

## Michael Directs MAP3S/RAINE



Paul Michael

Paul Michael, head of the Atmospheric Sciences Division, DEE, was recently named director of the MAP3S/RAINE Scientific Program. Conducted by the U.S. Environmental Protection Agency and the Department of Energy, the program is a multi-laboratory research effort which seeks to understand how pollution is transported and deposited over long distances. MAP3S is an abbreviation of Multi-state Atmospheric Power Production Pollution Study, and RAINE stands for Regional Acidity of Industrial Emissions.

Besides Brookhaven, other laboratories participating in this program are Pacific Northwest Argonne and Lawrence Livermore. The universities

of Kentucky and Iowa contribute computer modeling work, and various other universities maintain precipitation sampling sites. Previous directors of the MAP3S/RAINE program have been Jeremy Hales of Pacific Northwest and Michael MacCracken of Lawrence Livermore.

The program was initiated in the mid-70's, originally to understand how sulfate pollution was transported over long distances (hence the term "multi-state"). According to Paul Michael, the focus is now on the acid deposition problem. He says there is scientific controversy over whether acid rain is caused by pollution traveling long distances or by more local conditions. The eventual goal of the program is to identify which regions deliver what, where, and to be able to predict how changes in emissions affect depositions. "To do this," says Michael, "we have to know a lot more about emissions, meteorological transport effects and the chemical transformations that take place in the air and in rain and cloud water."

This past April, a large-scale rain sampling experiment (see Bulletin story on OSCAR, April 17, 1981) was done across 16 states and involved close to a hundred researchers in the MAP3S/RAINE program. Michael says future studies in the next year will center on a number of local experiments to look at how isolated mechanisms incorporate pollution into precipitation. Building on the analysis of data collected during OSCAR and the local experiments, other large field studies will be conducted further in the future. He also mentions greater emphasis on developing new computer models that can simulate more

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## Cut Costs — Save Jobs

Lab Director George Vineyard has announced the membership of a committee to review Laboratory expenditures and recommend ways to reduce operating costs. Members of the committee are Allen Goland, Henry Grahn, Joseph Hendrie, Geoffrey Hind, Vincent O'Leary, and Ronald Rau. Hendrie will chair the committee.

"This is a time for hard decisions," said Hendrie, "and in view of the budget difficulties we face this year and next, we have got to make Lab operations as efficient as possible." Hendrie stressed that doing all we can to decrease costs will be effective on two fronts: it will better our competitive position vis-a-vis other labs and government contractors, and it will have a lesser impact on staff reductions when budget cuts must be made."

Vineyard has asked the committee to report its recommendations to him in about six weeks so that prompt action can be taken on those measures judged by Laboratory management to be most effective. Vineyard directed the committee to consider all

aspects of Laboratory operations and to recommend measures, including significant changes in operation and policy, that would reduce costs without substantially impairing the ability of the Laboratory to carry out its scientific program. The committee will not deal with changes in scientific programs that may result from the current budget situation.

The committee will be reviewing all areas within its charge and will do its best to come up with recommendations, but individuals can start right now, said Hendrie. He reiterated Dr. Vineyard's urgent request last week that "all employees take personal responsibility for helping to reduce costs, both by preventing waste and by deferring expenditures of lower priority during this uncertain period."

In addition, Hendrie said that the committee would welcome suggestions for cost cutting. All employees are invited to send their ideas to him at Bldg. 475. Even a small saving in one office or lab can have an impact when applied Lab-wide.

## Holden Heads ICAW For Second Term

Norman E. Holden of the National Nuclear Data Center, DNE, was re-elected for a two-year term as president of the International Commission on Atomic Weights and Isotopic Abundances (ICAW) at a meeting of the International Union of Pure and Applied Chemistry (IUPAC) in Leuven, Belgium, this past August. Holden, who has been a member of ICAW since 1971, served two terms as secretary, beginning in 1975, until he was elected president in 1979.

