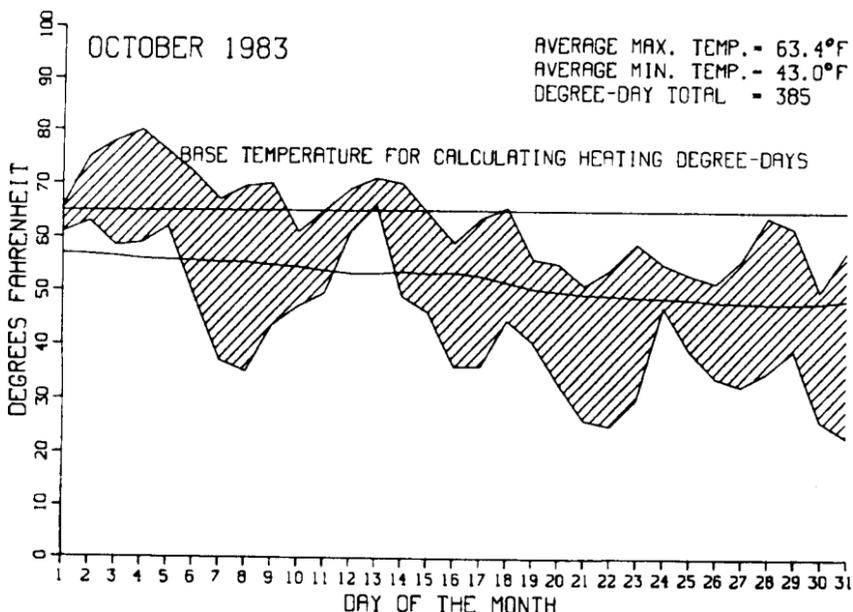
Thursday, November 10

Cream of cauliflower soup	(cup) .65
	(bowl) .75
Sweet and sour pork on rice	1.95
Breaded fish fillet w/french fries & cole slaw	1.85
Hot Deli: Sausage & pepper hero	2.00

Friday, November 11

Snack Bar — 9 a.m. - 2 p.m.

Degree Days at BNL



Classified Advertisements

Placement Notices

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

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

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

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

LABORATORY RECRUITMENT: Opportunities for present Laboratory employees.

1961. TECHNICAL POSITION - Requires AAS in mechanical or electrical technology or equivalent experience and some machine shop background. Will be responsible for the assembly, maintenance, and troubleshooting of beamlines at the National Synchrotron Light Source. Familiarity with cryogenic techniques desirable. Physics Department.

1962. COMPUTER APPLICATIONS/RESEARCH SERVICES POSITION - Will work in PETT VI (Positron Emission Scanner) environment. Work assignment will involve data preparation, entry, processing, checking and file maintenance. Will also be involved in equipment maintenance and calibration associated with project. Will also perform a variety of laboratory assignments. Candidate must be familiar with computer operations and use of consoles. Familiarity with laboratory procedures is desirable. Chemistry Department (Reposting of Job No. 1953).

1963. ASSOCIATE STAFF ENGINEER - Requires a bachelor's degree in either engineering, bio-engineering, chemical engineering or equivalent capabilities. Appropriate computer courses and/or experience is desirable. Responsibilities will include operating the photovoltaic - electrolyzer system now being installed at the BNL Integrated Test Bed Facility. Will be required to help develop the data analysis programs, run the system, verify that the system is operating properly, and initiate improvements or modifications, comparing observed operation to simulation results. Will also assist in performing economic system optimization analyses. Department of Applied Science.

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

1964. SCIENTIFIC ASSOCIATE - Requires a bachelor's or master's degree in nuclear engineering or health physics or equivalent capabilities. Must have demonstrated analytical and communication skills and considerable appropriate experience with at least two years' experience in an operating nuclear power plant. Duties will include studies of costs and effectiveness of dose radiation techniques in light water nuclear power plants. Safety and Environmental Protection Division.

1965. SCIENTIFIC ASSOCIATE - Requires a master's degree in health physics with emphasis in math and physics necessary. Familiarity with computer programming will be helpful. Will be involved in projects of an analytical nature and will be expected to detect problems and suggest adaptation of methods to solve them. (Appointment will be to September 30, 1984). Safety and Environmental Protection Division.

Auto & Auto Supplies

VW PARTS - new parts at wholesale prices, call for needs. Augie, Ext. 2419 or 289-4211 eves.

