BROOKHAVEN BULLETIN
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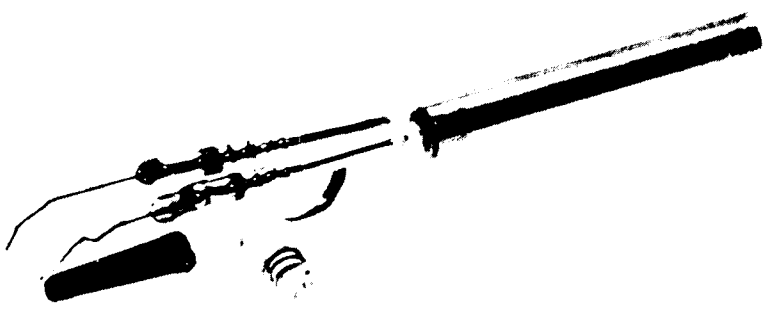
BROOKHAVEN NATIONAL LABORATORY



To date a sample, carbon dioxide gas is made from organic material in the sample. The CO_2 gas is then put into the glass tube (right half of counter), and beta particle emissions are detected and counted. From end to end, the counter measures eight inches.

Counting The Treasure

In mid-December, last year, Sotheby's of London auctioned at £500,000 a seventh century gold treasure from the Second Avar Period (circa 650-700 A.D.). It had been authenticated by carbon-14 dating, using a small counter developed at Brookhaven Lab.

The counter was developed in 1979 by Garman Harbottle, Edward Sayre and Raymond Stoenner, scientists in BNL's Chemistry Department. Sixteen counters were sold at cost to the Atomic Energy Research Authority at Harwell, England. Making the first commercial use of the counter, Harwell confirmed Sotheby's dating of the gold treasure at about 700 A.D., consistent with available historical evidence.

According to information supplied by Harwell and Sotheby's, the treasure is made up of 122 gold and silver belt fittings and two Byzantine silver plates from the Avar Period. In the sixth century, the Avar tribe swept into Europe from Inner Mongolia, dominating Eastern Europe. They were legendary hoarders of gold and silver, and they extracted annual tribute from their neighbors. In the year 570, for example, they received the equivalent of over 1,000 pounds of gold from the Byzantine Emperor.

The Avars were finally subjugated and converted to Christianity in 796. But remains of their culture have been found in over a thousand sites throughout Eastern Europe. The exact findspot of the recently auctioned treasure is unknown, however, there are many reasons to connect it to a hoard found at Vrap in Albania around 1902. Most of the Vrap treasure is now in the Metropolitan Museum in New York.

Both hoards have pieces which are closely related in style and decoration. One gold mount in the Vrap discovery is identical to six in the Sotheby treasure, and they are the only Avar mounts of this type known.

The belt is believed to have played a symbolic role as a badge of rank in Avar society, with details of design as well as the materials used being pointers to the status of the wearer and his membership of a particular clan.

Fibrous materials, identified as flax, were found on the belt fittings, and a 300-milligram sample was used for analysis by the Brookhaven counter, which can date objects with very low carbon content.

Carbon-14 occurs naturally in atmospheric carbon dioxide. As such, it is continuously absorbed in minute quantities by all living organisms, animal and vegetable. After death, when the carbon monoxide is no longer absorbed, the residual carbon-14 slowly decays with a half life of 5,730 years. By counting the beta particle emissions from the decaying carbon-14, any object or material originally derived from organic matter can be dated.

Up to now, the use of very small samples has been prohibited by difficulties in operating the counter over long periods and in eliminating natural background radiation.

The small counters pioneered at Brookhaven need only about 10 milligrams of extracted carbon for a sample measurement.

Gill Walker of the Low-Level Measurements Lab in Harwell, England, taking flax out of Avar belt fitting, which was dated with a carbon-14 counter developed at Brookhaven Lab. (Harwell photo.)

Davis And Samios Elected To NAS

Earlier this week, the National Academy of Sciences recognized the significant contributions of two Brookhaven scientists. Senior Chemist Raymond Davis, Jr. and Acting Director Nicholas P. Samios were elected to the Academy on Tuesday, April 27.

With the addition of 60 new members, including Samios and Davis, the total membership in the National Academy of Sciences will be 1,386. The scientists and engineers in this private organization are dedicated to the furtherance of science and its use for the general welfare. An 1863 Congressional Act of Incorporation, signed by Abraham Lincoln, established the Academy and calls upon it to act as an official advisor to the federal government, upon request, in any matter of science or technology.

Raymond Davis

Raymond Davis came to BNL's Chemistry Department in 1948 and was named Senior Chemist in 1964. His distinguished career has been spent in radiochemistry, with an emphasis on astronomy. In 1963 he began a pioneering study of neutrinos directed towards measuring the flux of neutrinos from the sun. The findings have stimulated an enormous amount of research in astrophysics and nuclear physics, forcing scientists to re-evaluate some basic assumptions underlying the whole theoretical framework of stellar evolution.

For his work, Davis was awarded the Cyrus B. Comstock Prize by the National Academy of Sciences in April 1978 and named the 1979 winner of the American Chemical Society Award for Nuclear Applications in Chemistry. In 1954, he shared the New York Academy of Sciences' Pregl Prize with Oliver Schaeffer.

Nicholas Samios is well-known for his many vital contributions to the field of high energy particle physics — particularly his discoveries of the Omega minus particle and the first charmed baryon. These have played an important role in untangling symmetries underlying the particle spectrum. For his work, Samios was named a winner of the 1980 E.O. Lawrence Award. The same year, he also received the New York Academy of Sciences Award in Physical and Mathematical Sciences.

Nicholas Samios

Samios joined the BNL Physics Department in 1959 and served as leader of the Omega Group from 1965-1975, when he was named Department Chairman. In February 1981, he became Deputy Director for High Energy and Nuclear Physics. His appointment as Acting Director of BNL was effective January 1, 1982.

Accel. Workshop Here Next Week

An international group of attendees will meet at Brookhaven May 3 through May 6 for a "Workshop on Accelerator Orbit and Particle Tracking Programs." The workshop will focus on computer programs which simulate the behavior of protons, electrons and other atomic particles in accelerators and storage rings. Simulation programs of this type are being used at all major laboratories for the design and operation of accelerators.