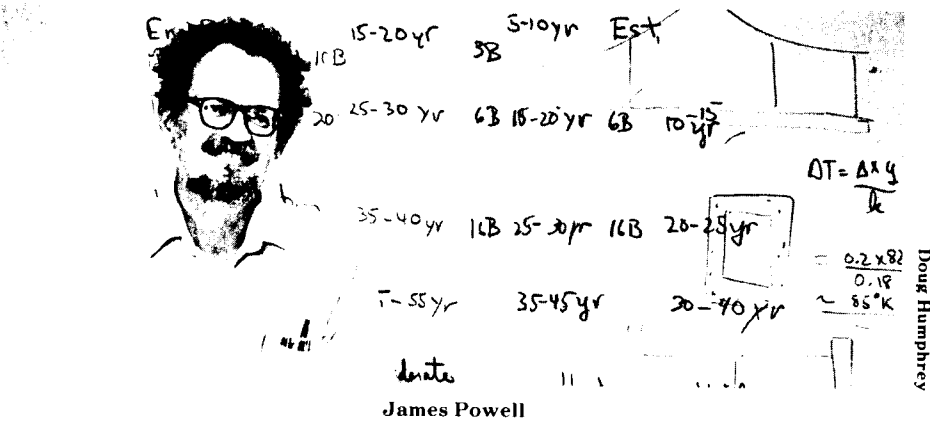
Atomic weight values, which are used in trade and commerce to fix the amounts of chemicals bought and sold and which are used in the laboratory and classroom to balance equations involving chemical reactions, have required standardization since the end of the last century. The request for an International Commission was made in 1899 and ICAW was formed in 1900. Thus, it is one of the oldest international scientific organizations still in existence, predating IUPAC, with which it is now affiliated. IUPAC was formed in 1919 and is a voluntary non-profit association of adhering organizations representing the chemists of 45 countries.

ICAW issued its first international table of atomic weights containing 76 elements in 1902. In contrast, the 1979 report contains 106 elements. The distinguished membership of the International Commission over the past eight years has included scientists who were awarded seven Nobel prizes in Physics and Chemistry.

Over the past decade, ICAW has increasingly turned its attention to the problem of the isotopic composition of the elements, and the phrase "isotopic abundances" was added to its name two years ago. Atomic weights can, of course, be calculated from the masses of the isotopes of an element and the abundances of those isotopes. Recently, the Commission has begun to investigate the isotopic composition of elements from non-terrestrial sources to determine the variability or lack of variability in composition compared to those same elements found on the earth.

Until comparatively recent times, atomic weights were considered to be constants of nature, like the other physical constants, where any uncertainty in their value was strictly due to experimental error. However, Holden is concerned about the failure of the scientific community to realize that isotopic composition has a natural variation for many elements such as lithium and boron, which has

(Continued on page 2)



James Powell

## On The Lookout For That Better Idea

In his old office, books were piled in heaps, papers were strewn around, and general disorder reigned. In his new office, the books are neatly shelved — thanks to a secretary, he admits — and papers are filed in fat, brown envelopes. He takes credit for the filing and says he can put his hands on any topic, even though the envelopes aren't labeled.

In spite of the move to new quarters, however, the old habits are slowly creeping back, evidenced by small stacks of papers beginning to form on the floor around his desk. Jim Powell is settling back into the environment in which he thinks best.

Thinking is what Powell does for a living. He's one of the nearly 800 scientists who work at Brookhaven

Lab, and coming up with ideas is a major part of his job.

About ten of his ideas are patented jointly with BNL employees with whom he has collaborated. And that's one reason Powell likes working at the Lab. He's surrounded by other creative people who can give him feedback.

Another reason is that he has the flexibility to work in a variety of areas. Holding an undergraduate degree in chemical engineering and a doctorate in nuclear engineering, Powell is head of DNE's Reactor Systems Office, which explores advanced designs for fission, fusion and accelerator reactors. But in the 25 years he's been at BNL, Powell has occa-

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Norman Holden

Doug Humphrey

## Concert Season Begins

The BERA Concert Series begins the season with a performance by the Galimir String Quartet on Friday, October 30, at 8:30 p.m. in Berkner Hall. On the program is Beethoven's String Quartet in C Minor, Op. 18, No. 4, Schoenberg's String Trio and Brahms' String Quartet in A Minor, Op. 51, No. 2.