81 FORD BRONCO - excel. cond., low mi., 4-wheel drive, am/fm cassette, captain chairs. Karen, Ext. 2882 or 2883.

79 HONDA - excel. cond., low mi., a/c, must see. 287-1394 weekends.

74 CHRYSLER NEWPORT - \$500 or best offer. 727-5912.

80 MUSTANG - 4 spd., brown & gold, 39K mi., beautiful cond., \$4,500. Bob, Ext. 5010 or 289-0357.

73 PLYMOUTH DUSTER - 60,000 orig. mi., a/t, p/s, 225 eng., runs excel., needs some minor work, \$850 neg. Ken, Ext. 2350 or 732-7944.

DRAWTITE TRAILER HITCH - Class II, for Cutlass, Century, Malibu, LeMans, 1978 & up, will install. Brian, Ext. 4121.

81 COUGAR XR-7 - red w/silver vinyl top, red velour interior, AOD, new tires, mint cond., must see, asking \$7,000 (firm). Ellen, Ext. 4486 or 878-0480 eves.

73 CUTLASS - \$750. Werner, Ext. 3027 or 4571.

66 MUSTANG - partially restored, new paint, exterior, tires, \$2,000. 363-6845.

CHEVY BLAZER SOFT-TOP - w/hardware, excel. cond., \$110. Ken, Ext. 2350 or 732-7944.

75 VEGA HATCHBACK - good cond., \$600. Ken, 979-7144 eves.

75 BUICK SUBURBAN - station wagon, good cond., \$950. Ext. 7110 or 2377.

74 VW SQUAREBACK - runs well, many new parts, asking \$850. 286-1183 eves.

MANLEY PISTONS - 327+ .030, .043 rings w/L.W. pins, \$150; alum. super rods, \$100. Bill S., Ext. 4434.

76 GRAN TORINO - 302, p/s, p/b, a/c, excel. cond., orig. owner, \$2,400. 281-7595 after 6 p.m.

REAR STEP BUMPER - (1) fits 1973-1984 Chevy or GMC, excel., \$75. Ext. 3084 or 269-9510.

CHEVY RIMS - wide spaced, 3/4 ton, 15 in., (4) for \$50. Jack Dunn, Ext. 4613.

69 FIREBIRD - auto., 6 cyl., 4.1 liter OHC, orig. owner, \$800. Tom, Ext. 3086 or 878-8689 eves.

80 CITATION - a/c, p/s, p/b, am/fm, stereo, low mi., excel. cond., \$3,500. 744-8767 eves.

78 CADILLAC ELDORADO - excel. cond., black w/red leather, all options, 50,000 mi., make offer. 473-4948 eves.

SNOW TIRES - (2) white walls on rims, LR78-15, \$60; (1) front bumper, fits 1973-1980 Chevy or GMC Pickup, \$65. Ext. 3084 or 269-9510.

76 DODGE ASPEN - station wagon, good cond., stick shift, 6 cyl., \$1,500. 878-0584.

75 DODGE DART - Sport, 340 c.i., 4 spd., Cragers, Dunlop radials, new clutch, stereo, asking \$1,700. 732-7288.

73 DODGE DART - Custom, reliable. Ted, Ext. 2620 or 751-6765 after 5 p.m.

83 BUICK SKYHAWK - under warranty, must sell, many extras, \$7,800. Ext. 5138 or 473-5095 eves.

SLIDE ON CAMPER - for 8' bed pickup, stove, sink, lights, dinette, cabinets, \$500. 928-8709.

73 APACHE POP-UP - Solid State, mint, sleeps 8, many extras, \$1,795. 286-8418.

TIRES - P-205/75R15, Good Year radials, \$25/pr. Tom, Ext. 4084 or 878-1060.

78 CHEVY IMPALA - station wagon, 305, a/t, p/b, 2 way tailgate, new radials, immac., 48,500 mi. Ext. 2434 or 589-4407.

SNOW TIRES - pair on rims for VW bug, also spare; other parts, flexible. Kevin, 473-0961.

70 VW SQUAREBACK - auto. trans., less engine & extras, \$150 neg. 473-9223.

71 DODGE SWINGER - 318, V8, auto., p/s, 2 dr., excel. cond., \$795. Rick, 727-7626 after 5:30 p.m.

78 SUBARU BRAT - 4x4, good cond., \$2,100. 924-3855 after 6 p.m.

72 BEETLE - runs well, body sound, \$550. Dave, Ext. 4289 or 288-3011 eves.

72 OLD CUTLASS - 350, V-8, auto., p/s, p/b, 4 dr., good for parts, runs, \$100. Rick, Ext. 4100.

72 VW CAMPER - pop-top, new, guaranteed engine, 1971 style, excel. cond., \$3,000. 727-8631.

71 SAAB 96 - runs well, orig. owner, radio, economical, \$400. Ext. 7687 or 744-1112.

TIRES - (4) Goodyear Viva ER78-14; (1) Firestone G78-14, 1/8" left, \$10 ea. Ext. 7505 or 689-8605.

