BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

Tristan:
Terrific Tool at the HFBR

If the disciplines of physics and poetry seem far apart, consider Tristan. Named after a medieval hero eulogized in verse since the twelfth century, Tristan is an isotope separator over which nuclear physicists often wax poetic.

Tristan's virtues have been on display at the H-2 beam line at the High Flux Beam Reactor (HFBR) since mid-1980, when it began operating at BNL. Prior to that, Tristan, which stands for Terrific Reactor Isotope Separator to Analyze Nuclei, had been a research tool at the Ames Laboratory in Iowa. When the research reactor there shut down at the end of 1977, Tristan took up residence at the HFBR.

At Brookhaven, Tristan has been part of the Neutron Nuclear Group in the Physics Department, headed by Richard Casten. Associate Group Leader is Robert Chrien, who explained that, in its three years of operation here, Tristan has attracted over fifteen research groups to the HFBR. "Tristan is the only general purpose reactor-on-line isotope separator in the country," he said. "If researchers need to measure fission product data, they come here."

Nuclear physicists need fission products to test theoretical models that predict nuclear structure and behavior. Nuclear models are largely based on observations of nuclei near the valley of stability — the area where the number of neutrons and protons in a nucleus are in balance. "Anything which departs from this, either on the side of having more protons or having more neutrons, will be unstable against decay and go back to the center of the valley of stability," Chrien said.

"Our interest is to produce isotopes through nuclear fission so we can study their radioactive emissions," said Chrien. "If they're out of the valley of stability, they're nuclei that are hard to get by other techniques, and you don't find them in nature, except in very evanescent forms."

This type of research has broad implications. "We are interested in studying processes for their fundamental properties," Chrien said. "Nevertheless, the same processes are also of interest in how they determine the operating characteristics of reactors." Interest in these processes is what prompted over 60 nuclear physicists to come to BNL this week for a four-day meeting on "Yields and Decay Data of Fission Product Nuclides." Many of the discussions that took place from Monday through Thursday focused on areas where Tristan can provide critical data.

Determination of nuclear masses is one such area. Nuclear physicists use formulas to predict the masses of stable nuclei. "In analyzing a nuclear reaction," Chrien said, "if you know the masses of the products involved, then you can determine the total energy that will be emitted in the process. That's important from an applications point of view with reactors. With Tristan we measure the energy of the beta particles emitted in the decay. From those energies we can construct the nuclear masses. Then we have data from nuclei outside the valley of stability to compare with the theory, which was based on nuclei in the valley. It's a good test of the theory."

Delayed neutron emitters were another area of Tristan research discussed at the meeting. As isotopes decay, energy is created, which, said Chrien, "at some point, is going to exceed the energy required to remove a neutron. When that happens, you can get a beta emission which will leave the nucleus in such a large state of excitation that it can emit a neutron which takes up to several seconds to come out — a delayed neutron. In practical terms, this time lag provides a handle by which a reactor can be controlled." One Tristan study in this area yielded a case in which two neutrons were emitted at once, rather than just one — the first time this was ever observed in a fission fragment.

Other areas in which Tristan has proved helpful include stellar nucleosynthesis, the process by which heavy elements are built up in the universe; nuclear systematics; the study of the process of deformation in nuclei; and nuclear structure, particularly the nature of the subshell closure which underlies the nuclear shell and disappears as a nucleus deforms. Future plans at Tristan include studies of hyperfine interactions using a laser to learn how the excitation of the nucleus affects energy levels.

Tristan is also of a scale well-suited for educational purposes. Said Chrien, "At this facility, graduate students can learn all phases of experimentation, and they're directly involved in executing experiments."

Roger Stoutenburgh

During a break in the proceedings of this week's meeting on "Yields and Decay Data of Fission Product Nuclides," BNL conference organizers Robert Chrien (right) and Thomas Burrows (second from left) met with Gosta Rudstam (left), Studsvit, Sweden, and Jean Blachot, Grenoble, France, who were both conference speakers. (See story on Tristan.)

The task of teaching researchers and graduate students how to run Tristan generally falls to physicist Ron Gill. Gill came to BNL from Ames Laboratory with Tristan in 1978 to set up the equipment. Now, along with physicist Antoni Piotrowski, his primary concern is with the development of new ion sources.

In the ion source, the HFBR's neutron beam collides with a uranium target, stopping there. As Gill explained, "In general, there are two fragments produced in the fission following neutron capture — one light and one heavy. But there are about 800 possible combinations of fission products, with a small probability for any particular one. To get a small cross-section into a measurable state, the products must be thermalized in

(Continued on page 2)

Mort Rosen

At the Tristan facility at the HFBR, technician Dean McDonald (foreground) works on one of the beam lines. Conferring around the magnet where the beam is switched to detector stations on each beam line are Antoni Piotrowski (left) and Ron Gill.

Carney Calls for Commitment to BNL

In the wake of the Department of Energy's decision to terminate the CBA project, First District Congressman William Carney has called upon the Department to insure that the CBA facility be utilized in a future physics research project.

In a press release issued last week, he said that "We have a huge investment at Brookhaven and before we look to build a bigger machine —one that isn't even on the drawing board yet — we should find a use for what we now have." (Editor's Note: one possible use for the CBA tunnel would be a heavy ion collider; such a proposal is being prepared for presentation to DOE by BNL.)