The original Galimir String Quartet was founded more than fifty years ago when Felix Galimir and his sisters, Adrienne, Renee and Marguerite, were students at the Vienna Conservatory. Present members of the quartet include, in addition to Mr. Galimir, violinist Hiroko Yajima, who appeared at BNL last year with "Music from Marlboro;" violist John Graham, who has appeared as guest artist with the Guarneri and Juilliard Quartets; and cellist Timothy Eddy, frequent performer in Music from Marlboro Tours, who has recorded for Columbia, Vanguard, Nonesuch and Vox.

Tickets will be sold at the door before the performance. Adults are \$7; students and senior citizens, \$4; and under 18, \$3. A better buy would be to



Galimir String Quartet

purchase a series subscription to all five concerts in the season, at the price of \$25. Subscription tickets can be purchased the night of the concert.

## Women In Science

A joint luncheon meeting of the Women in Science and the Professional Women in Government will be held on Wednesday, October 28, at noon in the Brookhaven Center. All women on site are invited. Corinne Ince from the Personnel Department will speak on "Employment Interviewing — Techniques for Conducting and Participating in the Job Interview."

The luncheon is \$6, and reservations are requested. Please send a check payable to SAGA Foods, Inc. to Harriet Fadem in Bldg. 911C (Ext. 4853) by October 23.

## French Poster Art

A historical survey of French poster art will be presented by Claude Verdier at the next meeting of *Le Cercle Francais de BNL*. The title of his lecture is *Cent Ans d'Affiches Francaises (A Century of French Posters)*, and will cover the period from Toulouse-Lautrec and Mucha up to the present day. The talk will be given in French, but will be generously illustrated with slides.

M. Verdier is visiting the U.S. on a lecture tour sponsored by the Federation of U.S. French Alliances. He is himself a graphic artist, with particular interests in drawing and design.

The meeting will be held in Room C of Berkner Hall, on Friday, October 23, at 8 p.m. Refreshments will be served after the lecture. Those who are not members of *The French Group of BNL* will be asked for a donation of \$3 (\$1.50 for students and senior citizens with I.D.).

## Michael (Continued)

complicated meteorological and chemical phenomena. A number of BNL researchers in Michael's Division and in the Environmental Chemistry Division will continue to work on the program.

Paul Michael holds a Ph.D. in Physics from New York University. He came to BNL in 1958 to work on theoretical reactor physics, and in 1970 began work on a cooperative program between the Meteorology Group and the Radiation Division of the Department of Applied Science. In 1972, he was appointed head of Meteorology, which was subsequently expanded and renamed the Atmospheric Sciences Division.

## Powell (Continued)

sionally ranged far afield from reactor designs. For example, he has explored the phenomenon of ball lightning and even simulated it in a laboratory to develop a theory. He has also been down in the bowels of a coal mine testing an optical device that can monitor mine roof sagging.

Most of his ideas, however, have been connected with his work. The latest one to surface, which he developed at BNL with Shih-Yung Hsieh, Gordon Danby, Paul Bezler, Donald Gardner and Charles Laverick, was a design for a take-apart, superconducting fusion reactor magnet. Powell says commercial reactors need either long-term reliability or easy repairability. Previously proposed magnet designs for fusion reactors have described relatively massive magnets. What's unique about Powell's design is that the magnet is assembled in sections so it can be easily taken apart for repair. The sections fit together like interlocking fingers and are held in place by an external clamp. Only small joint segments have been tested, with success, at the AGS. Still, Powell trusts the engineering and believes in the design even though a full-scale magnet has never been built.

In fact, many of his ideas are a couple of decades away, and now is not the time for building — like the minimal activity fusion reactor. At the request of the Atomic Energy Commission in 1974, Powell and John Fillo, also in the Reactor Systems Office, designed an aluminum reactor. Why aluminum? When neutrons from the reactor interact with aluminum, all the radioactive isotopes formed would have very short half lives of a day or less. Thus, only a few days after plant shutdown, there would be practically zero radioactivity to complicate maintenance and repair work. This means an aluminum reactor has significant environmental advantages, says Powell.

vertent isotopic separation, which can modify its isotopic composition and also its atomic weight. The Commission will continue to alert the scientific public to this problem.