The majority of the workshop's sessions will be concerned with the simulation of non-linear magnetic effects and their influence on beam lifetimes in storage rings. A session on software tools useful for the design and implementation of these programs is also planned.

For more information about the workshop, contact either Max Cornacchia, head of the organizing committee (Bldg. 902A, Ext. 7747), or conference secretary Anne Flood (Bldg. 902A, Ext. 4779.

Energy Analysts Look Ahead

First there was OPEC. And then came IEA. The International Energy Agency, IEA, was formed soon after the oil boycott of 1973. Its main purpose was to help member nations cope with oil price rises and interruption of oil supplies.

Brookhaven's involvement with IEA began in 1976 when two laboratories, BNL and Germany's KFA, were selected to do energy analysis work. Vance Sailor was co-director of the cooperative international project, housed at BNL in the National Center for Analysis of Energy Systems.

More recently, KFA has been designated the coordinator of the project, with Stefan Rath-Nagel in charge. A small Brookhaven team, headed by Douglas Hill, is still actively involved.

Hill explained that the energy analysis is done with the aid of a computer model, MARKAL, which was developed early on by scientists at BNL and KFA. The model is used to represent energy systems of participating countries — there is a U.S. case, a Swedish case, and so on.

Each country works with its own data base, and the model can accommodate each country's special characteristics. For example, the U.S. is rich in energy resources, in sharp contrast to Japan, which has almost none. And Germany has little solar figured into its energy picture — too cloudy there.

To run the model, assumptions are put in; for example, oil prices and energy demand. Then the model sifts through massive amounts of data, crunches through the calculations, and spits out a scenario, 45 years into the future. The first computer runs by each country were done beginning in 1978.

This week, representatives of 13 member countries, including the U.S., most of western Europe, Canada and Japan, met at BNL for a workshop. There, several countries presented preliminary results of computer runs

(Continued on page 2)

BNL Council Report

Mort Rosen

The BNL Council was formed in 1962 to advise and make recommendations to the Director on Laboratory policies affecting the scientific staff. Members of the 1982-83 Council are (seated, from left) Jack Fajer (DEE), Allen Goland (Phys.), Vance Sailor (DNE), Garman Harbottle (Chem.), Lawrence Leipuner (Phys.), Robert Louttit (Accel.) — *secretary*. Standing, from left, are John Dunn (Bio.), Stanley Seltzer (Chem.), Robert Marr (SLIM), James Reilly (DEE), Joachim Fischer (SLIM), Bertrand Brill (Med.), Joseph Weneser (Phys.) — *chairman*, Myron Ledbetter (Bio.), Hugh Brown (Accel.). SLIM members represent S&EP, the Light Source, Instrumentation, Applied Mathematics. Missing from the photo are Arjun Chanana (Med.) and James Powell (DNE).

Outgoing chairman, Jack Van't Hof, reports that during the past year the Council's major effort was the review of individuals nominated for tenure by the scientific departments. Also, because of the current status of funding at the Laboratory, the Council was involved in procedures concerning the termination of individuals holding scientific appointments. As stated in the Scientific Staff Manual, the Council is to be consulted when terminations resulting from financial exigency or major program changes are effected prematurely. Van't Hof says the loss of staff members is viewed as a serious problem to the Laboratory and the Council is continuing discussions on this matter with the Laboratory's directorship.

Frequent meetings were held with the Assistant Director for Scientific Personnel to explore and develop means by which the Laboratory can attract and retain people who are assets to research programs. The Council also expressed an interest in the health of the Research Library recognizing that it is an indispensable element in the production of quality work.

On other matters, the Council was instrumental in providing SRA options to all Laboratory employees, in increasing AUI scholarship stipends, and in improving benefits for families of deceased employees.

Whither Nuclear Power?

Richard Lester, a young Englishman with a solid background in nuclear engineering and a strong interest in international nuclear relations, will present a Lab-wide colloquium on May 12 at 3:30 p.m. in Berkner Hall. He will speak on "The Nuclear Power Problem: Interregnum or Irreversible Decline?"

Lester received a B.Sc. degree in Chemical Engineering from Imperial College, London, in 1974 and a Ph.D. in Nuclear Engineering from M.I.T. in 1979. From 1977-78 he was a Visiting Fellow in International Relations at the Rockefeller Foundation. He is currently an Associate Professor of Nuclear Engineering at M.I.T. and a Research Associate at the Institute's Center for International Studies. He also chairs the School of Engineering's Committee on Energy Education.

His research and teaching interests include radioactive waste management and disposal, international nuclear relations, and energy technology assessment and policy analysis.

Lester has been to Brookhaven before. In fact, he spent the summer of 1975 as a Visiting Research Assistant in what was then the Department of Applied Science.

A reception at 3 p.m. will precede the lecture.

Service Awards

The following employees will receive service award certificates during the month of April:

Thirty-Five Years

Douglas G. Clareus ..... Instr.
Harold R. Euler ..... Plant Engrg.
Andrew Greener ..... S&EP
Stanley W. Pollack ..... En. & Env.
Salvatore Saulle, Jr. ..... App. Math.
Joan J. Semecek ..... Staff Serv.
Michael Tesla ..... Plant Engrg.
Robert J. Walton ..... P&GA

Thirty Years

Joseph R. Steimers ..... S&EP

Twenty-Five Years

Joseph Cardamone ..... Medical
Bernard R. Comfort ..... Physics
Edward K. Elliott ..... Accel.
Oscar Gonzalez ..... Medical
Ronald J. Graeser ..... Nuc. Energy
Vincent R. O'Leary ..... Director's Off.
Cesar A. Sastre ..... Nuc. Energy
Mary S. Smith ..... Accel.
Vincent G. Stumpo ..... Cen. Shops

Twenty Years

Mary S. Austin ..... Personnel
Frank J. Chandler ..... S&M
Leonard C. Emma ..... Director's Off.
William R. Frank ..... Cen. Shops
John W. Jackson ..... Accel.
E. Eric Klug ..... Medical
Louis T. Kolb ..... Plant Engrg.
William K. Kristiansen ..... Accel.
Paul LeDoux ..... En. & Env.
Albert M. Lorensten ..... S&M
Edward A. MacDougall .. Nuc. Energy
Devon A. Plows ..... Accel.
Hugh S. Rhodus ..... Plant Engrg.
M. Joseph Rose ..... Plant Engrg.
John F. Slavik ..... Accel.
Walter M. Spiers, Jr. ..... Plant Engrg.
Richard C. Strand ..... Physics

Ten Years

Julian A. Aguilar ..... Plant Engrg.
Maureen T. Asendorf .... Plant Engrg.
Thomas A. Fitzgerald .... Plant Engrg.
William J. Michalouski ... App. Math.