Mr. Carney stated that the research needed before work can begin on the more advanced machine, which scientists refer to as a Superconducting Super Collider (SSC), should be pursued on Long Island.

"We're very optimistic that the Brookhaven National Laboratory will play a key role in the future of both high energy and nuclear physics," the Congressman said. "If the scientific community expects to receive the support of the taxpayer, they will have to act responsibly, and I think they will. In redirecting the money, Congress should insist that Brookhaven's facilities are used for research in a program with high scientific vitality."

8° Magnet Turns 10

It was Halloween night, 1973, and the group gathered around the console in the control room of the Alternating Gradient Synchrotron (AGS) wondered whether a "trick" or a "treat" was in store for them. But all the goblins were elsewhere that evening. Nothing haunted the perfect performance of the new 8° superconducting magnet in the AGS primary beam.

The magnet had been designed to bend a branch of the AGS proton beam eight degrees to accommodate a new neutrino physics program in the north area of the AGS. Recalling that night one decade ago, Gordon Danby, who led the magnet development team, said, "It was an important moment. This was not just something nice to run. It had to work, or we were in deep, deep trouble." The magnet not only worked then, but, said Danby, "It has worked quite well for ten years. And this is significant because north area physics, principally neutrino physics, has been one of the stellar things at the AGS."

Though the use of superconducting magnets in accelerators is becoming ever more routine, that was not the case ten years ago. "The 8° magnet was certainly one of the early ones." said Danby. "Making such a major commitment to a superconducting magnet at the AGS was unprecedented, so it was a pioneering milestone in the development of the business."

As such, the magnet has been used to study how radiation affects superconducting magnets. "There's a very intense proton beam going down that little hole in the center of the magnet," Danby explained, "and what effect that would have on magnet performance was essentially unknown." That the effect is easily controllable has been shown by the magnet's ten years of practically troublefree operation. And that the magnet's design has withstood the test of time is evidenced by what Danby called, "a renewal of interest today in one of its most unique properties, the use of high purity aluminum for cooling and stability. This property is being explored in certain designs for future accelerators."

The predecessor to this magnet was a tiny model, about as big as a telephone. The eight degree bend required two magnet modules, each bending the proton beam through four degrees. "This was a very major bend," said Danby. "Conventional AGS magnets each bend the beam $1^{1}/_{2}°$ so five or six of those magnets would have been needed. Since space was a consideration, it was decided to build two 40

(Continued on page 3)

Reports Available

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

BNL-51528
Assessment of Environmental Problems Associated with Increased Enhanced Oil Recovery in the United States: 1980-2000. E. Kaplan, M. Garrell, B. Royce, E.F. Riedel, J. Sathaye.

NUREG/CR-2907
BNL-NUREG-51581
Vol. 1
Radioactive Materials Released from Nuclear Power Plants. Annual Report 1980. J. Tichler, C. Benkovitz.

BNL-51599
Health and Environmental Effects Document for Photovoltaic Energy Systems - 1982. P.D. Moskowitz, et al.

NUREG/CR-3013
BNL-NUREG-51620
Review of the Rancho Seco Nuclear Generating Station Unit No. 1 Auxiliary Feedwater System Reliability Analysis. D. Ilberg, R. Youngblood, I.A. Papazoglou.

BNL-51669
Toxic Material Advisory Report 2-Mercaptoethanol. N.M. Bernholc, O. White, Jr., R.S. Baloyi, B.D. Silverstein.

Idea to Product

Today and tomorrow, a National Innovation Workshop for the Northeast Region will be held at Berkner Hall. The program is part of a nationwide series of regional workshops designed to provide practical guidance and information to inventors working independently or within small business.

The program will focus on the production, protection, financing and marketing of inventions. Also featured will be workshops, demonstrations, exhibits and literature on how to successfully commercialize an idea.

Invited speakers include Christopher M. Lehman, President of Venture Magazine; Ann Eskesen, President of Innovation Development Institute; Professor Albert Shapero, Ohio State University; and State Senator Kenneth LaValle.

In Appreciation

The loss of my husband left our home empty and our hearts saddened. Our friends' notes and their thoughts of us have helped us to look at his death more courageously. We are grateful to our friends at BNL who have helped us to bear our grief by their kind expressions of sympathy.

— Etsuko Fujita

Tristan (Cont'd)

the target, vaporized, then ionized and accelerated. All this takes place in the ion source, with temperatures reaching as high as 2500 degrees Celsius."

The isotopes are accelerated and passed through a large bending magnet where they are separated by mass number. They subsequently are deposited near detectors, where measurements of such things as gamma spectra, beta decays and neutron decays are recorded in Tristan's computer system. "Different masses have different radii of curvature," said Gill. "The separator can select from about 150 different masses, each of which may contain six different isobars. We can enhance a particular isotope by selecting the speed of the tape which collects the ions."

For the future, Gill said, "We are working on a technique for using a laser to pick just one isotope." And by next January, a new superconducting magnet will allow the measurements of magnetic moments of excited nuclear levels by a method known as perturbed angular correlation. These new techniques, coupled with newly-developed ion sources, will considerably enhance the attractiveness of the Tristan facility for pure and applied research.