## A Weighty Question

Should the term "atomic weight" be abandoned in favor of a more precise phrase? The definition of atomic weight has been under intense discussion in recent years, says Norman Holden, physicist in the Department of Nuclear Energy, and recently reelected President of ICAW (see accompanying story).

In a recent paper, "Atomic Weight — Love It or Leave It," Holden writes that in the early nineteenth century, scientists considered the atomic weight of an element to be a constant of nature. But Aston's discovery of isotopes in 1920 and later Thode's work on the variation in nature of boron's isotopic composition and its atomic weight made scientists realize that atomic weights are not constants of nature.

The discovery of the isotopes of oxygen in 1929 by Giaouque and Johnston led physicists to use a scale with  $^{16}\text{O} = 16$ , while chemists used an elemental oxygen = 16 scale. The physicists and chemists eventually agreed to a new scale with  $^{12}\text{C} = 12$ , and a new table of atomic weights was prepared in 1961. At the same time, the International Commission on Atomic Weights and Isotopic Abundances (ICAW) proposed to change the name "atomic weight" to "relative atomic mass."

Now, twenty years later, the ICAW strongly supports no change in the name "atomic weight," and instead proposes a new definition: "the ratio of the average mass per atom of the element to 1/12 of the mass of an atom of  $^{12}\text{C}$ ."

Holden says with this new definition, discussion is now shifting to the name of the quantity presently defined as "atomic weight." The name comes from a time when atomic masses could only be determined by procedures that involved weighing, that is, observing a mass reacting to the attraction of the earth's gravitational field. The term "atomic weight" is a misnomer since it really refers to atomic mass. Holden reports mounting pressure from various groups to replace the term.

He concludes, however, that the term "atomic weight" has been used for almost two hundred years now and is generally understood. Holden also points out that there is no rule in practice or by consensus that any definition of a noun modified by an adjective must have the dimensions of the noun. For example, resolving power is not a power, isotopic spin is not a spin and electromotive force is not a force. Holden writes, "As long as one defines what one means by atomic weight and uses it in a consistent fashion, there should be no problem."

## On Camera

Dr. F.P. Blackstein, Assistant to the Director of Research at Chalk River, Canada, will speak on "The Scientist's Responsibility to Communicate with the Public" at 10 a.m., October 27, in Room B, Berkner Hall. Blackstein will address the recently formed Science/Media Operations Group, an association of scientists and engineers who wish to seek training and exchange ideas with regard to appearances on TV and radio, conducting interviews, and addressing the public. The meeting is open to all who are interested. If you are not yet a member of the group, call extension 3336 for further information.

## Holden (Continued)

nothing to do with radioactive decay as in the case of lead. In addition, commercial material may have been subjected to an undisclosed or inad-

He is also working on an aluminum heat transfer device which would remove heat at the point where plasma particles from a fusion reactor core would hit a small section of the container surrounding the core. What Powell envisions is tiny aluminum pellets shooting across the edge of the plasma, absorbing extremely high fluxes of heat and defining the plasma limits.

Unlike these designs of aluminum, some of Powell's ideas have had more immediate application. This was true of the magnetically levitated and propelled train, which was built by those great train riders, the Japanese. Powell says he was inspired to work on mass transit when he was stuck in a traffic jam on the way to Boston, and later he and Gordon Danby developed the concept for the supertrain. Danby was in Japan in 1978 and saw a demonstration of the prototype built there. It goes over 325 miles an hour, far exceeding the speed of Japan's famous Bullet trains.

Most recently, Powell has been helping to organize a conference on district heating, to be held at Brookhaven next week. He says the initial work at BNL grew out of studies in the mid-70's on non-electrical applications of fusion energy. District heating is a system for urban and suburban population clusters that draws on a source of free energy: waste heat from power plants and industries. He cites growing interest by the federal government in this concept, which is already widely used in Europe.