Energy Analysts (Cont'd)

done in 1982, with new assumptions.

Hill reported on the U.S. runs. His assumptions were, first, the projected demand for energy has been greatly reduced, and second, oil prices over the long run are much higher than expected a few years ago.

He also looked at a short-term drop in oil prices, which is what the U.S. is experiencing now. "What's the cheapest thing this country can do now?" said Hill. "According to the computer results, we should import oil and not put as much money into energy conservation measures."

But Hill also pointed out that the price of oil does not reflect some intangible costs, like dependence on foreign oil and vulnerability to sudden reductions in supply. "If one is willing to spend a little more money, what can be done to reduce imports?" he asked. His computer runs point favorably to an import oil surcharge. "While prices are down, we could tax oil imports and use the money to offset other taxes. That would take into account some of these non-market considerations."

Hill said there is no simple, single answer to energy problems. They are systems problems, and the complexity of putting all the pieces together the best way takes careful analysis and lots of computer help.

Representatives from many of the member nations in IEA do their computer work at KFA, and a few countries have had the finances to duplicate the MARKAL model at home. But occasionally, representatives come to BNL to use the model or to learn how to use it on their home CDC computer.

Most recently, Gunnar Leman, Sweden, and Tom Kram, Netherlands, were at BNL to work on computer runs, staying on to participate in the workshop. Leman said a major change for Sweden was a 1980 referendum on nuclear energy, which led to a parliamentary decision to phase out nuclear energy by the year 2010.

Kram said the Netherlands has large reserves of natural gas. People in his country used to feel that the natural gas should be used up quickly before cheap nuclear power came on line. "All that has changed," he said. "We are now phasing out exports, trying to keep the natural gas at home for residential and commercial use and premium use in the chemical industry." As the gas runs out, the country will gradually shift to imported coal, much cheaper than indigenous coal, which is too deep underground to mine cheaply.

"While each country has unique problems, the extent to which this international group communicates is surprising," says Doug Hill. "The workshops are productive, with great exchange of ideas and information."

Other BNL people involved with the IEA energy analysis project are Leslie Fishbone, who worked on the original MARKAL model, and Gary Goldstein, computer programmer. Also helping with the programming are Joan Congeni and Chip Balzer. Liz Seubert is secretary for the group.

— Mona S. Rowe

Cheese Forever!

Good news cheese lovers! According to a press release of the University of Wisconsin-Madison, genetic engineers around the world are trying to clone rennin.

Rennin is an enzyme important in making quality cheese. In the more expensive, aged cheeses, rennin clots milk proteins into curds which eventually become cheese.

In nature, rennin comes from the stomach of young calves. But calves are scarce these days, so cheaper microbial enzymes are often used to replace rennin. The resulting cheese is not as desirable as cheese made with rennin.

Should someone win the international race to learn how to mass produce this enzyme, there would be plenty of rennin available to produce quality cheese products.

A Close Encounter

BNL's security guards had just finished their week long tactical training exercises and had moved out of the woods, when there was a horrendous whoosh from above as something tore through the trees and excavated a hole in the ground. The guards froze in their tracks. This was not on the agenda!

They ran into the woods and saw two large chunks of ice embedded in the earth. Presumably the ice had fallen off, or been thrown out of, a plane. The Federal Aeronautical Administration was notified and asked that a piece of ice be kept in the freezer so that they can have it analyzed. In any case, the training program participants were thanking their lucky stars that they were not crouching under that tree when the ice came hurtling down.

Doug Humphrey

BNL's Douglas Hill addresses representatives from member nations of the International Energy Agency, here at Brookhaven to report preliminary results of energy studies on their own countries. Hill presented U.S. data and results.

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The Violin Case

The astute reader who first alerted us to the reversal of the Isaac Stern picture was David Alburger. Following publication in last week's Bulletin of his view, we received these letters:

Re the "reversed" picture of the violinist. Maybe the picture was indeed reversed. But note that there are many left-handed string players who play specially made "left-handed" instruments. A well-known example is the late Rudolf Kolisch; he led a string quartet and pioneered for many decades in introducing contemporary chamber music — all on a lefty fiddle!

—Clemens Auerbach

Regarding the reversed picture on page 3 of the April 23 issue of the Brookhaven Bulletin, there is only one clue to the reversal — not two — and I am not positive even about that one.

The clue would be the tuning pegs. (I never noticed before, but it could well be that the peg for the E string is always higher than that for the G string, as it is in the correct picture.)

However, one can not judge by the reversal of the hands. I grant you that most people, including those who are normally left-handed in everything else, do indeed finger with the left and bow with the right, except for my oldest son David. When he was eight years old, he broke his left arm. When it healed, he had only about 80% rotation in it — not enough to enable him to finger a violin. His teacher saw no problem at all and simply restrung the violin so that he could finger it with his right hand. It worked out fine, except that it caused some seating problems in an orchestra, and it certainly made the orchestra look silly.

—Louis Stang

Hospitality News

Ms. Audrey Marlow, a well-known artist, will be the guest speaker at the next Hospitality Committee morning get-together, which will be held Tuesday, May 4, from 9:30 to 11:30 a.m. in the Brookhaven Center. Among other things, she will discuss and demonstrate some of the techniques she uses for painting in pastels. For your viewing pleasure, a small collection of her paintings will be displayed.

All wives of Laboratory employees and guests are welcome to join us on May 4. Please come and bring the children. Babysitting will be provided free of charge. Coffee, tea and danish will be served.

Special NYC Trip

In addition to the regular Wednesday LIRR trips to New York City, the Hospitality Committee will sponsor a group trip to the city on **Saturday, May 15.** Departure will be at **8:31 a.m.** from the Patchogue LIRR station. Round-trip fare for adults is $3.50, children under six years ride free.