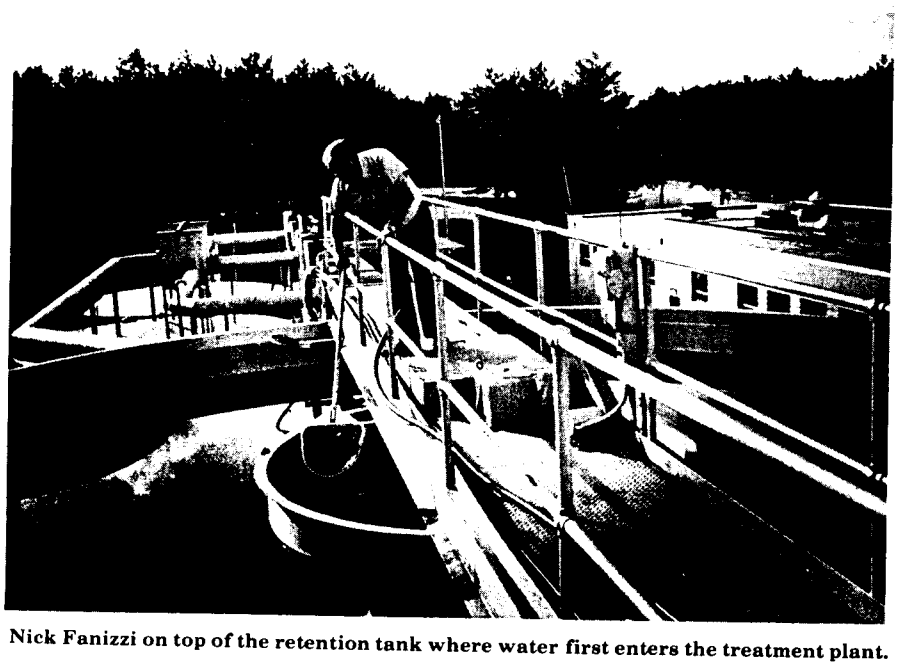
— Anita Cohen

Alex Reben

On behalf of the Secretary of Energy, David Schweller, Brookhaven Area Office Manager, presented the Distinguished Associate Award posthumously to Warren Winsche on October 21. Accepting the award was his widow, Mary Anne Winsche. This is DOE's highest award to a non-government employee. The citation reads: "In recognition of long and distinguished service and exceptional accomplishments in furtherance of the missions of the Department of Energy and its predecessor agencies. Homage is paid to a brilliant scientist, engineer and science administrator, a man who dedicated his lifetime to excellence, achievement, and integrity."

Water, Water Everywhere, And All of It Good to Drink

At the BNL water treatment plant are (from left) Tony Ross, Bill Slavinsky, Ted Dahne, Jim Hanson, Nick Fanizzi and Mike Ponticiello.



Nick Fanizzi on top of the retention tank where water first enters the treatment plant.

—photos by Horton

Visit the main office at BNL's water treatment plant and your ears will perk up at the splattering of running water. Leaky pipes? Not at all. Open faucets, deliberately kept so.

The constantly running tap water gives true samples for water quality analysis. And that's what the water treatment plant is all about. The plant's five operators and their supervisor see to it that the Lab's domestic water is well within the Environmental Protection Agency's standards for drinking water.

The Laboratory uses about three million gallons of water a day. A quarter of that is for personal use — water fountains, toilets, sinks. The rest is used for large-equipment cooling, in heat exchangers, electromagnets and other equipment.

In certain respects, the machinery is even more sensitive to water quality than people are. So while the Lab's domestic water meets Federal standards for drinking, BNL's own standards are even stricter.

For example, iron and manganese clog heat exchangers and other equipment, so a major effort is made to remove these elements. Iron content of the water coming into the plant can be as high as three parts per million (ppm). After being treated, it goes out at 0.1 ppm or less, nearly three times lower than the EPA standard. Manganese is similarly reduced.

Keeping the water clean — super clean — is the job of supervisor Bill Slavinsky, group leader Tony Ross, and plant operators Nick Fanizzi, Ted Dahne, Jim Hanson and Mike Ponticiello. Part of their job is taking daily samples to check on iron, turbidity (clearness), pH (acidity) and conductivity (dissolved substances). Once a month, samples are sent to an outside lab for bacteria tests. Once a year, a sample is sent out for a complete chemical analysis, which would pick up anything like pesticides or other foreign elements intruding into the Lab's well water supply.

Contamination is not likely. The Lab sits on 5,265 acres of mostly undeveloped land. Nearby are no heavy industries, no substantial farming. As for radiation, the Safety and Environmental Protection Division routinely samples the Lab's wells to check for that.

All the tests prove that BNL's water is safe for people and safe for machines.

The Lab's domestic water comes from eight wells that range from 101 to 150 feet deep. Except for the first three small wells drilled in the 1940s, each of the other wells has a capacity of 1200 gallons per minute.

Four wells bring up such good quality water that they feed directly into the system, with only chlorination at the wellheads. Water from the other four wells is pre-chlorinated and then piped to the treatment plant.

At the plant, the water goes through several steps. First it enters a retention tank, where chemicals are added to help remove iron and manganese and to raise the pH to 7.6 (to prevent pipe corrosion).

From the retention tank, the water passes through filter beds of sand and coal which remove more iron and any other impurities. Finally, the water is again chlorinated and then stored in a 252,000-gallon clearwell tank.