Powell likes to see his ideas applied, but his greatest pleasure lies in thinking them up. He says he consciously works at ideas. While there might be an initial revelation, it's usually a long evolutionary process. When he gets his thoughts completely assembled, then he goes off to talk to other people.

He estimates a third of his ideas are bad and discarded immediately, a third are mediocre and worth only a bit of mulling over, and a third are truly good. What ranks in the top third? "An idea which results in a significant improvement over what already exists," says Powell. "I find it satisfying to take something that is in some sense ugly and turn it around."

— Mona S. Rowe

## Basic Math Course

A tutorial session in basic mathematics is being offered in Personnel under the Technician Tutorial Program. The course will be given for the benefit of employees who intend to begin college technical mathematics courses and need a refresher course in basic arithmetic, algebra or geometry. If you would be interested in taking such a course, please call June Herbert on Ext. 2878 by Friday, October 23.

## FTS User's Note

The Washington, D.C. FTS Operator, 967-1221, through whom FTS calls are placed outside normal working hours at the call destination, is no longer available 24 hours per day. Effective October 3rd, hours of operation are 8 a.m. to midnight, Monday through Friday.

## Arrivals & Departures

### Arrivals

Christopher J. Ashton ..... Chem.

### Departures

Bahman Atefi ..... Nuclear Energy  
Leonard F. Corette ..... Pl. Engrg.  
Rhonda DiCunzolo ..... Appl Math  
Harold E. Knudsen ..... Accelerator

# BROOKHAVEN BULLETIN

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## Accelerator Department Service Awards

On October 1, Derek Lowenstein, Deputy Chairman of the Accelerator Department, presented the 30, 25, 20 and 10 year Service Awards for the entire year to the eligible members of the Department.



Seated: (30 year Service) — Sal T. Giordano, Paul R. Hichborn, David A. McCutcheon, Bernard F. McLaughlin and Thomas B. Scheuerer. (25 year Service) — Hugh N. Brown, John F. Donnelly, Charles D. Freeman and standing: Robert F. Glasmann, Herbert J. Lutz, Edward F. Meier, Richard Skelton, Charles R. Staal, Richard K. Stoehr, William G. Walker.

—photos by Rosen

## Register For Review

Suffolk County Community College will offer Part A of the Professional Engineers Licensing review course on site starting Wednesday, December 2. Classes will be held in Bldg. 184 (Stage II) from 5:15 to 9:15 p.m. and will run for 15 consecutive weeks.

The course will include such topics as: math, mathematical modeling, engineering economics, computer programming, statics, dynamics, mechanics of materials, materials science, chemistry, fluid mechanics, thermodynamics and nucleonics.