Reserve a ticket by sending your fare through the U.S. mail to BNL Hospitality Committee, P.O. Box 322, Upton, New York 11973, no later than **May 10.** Please make checks payable to **"Brookhaven National Laboratory,"** and put the date of the trip, your telephone number, and your BNL life number on your check. Reservations will be accepted on a first-come, first-served basis. Your tickets will be given to you on the train.

Tea & Sherry Time

One sure sign that spring has arrived at BNL is the Hospitality Committee's Spring Tea and Sherry Party. This year's party, which will be held on Thursday, May 13 from 3:30 to 5:30 p.m. at the Brookhaven Center, will focus on "Spring in Japan."

A modified version of a traditional Japanese tea ceremony will be performed at the Tea, and the utensils used in such a ceremony will also be on display. Other displays will feature Japanese dolls, toys, folk crafts and cooking utensils.

Beautiful Japanese kimonos will be worn by many of the women taking part in the program. One of the women will explain the correct way to wear a kimono and the type of accessories to use with it. Additional demonstrations will cover Japanese-style cooking, quilting, caligraphy, flower arranging and origami. A film on Japan will also be shown.

All women employees and wives of Laboratory employees and guests are invited to the party where tea, coffee and sherry will be served along with an assortment of cookies, vegetables and dips. Babysitting will be provided free of charge in the gymnasium.

Golf

The first tournament of the BGA golf season will be held on Monday, May 10 at the Indian Island Suffolk County Golf Course in Riverhead, with tee off times beginning at 11:30. The Calloway Handicap System will be used to determine tournament winners. Tee off times can be obtained by contacting Ron Webster, Ext. 2845, Bldg. 526.

There will be a $1 entry fee for BGA members and $2 for non-BGA members. Entry fees must be received by May 6. All tournaments are open to BNL employees, retired employees, and their spouses.

The BGA golf season will start the week of May 10. Schedules for both the team and individual leagues are being sent out to all members.

PSI News

The Queen Anne Chapter of Professional Secretaries International has selected temporary officers to lead the Upton Chapter for 90 days. After that, the members of the Upton Chapter will hold elections. The presiding officers are: President — Betty Ivero, DEE, Ext. 2208; Vice-president — Audrey Blake, TID, Ext. 3490; Treasurer — Nedy Santiago, Reactor, Ext. 4060; Secretary — Carmen Zopf, DEE, Ext. 2711.

New members are welcome to join the Upton Chapter at any time. Applications are available from Susan Carlsen, Bldg. 535A, Ext. 4207. She will also accept checks, made payable to Queen Anne Chapter, PSI, for the registration fee of $46.50.

Bowling

White League

High games were bowled by J. Roesler 204/200, B. Belligan 202, J. Griffin 223/237/200/660 scratch, G. Hassell 202, S. Smith 201, M. Scheidet 182, N. Mayeski 176. The Gropers remain in first.

Pink League

R. Rosati rolled a 206, M. Apelskog 167, C. Beckner 181, H. Keeley 201/168, E. Kristiansen 176, C. Tyler 168, F. Briening 181.

Purple League

E. Meier bowled a 230, E. Sperry 198/200/210/608 scratch, A. Pinelli 196/201, M. Haller 186, M-G Meier 185.

Red/Green League

R. Wiseman had games of 258/204 for a 632 scratch, 683 gross series, J. Connelly 224/205, W. Kristiansen 222, J. Ferrero 218, R. Larsen 213, J. Morris 208, N. Fewell 205, A. Dick 200, E. Sperry 200.

Bridge Stress Contest

Doug Humphrey

These bridges were built of balsa wood and Elmer's glue by high school students from the Metropolitan area. They are part of the 171 entries in the Model Bridge Contest Brookhaven will host tomorrow, May 1, for the second consecutive year. As the bridges arrived at BNL, contest coordinators Janet Tempel (above) and Jackie Mirzadeh carefully logged them in, numbering and storing them in preparation for the big day. Beginning at 9 a.m. on Saturday, the models will be placed in the hydraulic stress tester located in Bldg. 480, to see which one can support the greatest load in proportion to its mass. Last year, some bridges withstood pressures of more than a ton. Will this year's batch fare as well? That question should be answered by about 4:30 p.m. tomorrow when one young bridge builder is declared the winner.

Diners Note

The Cafeteria will be closed on Saturday, May 1. On that day, Snack Bar Service will be available from 9 a.m. to 2 p.m. at the Brookhaven Center.

Cafeteria Menu

Week Ending May 7, 1982

Monday, May 3		
Cream of potato soup	(cup)	.60
	(bowl)	.70
Cheese omelet & 1 veg.		1.70
Turkey a la king over rice		1.70
Hot Deli: Grilled Reuben		1.75
Tuesday, May 4		
French onion soup w/croutons	(cup)	.55
	(bowl)	.65
Meatcakes & onions w/potato pancake		1.75
Chicken cacciatore & 1 veg.		1.80
Hot Deli: Breaded chicken fillet Parmesan hero		1.85
Wednesday, May 5		
Turkey gumbo soup	(cup)	.55
	(bowl)	.65
Roasted fresh ham & 1 veg.		185
Swedish meatballs over buttered noodles		1.75
Hot Deli: Top round of beef	(bread)	1.75
	(roll)	1.85
Thursday, May 6		
Chicken vegetable soup	(cup)	.55
	(bowl)	.65
Stuffed bell pepper & 1 veg.		1.75
Pot roast of beef & 1 veg.		1.85
Hot Deli: Pastrami	(bread)	1.75
	(roll)	1.85
Friday, May 7		
New England clam chowder	(cup)	.60
	(bowl)	.70
Shrimp, fries & cole slaw		2.10
Beef and bean bake		1.70
Hot Deli: Eggplant Parmesan hero		1.85

French Club Film

The BNL French Group will present the film *L'Auberge Rouge* starring Fernandel, on Tuesday, May 4, at Berkner Hall.

Like most of Fernandel's films, the plot of *L'Auberge Rouge* is of secondary importance — the film is first of all a vehicle for this internationally-known master of facial expression. The sound track is in French, but English subtitles are available as well.