Water leaving the treatment plant is of a known quality, but then it weaves through about 45 miles of underground pipes that make up the distribution system. Because the water quality can change from residues built up in the distribution system, Slavinsky routinely takes random samples from taps in various buildings. That water is checked for iron, pH and chlorine. Also, the entire distribution system is flushed annually through the fire hydrants to remove residues.

Pressure in the entire system is maintained by the elevated water tank near Police Headquarters. Built during Camp Upton days, the tank has a capacity of about 300,000 gallons. While that seems like a lot, it's not big enough for the Lab's current needs. Partially for that reason, the Lab's water system will be upgraded over the next three years.

A one-million-gallon elevated tank will be built in the eastern section of the Lab site. Also, another retention tank and new filters will be added to the water treatment plant. Design work is going on now, and construction is planned for 1985.

—Mona S. Rowe

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Service Awards

The following employees received service awards during the month of October:

Thirty-Five Years

Lewis Friedman ..... Chemistry

Thirty Years

Lloyd A. Schairer ..... Biology

Twenty-Five Years

Michael Iwantschuk ..... Accelerator
Walter R. Kane ..... Nuclear Energy
Ernest A. Lange ..... Accelerator
Douglas C. Mitchell ..... Accelerator
Walter M. Reams ..... Applied Science
John H. Sondericker ..... Accelerator
Brian C. Vogt ..... Accelerator
Alexander Walker ..... Central Shops

Twenty Years

Carl A. Christianson ..... Accelerator
Frederick B. Heilemann .. Accelerator
Jeffrey L. Knighton ..... P&G Arts
Morris Laffer ..... Central Shops
Bernard J. McAlary ..... Fiscal
Dominick Salimando ..... Accelerator
Dieter Zantopp ..... Accelerator

Ten Years

Willie H. Campbell ..... S&M
Richard J. Chester ..... Cont. & Proc.
Arthur B. Harris ..... Reactor
Peter E. Haustein ..... Chemistry
Herman LeeMou ... Plant Engineering
Michael J. Murtagh ..... Physics
Ressie Stewart ..... Medical
Joseph S. Wall ..... Biology

Magnet (Cont'd)

kilogauss superconducting magnets to create the eight degree bend." From that one model, the team proceeded to design and build the almost fully automatic system known collectively as the 8° magnet. "We were quite proud of the fact that about two years after start up, when the two magnets were compared as to field precision, they were identical to the original figures, exhibiting a very high level of accuracy," Danby said.

For the success of the 8°magnet, Danby credits a "dedicated, excellent team," which included Joseph Allinger, who is now retired, as well as Bob Baker, Basil DeVito, Horst Foelsche, Bob Gibbs, Jack Haufman, Herb Hildebrand, David Hsieh, Mike Iwantschuk, John Jackson, John Markott, Ernie Ostheimer, Al Prodell, George Stenby, Dick Stoehr, Jack Weisenbloom and John Wilcenski. Once the magnet was off and running, the group disbanded, taking their talents to other projects. Many, like Danby, are still in the Accelerator Department, where, he said, "I never wander very far from magnetism in its various forms."

— Anita Cohen

Arrivals & Departures

Arrivals

Richard M. Fine ..... Biology
Howard Sachs ..... Chemistry

Departures

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

Susan C. Dyroff ..... DNE
Herman Lee Mou ..... Plant Eng.
Oscar Renault ..... Central Shops
Robert J. Stamm ..... Chemistry

Diet: a short period of starvation preceding a gain of five pounds.

Promoter: a person who will furnish the ocean if you will furnish the ships.

Youth: the first fifty years of your life; the first twenty of anyone else's.

Rogeri Trio

Return of the Rogeri

The Rogeri Trio is returning to Berkner Hall to give a concert on Wednesday, November 9, at 8:30 p.m. They first appeared here in March 1981.

Violinist Richard Young, pianist Barbara Weintraub and cellist Carter Brey make up the famed trio, which has met with critical and public acclaim throughout the country. The trio has appeared with the Buffalo Philharmonic in performances of the Beethoven Triple Concerto and at the First and Second Festival of Women's Music in New York. They have also performed in such prestigious series as the Coleman in Pasadena, and at the Chicago Chamber Music Society, the Frick Art Museum and the Toledo Museum of Art.

The Trio's repertoire includes the old masters, as well as works by more modern composers. The program here will include Beethoven's Trio in C Minor, Op. 1, No. 3; the Charles Ives Trio; and the Schubert B Flat Trio, Op. 99.

Tickets will be available at the door the night of the concert. General admission is $7; students and senior citizens, $4; and those under 18, $3. The concert is open to the public.

Tips on Tools

If you've ever started your spring gardening by repairing your equipment, you'll appreciate these tips from the Cooperative Extension Association of Suffolk County. Before you retire your tools for the winter, now is the time to:

- Thoroughly drain garden hoses so there is no water left inside to freeze. Store hoses coiled and lying flat.
- Drain and lubricate sprinklers. Replace washers in hose and sprinkler connections.
- Clean, repair and tighten ladders. To extend the ladder's life, use a brush to apply a wood preservative mixture of one part linseed oil to two parts paint thinner. Store the ladder indoors, off of damp floors.
- Remove soil from gardening tools. Clean metal parts with a wire brush to remove loose rust, if necessary. Then wipe the tools with an oily rag. Treat wood handles with the homemade preservative described above.
- Wipe sticky sap and pitch from hedge shears and pruners with a rag dipped in paint thinner; then sharpen and oil thoroughly.