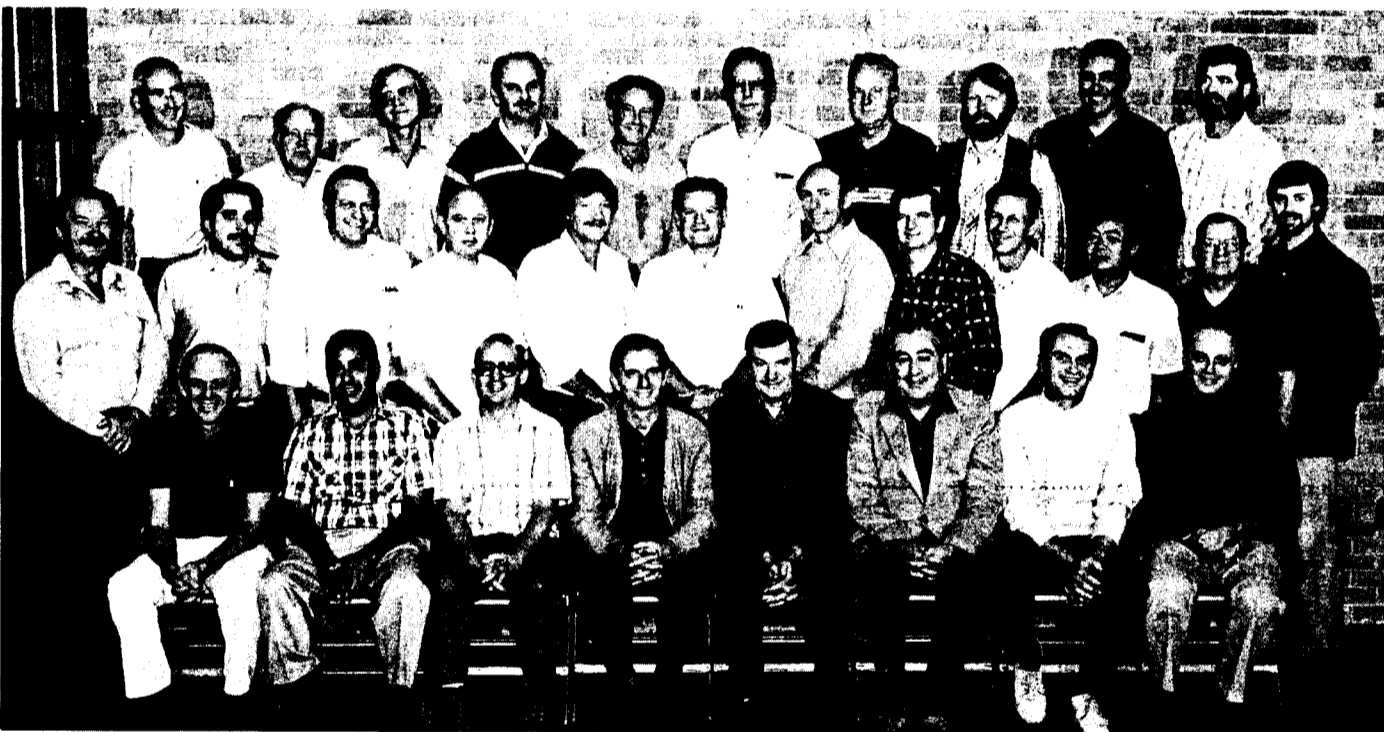
Registration is scheduled from Friday, October 30 to Friday, November 6, in Room 112, Bldg. 460. The tuition fee of \$128 can be paid with Visa or Mastercard or with checks/money orders payable to S.C.C.C. Students will be eligible for 75% tuition refund upon satisfactory completion of the course. Books will cost approximately \$15 and will be sold the first night of class.

For further information, call Renee Flack, Ext. 3316.

## Theater Group

The Theater Group will meet at 8 p.m. on Wednesday, October 28, at the Physics Department Auditorium.

It is time to start planning for the next production. Suggestions for plays and volunteers for directing or producing will be solicited. After the business meeting, we will read scenes from a few plays that have been proposed to date.



Seated: (20 year Service) — Henry Arnesen, Carl S. Avent, David R. Brady, John Bunicci, William H. Casswell, Leonard N. Chimienti, John J. Dabrowski, and Joseph H. Dilg. Middle Row: Alexander Wirszyka, Arnold J. Esper, Ernest Heppner, Robert S. Hulliger, Karl M. Kohler, Joseph T. Mayeski, Robert E. Meier, Carl N. Nagle, Kenneth Riker. (10 year Service) — Y. Y. Lee, John Boruch & Joseph F. Skelly. Top Row: (20 Year Service) — Philip H. Warner, Graham (Bud) Ryan, Ernest R. Schmitt, Arthur E. Scholtz, Edward T. Schwaner, William P. Sims, Stanley A. Staron, George Stenby, John D. Tilley and Franklin D. Timm. Those who could not attend were: (20 year Service) — Michael F. Clancy, Carl B. Eld, Eric B. Forsyth, Patricia R. Gassaway, Edward G. Gill, Frederick A. Schneider, Michael E. Stone and Manfred G. Thomas.