A donation of $2 is requested of non-members ($1 for students). The performance begins at 8 p.m. Pastry and coffee will follow the film.

Arrivals & Departures

Arrivals

None

Departures

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

Gertrude Ince ..... Physics
Allison J. Otto ..... Plant Engrg.
William Rutter ..... Energy & Env.
Reinhold Schlotz ..... Chemistry

You're Invited!

Starting at 5:30 this evening, the Afro-American Culture Club's Spring Fling swings. The music will be scintillating, as it always is when Mr. "T" is on the turntables, and the atmosphere will be warm and friendly. For those who enjoy good eating, delicious, sumptuous food, prepared by "The Duke," can be had for a nominal sum. Free admission, a cash bar, prizes and surprises will all contribute to one fantastic evening, tonight at the Recreation Building.

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.

The vacancies listed below have been exempted by the Director's Office from the current freeze on open requisitions.

LABORATORY RECRUITMENT: Opportunities for present Laboratory employees.

1694. MATERIAL HANDLERS (Temporary 5/24/82 - 9/3/82) Supply & Materiel Division.

SCIENTIFIC POSITIONS OPEN: The following staff positions are open. Candidates may apply directly to the department representative named, or through the Office of Scientific Personnel, Ext. 3338.

SCIENTIST - Seek Ph.D in Chemistry or related field to join NRC-sponsored program in chemical decontamination of the primary loop of LWR's. Contact: Dr. D.G. Schweitzer, Nuclear Waste Management Division, Department of Nuclear Energy.

PLANT SCIENTIST - Seek Ph.D. degreed candidates whose interests overlap those of strong existing programs in the genetics, cell biology, and biochemistry of higher plants, to pursue independent research. Contact: G. Hind, Biology Department.

Autos & Auto Supplies

65 CORVETTE - silver, blue interior, 327/350, 4 speed, complete drivetrain, brand new, asking $6,500. 744-3968 after 6 p.m.

74 HONDA CIVIC - rebuilt engine, excel. cond., new brakes, exhaust system, approx. 30 mi./gal., $2,200. Sharon, Ext. 3755.

70 FORD WAGON - 83,000 mi., good cond., new muffler, starter, $900. Krishna, Ext. 4025.

79 CAMARO - a/t, p/s, p/b, mint cond., new tires, brakes, battery, am/fm cassette stereo. Gail, 727-3907 after 5 p.m.

74 MUSTANG GHIA - V-6 engine, p/s, a/c, disc brakes, am/fm 8-track stereo, 4 speed fl., $1,800. 744-5752 after 7 p.m.

78 HONDA ACCORD LX - 37,000 mi., 5 speed, a/c, am/fm-tape. 477-2269 after 5:30 p.m.

MINI-BIKE - Rupp Scrambler, good cond., needs some work, 3.5 HP engine, reasonable. 929-4446 after 3:00 p.m.

79 HONDA MOTORCYCLE - Hawk Mod., 400cc, like new, $1,200. 588-0805 eves.

70 VOLKS KARMAN GHIA - convertible, canary yellow, runs well, stereo, $2,150. 924-4284 after 5:30 p.m.

TIRES - (4) used, P205/70R14, polysteel radial, Goodyear, $50. Henry, Ext. 3084.

77 TRUCK CAMPER - 11' Aristocrat, loaded, mint cond., must sell. Mike, 878-1325.

SUBARU WAGON - GL5, 5 speed, am/fm, 23,000 mi., excel. cond., $5,500. 689-9282.

78 HONDA ACCORD LX - $4,950; also 1981 Pontiac T-1000, 5,000 mi., $5,100. Ext. 3985 or 265-3612.

70 APACHE POP-UP CAMPER - sleeps 6, stove, heater, sink, icebox, attached screen room, $650. 286-2435.

78 HONDA - 400cc, well maint., 6,000 orig. mi., some extras, must see, $1,000. Ext. 2926.

80 YAMAHOPPER MOPED - like new cond., 2,000 mi., $475. 331-2298.

HONDA MOTORCYCLE - 200cc, excel. commuter. Kristin, Ext. 3372 or 744-6287 after 7 p.m.

73 VW MINIBUS - am/fm stereo, good eng., body very clean. Ext. 7699 or 821-1435.

76 FORD - F250 pickup, club cab, trailer package, many extras, excel. cond. 589-6151.

75 HONDA CB500T - limited edition, garaged, 1,600 mi., many new extras, chrome, new batt., showroom cond., must see, $1,200. 289-4270.

65 PLYMOUTH - Valiant, good running cond., body good, asking $450. 924-5192 eves.

78 TRANS AM - gold, 6.6 LT, beige inter., new brakes & exhaust, ps/pb, 4 sp., am/fm 8 track, T-top. Roy, Ext. 4664 or 744-8779.

76 VW - Dasher, 4 dr., a/t, am/fm, $2,800 or best offer. Arnie, Ext. 2606.

80 SUZUKI - GS1000L, shaft drive, lugg. rack, many extras, warranty, $3,000. Ext. 7187 or 981-9474.

80 VESPA MOTORCYCLE - 200cc, 700 mi., travel trunk, great commuter, $1,400 or best offer. Harry, Ext. 3675 or 744-2581.

TIRES - (2) BR70-13 Goodrich, steel radials, fair tread, $40/pr. Dave, Ext. 5211 or 475-2626.

TRAILER TIRES - (5) 30x10 w/1 rim, used, all for $25. Don, 286-1205.

WINNEBAGO CAP - insulated, fits 6 ft. bed, foreign pickups, $150. Bill, 744-3926.

78 HONDA MOTORCYCLE - GL1000 Gold Wing, 4,000 mi., like new, $2,600. 473-8783.

69 ENGLISH FORD - Cortina, blue, new tires, water pump, exhaust, brakes, needs trans., clean inter. 744-3069.

80 MAZDA - Sport Pickup, immac., stereo w/tape, 21,000 mi., 26 mpg. local, 40 mpg. hywy., cap. 727-7741.

79 GMC - Pickup, 3/4 ton, 350 cu. in. eng., 4 sp., extras, excel. cond. Ext. 4289/4070 or 878-9582.

75 FORD LTD - v.g. cond., new tires, brakes, muffler system, asking $900. 286-3928.

75 OLDS - Cutlass Supreme Spt. Cpe, a/t, 260 V8, stereo, cass., powder blue/white int., excel. Ext. 3381 or 286-1024.

TIRES - (2) SR175-14, very good cond., $15 ea. or 2 for $25. Ext. 3488 or 924-7832 after 5 p.m.