73 PLYMOUTH - station wagon, good running cond., needs some window repair, comes w/CB, \$400. 929-3325.

83 PLYMOUTH TURISMO - 2.2, 5 spd., low mi., am/fm cassette, warranty, \$7,100. 331-1907 eves.

77 BMW - 320i, low mi., good cond., am/fm stereo, a/c, sunroof. Ext. 7918 or 286-0898.

78 CHEVY MALIBU WAGON - green, am/fm stereo w/CB, excel. cond., \$3,350. 821-9280.

74 MERCURY COUGAR - very good cond., 2nd owner, \$1,095. 289-2864 after 5 p.m.

82 DATSUN B210 - 4 dr., auto., mint, 29K mi., asking \$5,100. Frank, Ext. 3976.

70 FORD F100 - 302 engine, camper, CB, from salt-free south, \$1,000. 928-0281 after 6 p.m.

63 FORD GALAXIE 500 - new tires, exhaust system, 289, V8, manual trans., very good cond. Mike, Ext. 4988.

61 VW BEETLE - restorable or for parts, make an offer. Ext. 7518.

TIRES - (4) Michelin, 165GR13, 15,000 mi., Alloy mag hubs, 5-1/2Jx13HZ, \$400. Bruce, Ext. 7132 or 653-9653.

77 GREMLIN - 80,000 mi., 3 spd., many new parts, good transportation. Ext. 3449 or 924-5802.

71 DUSTER - 6 cyl., high mi., good cond., \$700. Ext. 4095 or 475-8504.

76 DATSUN B210 - Ext. 3173 or 473-7460.

74 VW - good to excel. cond., \$1,575. 281-5827 after 6 p.m.

81 KAWASAKI 250 KDX - like new, 300 mi., \$1,000. Dave, Ext. 3344 or 475-7891 after 5 p.m.

75 FORD GRAN TORINO - station wagon, good cond., auto., a/c, p/s, p/b, l/r, radio. Jim, Ext. 3290.

76 CHEVY NOVA - 65,000 mi., auto., p/s, excel. mech. cond. Ext. 2073 or 928-8071.

80 MONTE CARLO - V-6, p/s, p/b, a/c, am/fm stereo cassette, excel. cond. Ed, Ext. 2900 after 5 p.m. or 289-1627 days.

76 FORD TORINO - p/s, p/b, 84 K, good running cond., body damaged, leaving, must sell, \$1,000. Ext. 3641.

76 MGB - blue convertible, rebuilt engine, asking \$1,900. 261-5646.

Boats & Marine Supplies

EVINRUDE MOTOR - 1981, 6 HP, good cond., \$400. Ext. 2705 or 298-9581.

EVINRUDE MOTOR - 1971, 40 HP, needs power-head, all else complete, make offer. Ext. 7518.

Yard Sales

HARVEST HOLIDAY - a fair with a country flavor, Sat., Nov. 5, 10-4 p.m., Sayville Congregation Church, Middle Rd., Sayville.

WEST SAYVILLE - 115 Carley Dr., 11/5, some furn., freezer. Call 589-3485 for info.

Free

CAT - loving, 3 yr. old, spayed, shots, owner moving, heartbroken. Harvey, Ext. 5515 eves.

Miscellaneous

FLUTE - Gemeinhardt, excel. cond., purchased new Oct. 1981, silver plated, closed hole, \$150. Ext. 4782 or 821-0695.

DIRT BIKE - 1981 KX80, \$425 S. O'Kula, Ext. 4167.

TV - Zenith, 19", b&w with table. 698-3856.

COAL STOVE - Franco Belge #275, used 2 seasons, \$375. 399-0537.

MAMIYA C330 TLR - case, extras, misc. darkroom equip., \$275. Brian, Ext. 4121.

BIRDS - home bred, Zebra Finches, \$11 ea. or \$20/pair. 928-6457 after 5 p.m.

ELECTRIC RANGE - Westinghouse, very good cond., 30", \$75. Joe, 281-8943.

ORGAN - Wurlitzer Super Sprite Funmaker, many features, excel. cond., \$995. 281-8957 eves.