## Cafeteria Menu

### Week Ending October 23, 1981

#### Monday, October 19

Turkey rice soup	(cup) .55
	(bowl) .65
Corned beef & cabbage	1.65
Beef chow mein & rice	1.55
Hot Deli - Sandwich steak w/peppers & onions	(on bread) 1.70
	(on roll) 1.80

#### Tuesday, October 20

Split pea soup	(cup) .55
	(bowl) .65
Roasted fresh ham w/barbeque sauce & 1 veg.	1.65
Spaghetti & meatballs w/garlic bread	1.60
Hot Deli - French toasted grilled ham & cheese	1.60

#### Wednesday, October 21

Cream of mushroom soup	(cup) .55
	(bowl) .65
Beef stew over noodles	1.65
Roasted chicken w/cranberry sauce & 1 veg.	1.60
Hot Deli - Roast beef	(on bread) 1.65
	(on roll) 1.75

#### Thursday, October 22

Minestrone soup	(cup) .55
	(bowl) .65
Braised Swiss steak a la mode w/ rice	1.70
Baked lasagna & 1 veg.	1.60
Hot Deli - Baked Virginia ham	(on bread) 1.65
	(on roll) 1.75

#### Friday, October 23

Manhattan clam chowder	(cup) .60
	(bowl) .70
Fried fillet & french fries	1.60
Veal pattie parmigiana & 1 veg.	1.55
Hot Deli - Meatloaf hero w tomato sauce	1.70

## Equipment Demo

Xerox Corporation's Printing Systems Division will present an exhibit in the lobby of Berkner Hall on Tuesday, October 20, from 10 a.m. to 4 p.m. Items on display will include communications terminals, plotting, and color graphics printing.

## Mountain Club

The Mountain and Canoe Club is planning a canoe trip on the Carmen's River for Sunday, October 25. For the following weekend, October 31-November 1, a backpacking trip (destination negotiable) is in the planning stages. Contact Pat Thompson, Ext. 7635, for information.

## Volleyball

This is a last call for rosters! League play begins on October 26, and it is necessary that *all* rosters be turned in by Friday, October 16, to Don Litcher, Bldg. 515. Team fees (\$60 per team) should be sent immediately to Sandi Lane, Bldg. 830. Please make sure the team name and league desired is marked on the face of the check. This is all necessary so that schedules can be started.

## I.B.E.W. Meeting

Local 2230, I.B.E.W. will hold its regular monthly meeting on Thursday, October 22, 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.

## Home Energy Day

It will be Home Energy Day at the Suffolk County Farm and Education Center in Yaphank on Sunday, October 25, when the Suffolk County Cooperative Extension and the Suffolk County Solar Energy Commission will co-sponsor a community education conference, including workshops and seminars. Topics to be covered will range from energy-saving window treatments to home oil burner efficiency to basic home insulation techniques.

There will be no charge for attending the session, scheduled from 10 a.m. to 4 p.m. However, advance registration is required for the morning workshops. For more information and/or registration, call the Yaphank County Center at 924-4535, Ext. 507.

## Bowling

### Red & Green League

The Blue Jays won 8-3 over the Light Source with H. Marshall rolling a 200. The Sparks topped This Isa Team 8-3. M. Jarocci had a 202. The Freon Loaders (3039 pins) took the Pinball Wizards 7-4. F. Pond bowled a 239/669 gross, R. Eggert 232 and M. Israel 202. The Designers won 7-4 over the 76'ers. J. Ferrante had a 214, R. Larsen 214, J. Morris 202. The Sandbaggers split 6-5 with the Phoubars. R. Meier rolled a 200.

### Pink League

The Lickety Splits are in first place after 4 weeks of bowling. Good games were bowled by Mary Grace Meier 234/190, Deb Johnson 220/593 scratch, Ellie Kristiansen 168, Renie Rosati 178, Kit McNally 181/184, Kathy Kissel (our newest bowler) 185.

## Runners Corner

This Sunday, October 18, the BNL Roadrunners will hold the 10th Annual Fall Races. The 30 km Race will start at 8:30 a.m. (registration 7:30 a.m.—8:15 a.m.) and the 5 km and 10 km Fun Runs will start at 9:30 a.m. (registration 8:00 a.m.-9:15 a.m.). No registration fee, free refreshments (bagels & hot drinks), accurate courses, times and places posted at finish, and no awards, should add up to a fun time for everyone.