Boats & Marine Supplies

23' SAILBOAT CUTTER RIG - swing keel, new sails, rigging & cushion, many custom extras, in-water, mint cond., $7,500. Joe, Ext. 7961 or 878-2655 eves.

16' ALUMINUM VEE HULL - 40 HP Evinrude, elec. start, mfg. trailer, $900. 924-6751.

12' FIBERGLASS BOAT - 10 HP Evinrude motor, excel. 1979 trailer, $725 or best offer. Brian, Ext. 2059.

78 19' REINKEN BOW RIDER - 85 HP Evinrude, trailer, skis, coast guard package, $4,200. 744-4595.

76 BAYLINER - 20 ft., Liberty 130, Volvo I/O, cabin, trailer, extras, $5,500. John, 541-4792.

22' DEEP-V GLASS CUDDY CABIN - & trailer, 75 hrs. on V6 I/O, asking $3,500. C. Nielson, Ext. 3935 or 325-0968.

CLAM RAKE - $20; wire basket, $5. 475-4199.

60 DORSETT RUNABOUT - 18', glass, 40 HP Evinrude, elec. start, trailer in need of repair. Ext. 4289/4070 or 878-9582.

66 PACEMAKER FWC - 25', 2200 HP, Palmer self-contained head, sleeps 4, many extras, $2,500. Ext. 4289/4070 or 878-9582.

16' TOMB'S GARVEY - 40 HP Johnson, good cond., many extras, $950. 286-0795.

Free

REMOVAL - old out-buildings, fencing, pools, H_2O heaters, etc. Bob, Ext. 3145 or 924-9210.

Yard Sales

GROUP YARD/GARAGE SALE - April 30, May 1st & 2nd, Halsey Manor Rd., Manorville, tools, household, old furniture, lots more.

THRIFT SALE - clothing, housewares, books, records. Saturday, May 1st, St. James Episcopal Church, Beaver Dam & Bay Rds., Brookhaven.

YARD SALE - May 15 & 16, odds & ends, Wading River, call for info. Lois, Ext. 4904 or 929-4753.

Miscellaneous

G.E. WASHING MACHINE - water pump never used, paid $33 sell for $25. 331-1162.

BOY'S 3-PIECE SUITS - 1 grey, size 16, 1 beige, size 18, like new, $15/ea. Ext. 4760.

COUCH - 90", Italian provin., sturdy wood frame, cane panels, good cond., needs reupholstering, $75. 929-4446.

LAWN MOWER - 20", not running, 2 blades, make offer. Ray, Ext. 7509.

MEN'S PAJAMAS - Van Heusen, small, never worn, 53% cotton, 45% poly., v-neck pullover style, not flannelette, $10. Ext. 5373 or 286-0999.

GUITAR - electric w/amplifier, needs three strings, good for beginner, $30. Otto, Ext. 3514.

MATTRESS - new, twin (80" long), perf. for platform bed, $50. Carole, Ext. 3362 or 924-4097.

MANUAL TYPEWRITER - Olympia, heavy duty office model-SG4, excel. cond., $85. 581-6432.

STEREO CONSOLE - Harmon Kardon tuner, amp., electrovoice speakers, Garard turntable, walnut construction, best offer. 369-2151 eves.

PAINT SPRAYER - binks, pump and HP motor, $25 or offer. Dick, Ext. 2911.

MOUTON LAMB JACKET - very good cond., fits sizes 12-16, $75. 475-0144 after 6 p.m.

MOTORCYCLE HELMETS - metallic blue, metallic red, like new, $10/ea. Bob, Ext. 2517.

POSEIDON UNISUIT - (1) large, (1) x-large, complete w/underwear, no regulator, used once, brand new, $500/ea. 744-3968 after 6.

BIKES - boy's 20", girl's 20", both like new cond. Richie, Ext. 2175 or 734-7342 after 6 p.m.

G.E. DELUXE NO-FROST REFRIGERATOR - 19 cu. ft., avocado, perfect cond., price negotiable. Ext. 4959.

TUMBLING BARRELS - machine and 2 rubber lined barrels (110 V), $100. Fred, Ext. 4407.

BACK PACK - nylon, 24x15x8" w/magnesium alloy frame, $40; hiking boots, Dunham, women's size 6, rust, broken in, $25; aquarium, 29 gal., w/full fluorescent hood, underground filter unit, $40. Ext. 7509.

INDIAN HEAD PENNIES - most dates between 1880-1899. Gregg, Ext. 7960.

PIANO - upright, great for beginning student, $200. Mona, Ext. 2347 or 878-9384 eves.

BALLET TICKETS - (2) for ABT performance of Don Quixote at Lincoln Center, Wed. mat. on 5/26/82, $20 ea. Jack, Ext. 4054 or 289-1989.

FISHING EQUIPMENT - diamond rigs, mackeral rigs, molds, leader mtl. Richie, Ext. 3815 or 924-5329.

COLOR TV - Magnavox, 23", needs some work, $50. 654-5609.

FISH TANK - 55 gal., fully equipped, $200. Ext. 7187 or 981-9474.

TYPEWRITER - IBM Model C, good cond., elec., $275; stand, $50; court steno machine, good cond., hardly used, still in case plus books, orig. $250, asking $125. Ext. 4933 or 369-2065.

MACAW - yellow naped, approx. 1 yrs. old, w/cage, hand tamed, $400. Ext. 7187 or 981-9474.

DINING TABLE - Fruitwood, 5'x40" w/pads, $50; Tensolator isometric musclebuilder, $15; Samsonite luggage, sev. sizes; Puritron air purifier, $15. Mary Smith, Ext. 4622.

GOLF CLUBS - 2 thru PW, 3 woods, $90. Dino, Ext. 5279.

BRAIDED OVAL RUG - 8x11 ft., red, also 4 ft. dia. round Ottoman. 924-0569.

NATIONAL GEOGRAPHIC MAGAZINES - from 1970 to 1981, 1/magazine. 286-1192.