STUDIO COUCH - 34"x74", foam mattress and cushions, \$30; range hood w/fan, light and filters, \$30. Victor, Ext. 2395.

HOT AIR BLOWER - will heat small room; antique stone grinder. Ext. 3688.

SKIS - Head, vector 190cm, excel. cond., bindings, carry case, best offer. Carol, Ext. 4398.

TV - Sharp, 12", b&w, used one month, \$75. Giancarlo, Ext. 4397.

INTERNAL FRAME PACK - Hine, Snowbridge, Model Alpha, \$80. David, 286-2265.

LAWN TRACTOR - 36" snow blower, 32" mower deck, skid chains, 8 HP, Simplicity, \$550. 473-1967.

DISHWASHER - GE, under sink model, gold, \$40; Akai R/R tape deck, \$100. Pete, Ext. 4819.

BIG TRAK - w/back dumper, computerized toy by Milton Bradley, \$30. 399-4822.

GUEST BED - foam mattress, box spring, hardly used, full sized, \$90. Jane, 473-0961.

YOUTH BEDS - (2), good cond. w/springs, \$15 ea. 473-9223.

FREEZER - Frigidaire, 18.7 cu. ft., upright, white, excel. cond., \$300. 931-4225 after 6 p.m.

WOOD STOVE - 24" box stove w/flue pipe & triple wall chimney, never used, \$200. Dave, Ext. 4289 or 288-3011 eves.

TABLE - wrought iron, glass top, plus 5 chairs, excel. cond., \$100. Walter, Ext. 4986 or 757-5478.

CAMERA - 35mm, Minolta SR7, 55mm f1.8, 35mm f2.8, 135mm f2.8 filters. David, Ext. 7646 or 286-8229 after 6 p.m.

STEREO CABINETS - and camping tent. 751-8158.

MIXING BOWLS - Pyrex, 4 piece, 1-1/2 pt., 1-1/2 qt., 2-1/2 qt., 4 qt., green & white pattern. \$8. Susan, Ext. 4267.

ROCKING CHAIR - \$10. Ext. 7505 or 689-8605.

BEDSPEAD - almost new, red, white & blue, twin size, cost \$35 new, sell for \$15. Les, Ext. 2920.

COAL STOVE - Haas and Sohn, model 121-12u., brand new in crate, \$350. 929-6013 or 929-4678.

MICROSCOPE ILLUMINATOR - high intensity. Plotkin, Ext. 4717.

ELECTRIC TYPEWRITER - Coronamatic 2200, \$130; portable tape recorders, \$10 ea. Jan, Ext. 4263 or 751-6734.

FIREPLACE BRASS SCREEN - and andirons, \$45. 744-9832.

FRUIT PIES - cakes, for the holidays; (2) white oak cords, you pick up, \$100/cord. J. Medina, Ext. 7636 or 924-6971.

BOY'S BIKE - 23", good cond., \$40; reel to reel Sony tape recorder, \$100. Tom, Ext. 3128.

WASHER - G.E., good cond., \$60. Ext. 3293 or 698-6437 eves.

ENCYCLOPEDIAS - Funk & Wagnalls, complete set, published 1967, excel. cond., \$50. 399-4076.

FREEZER - Frigidaire, upright, 18.7 cu. ft., frost-free, excel. cond., reasonable; Multivox MX2000 synthesizer, excel. cond. 363-2614 or 363-6121 after 6 p.m.

SOFA BED - queen size; arm chair; sewing machine. 924-5802 after 6 p.m.

GIRL'S BIKE - 26 in., single speed, w/balloon tires, \$8; elec. baseboard heater, \$10. Sal, Ext. 2460.

CONTEMPORARY SOFA - loveseat, 2 tables, hanging lamp, entertainment unit with complete stereo system, \$500, will sell separately. 981-5661.

ALTO SAXOPHONE - R.E. Olds, Parisienne, Ambassador, excel. cond. 298-8657 eves.

CHILD'S TABLE - solid rock maple, formica top, w/2 chairs, \$35. Judi, 928-5714.

CASEMENT WINDOWS - heavy duty, aluminum, screens, storms incl., various sizes, \$20/ea. Niels, Ext. 4124.

TRUMPET - school model, and guitar, excel. cond. Ext. 4850.

KEROSENE HEATER - Sanyo, 13,000 BTU, 2 yrs., used one season, \$95; humidifier; vaporizer; red-wood lawn table. Rolf, Ext. 5506 or 928-7328.