While you're working with your hand tools, why not wax your snow shovel blade? Snow will slide off the blade, instead of sticking. You can also treat the wooden handle with your homemade preservative.

No Air on Weekends ...For Now

The Gulf Station on site informs us that they have had to turn off the air hose on weekends because their compressor is on its last legs, and they are waiting for a new one. If the compressor should seize on a weekend, and no one is around to turn it off, a fire could break out, and also there would be no working lifts in the garage.

A new compressor is expected shortly and, when it is installed, the air hose will be turned on again. The station regrets the inconvenience.

In Stormy Weather

The following radio stations have agreed to carry announcements regarding Laboratory closings and delayed openings in the event of storm conditions:

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

Fly Tyers

The BNL Fly Tyers are meeting each Tuesday at 6 p.m., until spring, in the cafeteria located in the basement of the Medical Department. Annual dues are $3.00 and new members are welcome.

Bowling

Red/Green League

High games were bowled by J. Petro 231, J. Morris 224, R. Jones 215/214 for a 612 scratch, 681 gross series, N. Combatti 213/200, E. Meier 205, R. Sick 205, J. Medaris 200.

White League

J. Thiede rolled a 205, K. Jacobs 190, J. Pinelli 187, K. Riker 198, T. Erickson 194, D. Klein 193, E. Blanton 191.

Purple League

J. Roesler bowled a 220, K. Asselta 213, G. Hassell 203.

Basketball

A sign-up sheet is posted in the gymnasium for those who would like to play basketball this year. Call Mitchell Williams, Ext. 2021, for league play starting date and other information.

Cafeteria Menu

Week Ending November 4

Monday, October 31

Cream of mushroom soup	(cup)	.65
	(bowl)	.75
Beef liver & onions w/1 veg.		1.85
Tamale pie & 1 veg.		1.85
Hot Deli — Veal patty Parmesan	(bread)	1.90
	(roll)	2.05

Tuesday, November 1

Minestrone	(cup)	.65
	(bowl)	.75
Pot roast of beef & stewed tomatoes		2.00
Shrimp cakes w/cream sauce & 1 veg.		1.90
Hot Deli — Pastrami	(bread)	1.85
	(roll)	2.00

Wednesday, November 2

French onion soup	(cup)	.65
	(bowl)	.75
Boiled pigs feet w/collard greens & potato salad w/corn bread		1.95
BBQ chicken breast & 1 veg.		2.10
Hot Deli — Sandwich steak w/peppers & onions	(bread)	1.95
	(roll)	2.10

Thursday, November 3

Cream of tomato soup	(cup)	.65
	(bowl)	.75
Breaded pork chop w/one baked apple		1.95
Stuffed pepper & 1 veg.		1.85
Hot Deli — Monte Cristo		1.90

Friday, November 4

Fish chowder	(cup)	.65
	(bowl)	.75
Chinese pepper steak on noodles		1.95
Breaded fish fillet & 1 veg.		1.85
Hot Deli — Corned beef	(bread)	1.85
	(roll)	1.95

Holiday Hams

The cafeteria has a limited number of smoked hams which they will cook and decorate for you at $2 per lb., plus tax. The holidays are just around the corner, so order early. Call the cafeteria at Ext. 3541.

Roger Stoutenburgh

This pumpkin and scarecrow (courtesy of Saga Foods at the cafeteria) are teamed up to remind you to turn back your clocks one hour on Sunday, October 30 at 2 a.m. The setback comes one day before Halloween which means it will be dark when those little ghosts and goblins go trick or treating. So be careful driving home that evening and caution the kids to watch out for traffic.

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.

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.

PHYSICIST/PROGRAMMER - Seek Ph.D. (or M.S. + equivalent experience) physicist with background in nuclear or high energy physics and strong computer programming skills for position in the National Nuclear Data Center. Contact: Mulki Bhat, Department of Nuclear Energy.

LABORATORY RECRUITMENT: Opportunities for present Laboratory employees.

1957. TOOL AND INSTRUMENT MAKER -(two openings) - Central Shops Division.

1958. ADMINISTRATIVE/BUDGET POSITION - Requires a bachelor's degree in business administration or its equivalent. Will assist in the Department's business office in the preparation, control and general administration of operating budgets and forecasting. Responsibilities will also include the management of specific projects. Experience in a high technology environment with exposure to and development of automatic data processing management information systems and techniques is very desirable. Accelerator Department.

1959. CLERICAL POSITION - Requires AAS in secretarial science or equivalent and excellent communication and clerical skills. Familiarity with library procedures and practices desirable. Previous experience in OCLC database searching very desirable. Will work in the Technical Services Section of Research Library. Technical Information Division.

1960. SECRETARIAL POSITION - Requires AAS in secretarial science or equivalent and excellent secretarial skills. Responsibilities include report production on a word processor, taking dictation and planning activities both within and outside BNL. Must have thorough knowledge of Laboratory procedures and policy and the ability to work independently. Department of Nuclear Energy.