HALF-FARE COUPONS - Pan Am. Jan, 751-6734.

WOOD - approx. 2 cords, make offer, you haul. Ext. 2543.

WOOD SCREENS - (2) 28x42, $6 ea.; 5' glass tub enclosure, $30. Bill, Ext. 3355 or 472-4684 after 6 p.m.

SPEAKERS - pair, Sound Design, $45; new G.E. steam iron, $3; waffle iron, $3. 286-2280.

DRESSER TABLE - 5-drawer, $10; coffee table, $6; kitchen table w/2 chairs, $25. 821-1435.

SLEEPING BAGS - (2) Alpine designs, backpacker, down, zip together, cleaned, $90/pr. Dave, Ext. 5211 or 475-2626.

ANTIQUE GRAIN TRESHER - all wood, excel. cond., hand crank oper., really works! Separates grain from chaff, circa turn of century, $250. Adam, Ext. 7737 or 286-8611.

KITCHEN CABINETS - solid pine (base & wall), custom built, wrought iron hardware, porcelain knobs, suspended drawers, excel. cond., simply don't fit new kitchen. David, Ext. 3576 or 286-8229.

COMPACT REFRIGERATOR - 1.5 cu. ft., mint cond., orig. carton, still under warranty, $90. Jim, 929-8560.

WASHER & DRYER - Sears Kenmore, lrg. capacity, excel. cond., $400. 744-5161 eves.

STONE - granite, for fireplace, gardens, barbecues, walks, white/gray, white/pink, 1 tons part or all. Ext. 2957 or 924-3553 after 5:30 p.m.

BABY BUGGY - 3 in 1, $25; mahoganey dresser, mirror, chest, make offer. Carl, Ext. 5329 or 281-7627 after 5 p.m.

VERMONT MAPLE SYRUP - $20 gal., $12 half, $7 qt. P. Wanderer, Ext. 7687.

MOWER - Craftsman, 22" self-propelled w/new catcher, 2 sp., $50. B. Azzara, Ext. 2050.

PROPANE TANKS - (2) 100 lbs. w/regulator & switch-over valve, $50. Gene, Ext. 3254 or 363-9527.

HOUSEHOLD FURNISHINGS - bedroom, living rm., dining rm. and others; blue prom dress, sz. 9, $20. 744-2766.

DEEP WELL PUMP - 1 HP, 2 stage, 110-220 volts, $95; hanging bathroom sink, cast iron, pink, faucet, legs, very good cond., $35. 924-3565.

DRESSERS - 34"Hx36"L, 43"Hx30"L, 4 drawer, $35 ea.; 32"Hx50"L, 6 drawer, $40; belt exerciser, $40; sewing machine table, $18. Carl, Ext. 7658 or 273-0786.

MINOLTA CAMERA - SRT102, 35mm, 50mm 1:17 lens, shutter 0-1000, good cond., $125 firm. 281-0360 eves.

COLOR TV - Sony, 17", needs repair, $75. Ext. 3503.

PORTABLE ELECTRIC PIANO - Hohner Pianette T w/legs, $250. 821-1460 after 6 p.m.

REFRIGERATOR - icebox section works fine, freezer kaputt, free for the carrying. Karen, Ext. 3626.

POLAROID AUTO 100 - w/flash att., plus 9" to 15" closeup equip., uses 108 film, excel. cond., $35 firm. Charlie, Ext. 3354 or 234-8530.

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

N. PATCHOGUE - high ranch, l/r, d/r, kitchen, 3 bdrms., 1 bath, large paneled family rm., garage, util. rm., prime area, walk to schools, assumable 8% mort., low taxes, $39,000. Owner, 929-6984.

MIDDLE ISLAND - 2-3 bdrm., l/r, kit., bath, 1 car garage on acre (north of Jericho), $35,900. Joann, 744-2821 or 473-8760.

CONDO - Birchwood at Blue Ridge, 15 min. from Lab, 3 bdrms., many extras, facing golf course, low 60's. 698-7213.

COLONIAL - 4 bdrm., 2 baths, 2 car garage, inground pool, fenced yard, central air, fin. bsmt., alum. siding, 6% assum. mortg., $62,500 firm. 744-6929.

SHOREHAM - 3/4 acre wooded plot. Steve, Ext. 2023 or 744-0047.

RIDGE - Leisure Village, 1 bdrm. condo, sunporch, all appl., w/w carpeting, drapes & blinds, 8% mortg., $34,000. 744-6874 eves.

MASTIC BEACH - 4 bdrm. cape, d/r, eik, lrg. l/r, gas hot water, 160x100 prop., low taxes, shed & full porch, near stores & bay, 8% Farmers mort., $28,000. 281-0360 after 6 p.m.

BROOKHAVEN HAMLET - cape, 1/3 acre, 3 lrg. bdrms., walk-in closet, lrg. l/r, d/r, entry kit., family rm., play rm., laundry rm., 1 full bath down, 2 unfin. baths up, wood stove, fp, ref., stove, dw, w/w carpet throughout, patio, yard fenced 2 sides + fenced play yard, $50,000. 286-3623.

For Rent

VERMONT CHALET - beautifully furnished, stone fireplace, woodland trails, hiking, pond, lake, swim, fish, canoe, nearby tennis, golf, riding, antiques, music and theatre festivals, weekly rates. 757-5599 after 4 p.m.

SOUTHAMPTON - new ranch, 3 bdrm., 2 bath, d/r, l/r, m/r, large kit., deck, fireplace, bar, rent includes use of chartered boat. Full summer, $6,200, by month, $2,100, by week, $650. 283-0223.

SETAUKET - 1 bdrm., furn. apt., ideal for single or couple, $350 + elec., no lease. 331-9349.

SOUND BEACH - furn. rm., share 2 bdrm. apt., kitchen, bath, l/r, walk to pvt. beach, rm. has phone, full sz. bed & TV, $200/mo. incl. util. Roy, Ext. 4664 or 744-8779.

WADING RIVER - lovely house on wooded acre, 3 bdrms., 2 baths, l/r, d/r, den, study rm., eik, 2 car garage, deck, all appl., 12 min. to Lab, SWR schools, avail Aug. Ext. 4391/3642 or 929-6964 after 6 p.m.