SEWING MACHINE - Singer, with attachments, \$35. Ext. 7727 or 929-4631.

TICKETS - (2), Lou Rawls, Ray Charles, Sister Sledge, Westbury Music Fair, 11/17/83, 8 p.m., row 5, \$33. Ext. 3173.

CASTRO - convertible sofa, king size bed, \$75. 261-5646.

DISHWASHER - GE, portable, \$100; Kenmore washer, 10 yrs. old, runs, \$25; Sears 4 HP self-propelled lawn mower, \$125. 744-9677.

LUGGAGE - white, 21" American Tourister train case. 27" pullman, like w, \$50. Fran, Ext. 2461.

MOVING SALE - dining room set, couch, chairs, table, lamps, breakfast nook, organ. Joan, Ext. 2090 or 698-5787.

DOG TRANSPORTATION KENNEL - plastic, airline approved, used once, 27" long x 19" high x 20" wide, \$25. Ext. 3254 or 2561.

TABLES - chrome coffee w/glass tops, 3 pcs., \$25. 467-8563.

MEN'S ICE SKATES - 2 prs., sizes 8 & 11, \$15 ea. 727-0552 after 6 p.m.

CANARIES - all types & colors, beautiful birds, good gift or for own enjoyment. Ramona, 928-3088.

OAK DESK - & swivel chair, \$95. 878-1580 after 6 p.m.

SEWING MACHINE - Sears, mechanical damage, zig-zag, cam operated, \$15. Walt, Ext. 7154.

GAS HEATER - 75,000 BTU, thermostat controlled, excel. cond. Hugh, Ext. 4669 or 924-3522 after 5 p.m.

ELECTRIC RANGE - GE, 1981, 30 inch, olive green, \$150. Tim, 654-1836.

BOW - "Bear LTD", R.H., 30" draw, 40-65 lbs., with case and bow quiver, sights, \$125. Bill S., Ext. 4434.

RIDING MOWER - 8 HP, needs motor, \$40. Jack Dunn, Ext. 4613.

Car Pools

NORTHPORT/FT. SALONGA - 8:30-5:00, need 1-2 additional riders. Walt, Ext. 7154.

HUNTINGTON STA./MELVILLE - 3 person car pool looking for 4th. Joe, Ext. 4259.

SMITHTOWN - would like to join or start car pool, 8:30-5:00. Bob, Ext. 4758.

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

COOPERSTOWN - 180 acres, deep well, bldgs., reasonable. 363-7032.

SHOREHAM VILLAGE - 4 bdrms., Clarendon cape, 2 baths, full basement, 2 car garage, 3/4 acre partly wooded lot, beach rights, \$115,000. 744-6812.

BROOKHAVEN HAMLET - 4 bdrms., split, 1.25 acres with privacy, 2 car garage, city water, excel. cond., efficient, 9 mi. to Lab, walk to schools, asking \$125,000. 286-0436.

RIDGE - L.V. condo, 2 bdrms., 2 baths, large l/r, enclosed porch, family room, garage, central air, 24 hour security. 744-1022.

For Rent

LAKE PANAMOKA - newly remodeled cape, 2 bdrms. 821-1033.

MILLER PLACE - 1 bdrm. apt., kitchen, living room, spare room, private entrance. Ext. 2537 or 473-1658.

CENTER MORICHES SO. - 3-1/2 lg. rooms, full kitchen, full bath, carpet, refrigerator, private entrance, Nov. 1 occupancy, 1 mo. security, no pets, \$500 pays all. Ellen, Ext. 4486 or 878-0480 eves.

SHIRLEY - mother/daughter house, near Lab., modern 3 bdrms./2 bdrms., has all attractive extras, dining room, large basement, large back yard, good location, BNL discount. Kathy, 281-5605.

ROCKY POINT - 7 mi. to Lab., 2 bdrm. house. Ext. 4853 after 1 pm or 473-4948 eves.

FARMINGVILLE - for responsible single, l/r, bedroom, full bath., partial kitchen, clean and private, \$325 plus security, includes all. Pat, Ext. 2907 or 736-1341.

LAKE PANAMOKA - 5 min. to Lab, sunny 3-room furnished apt., w/w, private entrance, single profess. female only, \$350/mo. Ext. 7996.

LEISURE KNOLLS - 1 bdrm., l/r, d/r, eik, patio, garage, meet residency requirements, \$500 plus util. Ext. 4589 or 475-8581.

BELLPORT - large studio apt., w/kitchen, one person only, \$325 util. incl. 286-9051.