Auto & Auto Supplies

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

75 MERCURY COUGAR XR7 - auto, p/s, p/b, a/c, silver, new vinyl top, excel., $1,800. 732-6712.

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

69 AMC AMBASSADOR - 4 dr. sedan, good cond., $295. Vinny, 473-0312.

80 SUSUKI ENDURORS DIRT BIKE - 175cc, good cond., $675. Ron, Ext. 7696 or 289-1003.

66 VW BUG - running cond., best offer. Ext. 4345 or 473-9124 after 6 p.m.

TIRES - (4) Goodyear polysteel w/w, (3) P195/75-5-14, (1) P205/75-R-14, $10 ea. Ext. 2492.

76 DATSUN B-210 - new tires. Mickey, Ext. 3173.

73 DUSTER - 225 cu., 6 cyl., a/t, p/s, 60,000 orig. mi., needs little work, $850 neg. Ken, Ext. 2350 or 732-7944.

FORD CARBURETOR - new 4 barrel, 351c., Ford heads & intake manifold, completely rebuilt, 351c., excel. cond. Ext. 3319 or 744-9802.

77 HONDA XL75 - good cond. Bob, Ext. 4672 or 929-4753.

73 PLYMOUTH VALIANT - 6 cyl., a/c, good cond., $500. Don, 924-3385.

78 LECAR R5-GTL - am/fm tape, sunroof, good running cond., $1,000. Ext. 3749 or (212) 793-0754 eves.

69 COUGAR - running cond., make offer. Ext. 4050.

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

75 VOLKSWAGON RABBIT - no engine, in good cond., new tires. 878-2191 after 5 p.m.

72 VOLVO - 145 auto, new battery, many new parts, $1,800 negotiable. Amy, Ext. 2369 or 821-0754.

71 CHEVY - truck, fenders, windshield, 4 speed trans., rear end, 4x4 transfer case, all reasonable. Dick, Ext. 3499 or 589-9103.

77 BUICK SKYHAWK - V-6, 4 speed, a/c, p/s, am/fm cassette, new steel radials. 472-4684 after 7:00 pm.

74 VW - good to excellent cond., $1,550. Ext. 2951 or 281-5827.

RIMS - two Ford Courier pickup rims, 14x6", 6 lug, excellent condition, $25/pr. 744-5552.

77 GREMLIN - 6 cyl., 3 speed manual, 70,000 miles, many new parts. Ext. 3449 or 924-5802 after Oct. 29.

VW BATTERY CABLE - new, $7. Ext. 3028.

73 FORD VAN - $650; 83 Pulsar, fully equipped, must sell. Debbie, Ext. 3783 or 732-6678.

75 DATSUN B210 - runs well, body fair, 35 mpg, $500. Ext. 3606.

TIRES - (4) Goodyear, Viva radial, w/w, ER78-14, (1) Firestone Champion G78-14, excel. spares, $10 ea. Ext. 7505 or 689-8605.

66 DODGE - 4 dr., V8, automatic, $400. Bob, 751-6754.

CHROME WHEELS - (4) for GM X-body car, complete w/wire baskets, hardware, brand new, $60. Ext. 2098.

72 CAPRI - sunroof, silver, good running cond., good tires. Ernie, Ext. 3357.

72 CHEVY NOVA - 8 cylinder, automatic, good running condition, clean, mag wheels. Terry, Ext. 3725 or 325-1080.

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

68 VW FASTBACK - runs but needs work, $150. Eric, Ext. 4461 or 363-6753.

76 HONDA CIVIC CVCC - 2 dr., hatchback, 50K mi. on rebuilt engine, new parts, 4 spd. Debbie, Ext. 3420 or 736-4280 eves.

WHEEL - 19" for Ford Model 'A', $20; 18" wire wheels, $20/set, misc. old car parts, literature. Frank, Ext. 2022.

76 VW RABBIT - good condition, $1,600 Serban, Ext. 3721 or 473-4375.

76 PONTIAC GRAND PRIX - ST, p/w, p/seat buckets, 63,000 mi., good cond., $2,795. Ext. 3379 or 473-7192.

76 VEGA HATCHBACK - stick, air, am/fm, excel., no rust, good radials, (4) extra tires and rims, $1,100. Ext. 7676.

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

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

70 OLDS CUTLASS - good transportation, tires, engine and transmission, needs muffler, $150. Ext. 3763.

76 NOVA - 6 cyl., auto., 4 dr., 65,000 mi., excellent mech. cond. 928-8071.

75 FORD GRAN TORINO - station wagon, good condition, automatic, a/c, p/s, p/b, radio. Jim, Ext. 3290.

78 HONDA 550 MOTORCYCLE - 4 cyl., w/extras, $950; 75 Honda CB400 S/Sport, 4 cyl., $695. 467-8563.

80 TOYOTA CELICA GT - black, loaded. Ext. 3354 or 325-9580 after 6 p.m.

78 CHEVY MALIBU WAGON - green, runs excellent, pb/ps, a/c, low mileage, $3,300. 744-5224.

68 VW - pop-top camper, sleeps 3-4, all fixtures, good mileage, $1,000. Wanda, Ext. 3583 or 3682.

81 SUBARU GL - 4 dr., 5 sp., a/c, p/b, am/fm cassette, 33K mi., excel. cond., $5,500. Fred, 744-2655.

82 FIREBIRD S/E - loaded, 9,500 mi., $16,000 new, sell $10,000 negotiable. 929-6531.

77 FORD PINTO - am/fm cassette, automatic trans., new tires, good condition. Patti, 924-5533 Ext. 210.

81 COUGAR XR-7 - mint condition, new brakes, new tires, V8, 318, loaded, automatic overdrive, 25 mpg+, $6,500. Ext. 4486 or 878-0480.