Car Pools

RONKONKOMA - driver to join 3 person pool, L.I.E. exits 59, 60 and 61. Victor, Ext. 2395.

MILLER PLACE - individual would like to join car pool. Pete, Ext. 2304.

CENTER MORICHES - paying rider wishes to join 8:30 to 5:00 car pool. Blanche, Ext. 2873.

Wanted

TRAINS - Lionel, American Flyer, accessories, any condition brings good price. Carole, Ext. 3362 or 924-4097 eves.

RAW HONEY - Ext. 4959.

BOAT/TRAILER/TIRE&RIM - for 4.80x8' for spare, condition not important. Richie, Ext. 2175 or 734-7342.

CAMPBELLS SOUP LABELS - send to F. Chandler, Bldg. T-89 (for St, Mary School, East Islip).

VENDORS NEEDED - for church flea market, exit 70, Manorville, May 29, rain date June 5th, $5/space. 727-1617 or 727-1067.

METRONOME - for aspiring nine year old clarinetist, reasonable. Ann, Ext. 2114.

HOMES FOR CATS OR KITTENS - from local humane society. 928-9537 or 744-2821.

HOUSE - 3 bdrms., reasonable rent, close to BNL preferred, refs. avail. upon request. 288-6367.

BABYSITTER - Westhampton Beach area, 9 a.m.-6:30 p.m., mature person, own transportation preferred. 288-6367 after 7 p.m.

TAIL LIGHT ASSEMBLY - right side, from 1970 Torino or Montego station wagon. Stan, Ext. 4068.

HOUSE TO RENT - working couple w/well trained dog, reasonable price, Bellport, Brookhaven, E. Patchogue area. Pete, Ext. 7513 or 929-6980.

WASHING MACHINE - automatic. 928-3653.

COMPOUND BOW - 25-30 lbs., access. too. Kristin, Ext. 3372 or 744-6287 after 7 p.m.

HOUSE - to buy or rent, S. Bellport or Brookhaven, 1/1/83 or before. Ext. 4388 or 286-5879.

TENT - inexpensive but weatherproof for kids to sleep out in yard. Liz, Ext. 2082.

RIMS - for Dodge, 16' or 16.5' wide; wheelbarrow. Bob, Ext. 3145 or 924-9210.

APT/HOUSE TO RENT - prof. couple, unfurn., prefer N. Shore, occupancy by 7/15/82. Scott, Ext. 7535.

TRAINS - Lionel, any "0" gauge or "027" gauge cars, track & equip. Frank, Ext. 3120.

SMALL UTILITY TRAILER - to buy or rent for month of July. Horst, Ext. 7179 or 286-3887.

Services

Services are listed as a courtesy to BNL employees. They are neither screened nor recommended by the ***Bulletin.***

INCOME TAXES - prepared by professional accountant, very reasonable rates. Bob, 286-5829 eves/weekends.

VERTICAL BLINDS - mini-blinds, wovenwood shades, discount prices, completely installed. Tony, 928-9241.

BABYSITTING - and/or house cleaning, hours flexible, can provide references. Cathi, 281-0360.

KAYAK LESSONS - wildlife trips, cruising local waters, for physical fitness, $10/lesson. Ernie, Ext. 3499 or 281-7873.

PLUMBING AND HEATING - Lab discount. John, 654-8189.

MOTHER'S HELPER - mature 15 yr. old wants babysitting/housecleaning during summer in Wading River/Shoreham/Rocky Point area. Miriam, 744-3919.

ASPHALT PAVING AND SEALING - Bob, 475-4382.

HOUSE SITTING - free, experienced, caring, any period after May 28, plan your vacation now. J. Allentuck, Ext. 2412.

LIMO SERVICE - luxury chauffered for proms, weddings, airport, night out. Roy, Ext. 4664 or 744-8779.

RESUMES PREPARED - typed, printed, cover letters. Bill Polvent, 821-9081.

AUTOMOTIVE REPAIRS - and tune-ups. Glenn, 281-7873.

FIRESIDE CHIMNEY SWEEPS - spring clean-up, $10 off, fireplaces, wood, coal & oil flues, dustless removal. Bill, 584-6425.

TILE SETTERS - ceramic tiles, no job too small, free estimates. E. Harris, 475-6460.

ROTOTILLING - for any size lawn or garden, $15/hr. Dave, Ext. 4289 or 288-3011.

ART LESSONS - drawing, painting, basic design. Classes starting soon for serious persons. Adam Leskowicz, Ext. 7737 or 286-8611 after 6 p.m.

CAR CARRIER - and driver for hire, any kind of car transported safely. Ed, Ext. 4095.

SMALL APPLIANCE REPAIRS - vacuums, all small appliances, No. Patchogue. 654-3900.

EXTERMINATING - licensed professionals, all phases of pest control, termite specialists, no job too small, free estimates. 281-5445.

PET GROOMING - Rocky Point, Route 25A, flea/tick bath, nails cut, $9.99, $4 off all haircuts. 744-6410.

BICYCLE REPAIRS - and tuneups, quality work, reasonable rates. Alan, Ext. 2928 or 821-1389.

AUTO REPAIRS - cars and light trucks, Lab discount. Dan, Ext. 4988 or 698-7322 after 6 p.m.

TILE & CEMENT WORK - reasonable rates, good work. John, Ext. 3292 or Donald, 281-8848.

SPRING CLEANUP - yard work, landscaping, light auto repairs, lowest rates possible. 289-9811.

EXTERMINATING - termites, Gypsy moth treatments. 399-0523.

ATTENTION MOTHERS - in Shoreham/Wading River/Rocky Point, responsible, loving 13 yr. old desires babysitting/mother's helper position during summer months. Nancy in Shoreham, 821-9547.

SPRING CLEAN-UP - ambitious, strong, 11 yr. old desires yard work, car washing, garage cleaning. Pete in Shoreham, 821-9547.

HOME BURGLAR ALARM - package incl. panel, c/s monitoring, TELSTAR, 2 drs., 4 windows, encl. w/siren, installed $795. Custom System, 399-3806.

CLOCK REPAIRS - Grandfather clocks, a specialty w/father time. Ext. 4311 or 727-7440.

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