TIRES - (2) R14 radial, seasonal, Collette Gillette, $5/ea. Ext. 4933

81 PLYMOUTH HORIZON - excel. cond., 4 dr., 4 cyl., 4 sp. Miser, a/c, fm radio, radial, orig. owner. 698-7428

68 TROTWOOD TRAVEL TRAILER - 21', Tadem axel, sleeps 6, 8 x 12 ft. add-a-room, $2,600. 363-6845.

73 PONTIAC GRAND SAFARI - station wagon, $1,000. J. Petro, Ext. 4040 or 286-8249 after 5 p.m.

71 MERCURY WAGON - 71,000 orig. mi., good rubber, $500. Ext. 3254 or 277-2112 eves.

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

Boats & Marine Supplies

VOLVO 270 OUTDRIVE - engine and mounting flanges for rebuilding, make offer. Ron, Ext. 7696 or 289-1003.

30' CHRIS CRAFT - twin Chrysler engine, wood, many extras, $3,500. Clarke, 281-4871 after 5 p.m.

16' GRUMMAN CANOE - reconditioned, $175. 929-8662.

MARINE V.H.F. RADIO - used twice, Horizon L.T.D. model, absolute new condition, $150. Carl, Ext. 3848 or 928-6944.

15' COBIS - fiberglass, 40 HP Evinrude, 1982 trailer, all accessories included, must sell, $1,250. Rick, Ext. 2907 or 924-6199.

Yard Sales

SOUTH HAVEN - antiques, collectibles and decorator items, 2731 Montauk Highway, 10/28, 10/29 only, 10 a.m. to 4 p.m. (weather permitting). 286-8338.

BELLPORT - browse & buy, 4 Bayview Street, 10/29, 10 a.m. to 4 p.m., (rain date 10/30).

Miscellaneous

GOLF BALLS - used, very good cond., $2.50 doz.; Belgium blocks, 62, $30; 45 burlaps, 4x4', $22; turf fungicide, TERSAN 1991, 2 lbs., $25. 589-6468.

JAPANESE WOODBLOCK PAINTINGS - of exotic birds, selling at sacrifice, $25 ea.; plant sale. 589-5126.

STUDIO COUCH/BED - 74"x34", 4" foam mattress & cushions, $30; stove hood, coppertone, fan/light, $30. Victor, Ext. 2395.

ICE SKATES - size 9, brand new, asking $10. Fran, 399-4822.

BEDROOM SET - 6 pc. colonial w/2 glass lamps, hope chest, $500; colonial buffet & hutch, $300. 399-5316 or 399-4122.

ELECTRIC TYPEWRITER - Royal, $50; solid brass andirons, $50. Diane, Ext. 4142.

VACUUM - Sears Kenmore upright model w/attachments, excel. cond., $45. Henry, Ext. 4547 or 924-6688.

WAYNE PUMP - $15; Scotch Pine Christmas tree, $10; twin l/r chairs, $25 ea.; red plaid recliner, $30. Ann, 286-2280.

COT - w/mattress & 2 bolsters. brown/red plaid, removable legs, good cond., $15. Ext. 4602.

DRAFTING SET - K&E Jupiter N9406B, 6" bow pen & pencil, 6" divider, 5" bow pencil, pen & divider, chrome plated brass, $35. Dick, 878-1580.

COLDSPOT HUMIDIFIER/DEHUMIDIFIER - 25" w x 25" h x 14" deep, walnut finish, good cond., $40. Ext. 4602.

ELECTRIC BIKE - 3-wheel, 1983, 20 miles on one charlie, hand controlled. Vinny, 473-0312.

19" B&W TV - Zenith w/table. 698-3856.

N-GAUGE TRAINS - 4' x8' layout, 3 tracks, mountains, locomotives & cars, $100. Ramona, 928-3088.

FOLDING ATTIC STAIRS - wood burning stove, efficient, like new. Ext. 4635 or 751-2860.

SEWING MACHNINE - in walnut cabinet, Westinghouse w/attachments, $40. 727-0552 after 6 p.m.

STORKLINE CRIB - playpen, kiddie corral, good cond., $50. 475-2873.

QUEENSIZE SOFA BED - armchair; sewing machine. Ext. 3537 or 924-5802 after Oct. 29.

WHEELBARROW - $10; soldering iron, $3; cassette tape recorder, $5; push mower, $5; wood gun case w/handle $5. Ext. 2733.

TV ANTENNA - Radio Shack, V-185, new, $40; portable dishwasher, $75; Kenmore washer, $25; self propelled lawn mower, $100. 744-9677.

SAW/SANDER - Craftsman, 12" band, $250; Craftsman 1/3 HP grinder, $50. 588-3894 eves.

KEROSUN HEATER - Radiant 10, like new, $85. 589-3608.

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

KINDLING WOOD - 100 lb. size bags, $5/ea.; aluminum storm and screen windows. 36" x 43", $5/ea.; (2) 35 gal. kerosene drums. 751-6418.

NIGHTALL STOVE - wood or coal, $450. 281-5605.

MEN'S LEATHER JACKET - rusty/brown from Chess King, good cond., size 42-44, must try on, slim cut, $25. Ext. 7745.

AMPLIFIER/EQUALIZER - Audiovox automobile, 50 watt, good condition, $20. Ext. 4153 or 732-5829.

SAFARI DOG CRATES - (3) large breed, folds flat, new cost $76, sell $10/ea. Ext. 2561 or 3254.

WOOD BURNING STOVE - "Old Mill", free standing or as insert, $275. Alan, 286-0372.

ENCYCLOPEDIA BRITANNICA - 24 volumes in maghogany bookcase, 14th edition; colonial sofa bed, excellent condition. 286-1192.

GOLF CLUB CART - $30; range hood, lamp & fan $30; studio couch 74" x 34", $30. Victor, Ext. 2395.

SNOW PLOW - 6-½ ft., old but good, $100. 363-6845.

COCKTAIL CABINET - serving bar, walnut, drop leaf, lighted, attractive furniture, excel. cond., $85. Ext 3254 or 2561.

SCHWINN BICYCLE - 10 speed, like new, $100. 744-9832.

PING PONG TABLE - ¾ in., with net & paddles, $40. Raul, Ext. 4331 or 282-3025.

CHILD'S CLARINETTE STEREO - $25; Magnus five cord organ, $25; pull chain fireplace screen, brass top, fits opening 32 x 38 in., $40. L. Kukacka, 473-1157 after 6 p.m.

DESK - chest of drawers, Bassett, modern, excellent condition. 286-8831.

AREA RUGS - (2) green and gold. excellent condition, $10/ea. 286-1192.

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

DINETTE SET - octogon table with smoked glass, chrome legs, with (4) upholstered chairs, $225. 467-8563.

KEROSENE HEATER - Sanyo, 13,000 btu, 2 yrs., used one season, $100; fan, $5; garden hose & lawn sprinkler; humidifier. Rolf, Ext. 5506 or 928-7328.

EXERCISE BIKE - like new, caliper tension, extra padded seat, cost $120, $65. 281-4541.

ANDERSON WINDOWS - still in carton, many sizes to chose from. Richie, Ext. 3815 or 924-5329.

REFRIGERATOR - 10 cu. ft., 5 yrs. old, $50; efficiency kitchen with built-in refrigerator. Serban, Ext 3721 or 473-4375.

CRAFTSMAN BANDSAW - w/motor, $75; Craftsman jigsaw, w/motor, $75. 929-8662.

SEARS CHAIN SAW - 12", good cond., $75. Joe, Ext. 4661.

BAKED GOODS - cookies, $4.25/lb.; breads; fruitcakes, $5.25/lb., for holidays or special occasions. Adrienne, 654-4206.

WOOD BURNING STOVE - $275; gold G.E. refrigerator, excellent condition, $125. Brenda, 751-6754.

STAIR RUNNER - carpet, blue-green, 2' 3" width x 24' length, w/installation hardware, good condition, $15. Ext. 4602.

COLECOVISION - w/Donkey Kong cartridge, brand new, $120; 9 x 12 red rug & pad. 265-7089.

CHAIN SAW - McCulloch, gas, good condition, $50; Singer sewing machine, $35. Ext. 7727 or 929-4631.

HOOVER SPIRIT PORTABLE VACUUM - all tools, used twice, $50. Bob, Ext 4547 or 473-3987.

Free

CAT - loving, 3 yrs. old, spayed, shots, owner leaving & must give up. Harvey, Ext. 5515 in p.m.

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

BROOKHAVEN HAMLET - custom 4 bdrm., split, walk to schools, 9 miles to Lab., on 1.25 acres of privacy, modern and efficient, 2 car garage, city water, asking $125,000. 286-0436 for appointment.

SHOREHAM VILLAGE - 4 bdrm., Clarendon cape, 2 baths, full basement, 2 car garage, ¾ acre partly wooded lot, beach rights, $115,000. 744-6812.

RIDGE - Leisure Villlage condo, 2 bdrm., 2 baths, large living room, enclosed porch, family room, garage, central air, 24 hr. security. 744-1022.

For Rent

BELLPORT - furnished apt., kitchen, l/r, utilities incl., one person only. 286-9051.

VERMONT - reasonable vacation, 3 bdrm., 2 bath house, f/p, fully equipped, x-country & downhill skiing, beautiful view, family oriented, woodland trails, avail. weekly or weekends. 732-6499 after 6 p.m.

ROCKY POINT - 2 bdrm. house. 473-4948 eves. & weekends.

MASTIC BEACH - custom built, 3 bdrm., ¾ acre overlooking Pattersquash Creek, 2 car garage, basement, screened porch, 2-½ baths, fireplace, 2 decks and dock facilities. 281-6564.

HAMPTON BAYS - cozy 1 bdrm. cottage, fireplace, w/w carpet, no pets, single or couple, $310/mo. + utilities and security. 728-2104, after 10/30.

LEISURE KNOLLS - 1 bdrm., living room, dr, eik, patio, garage, must meet residency requirements. $500 + utilities. Ext. 4589 or 475-8581.

CTR. MORICHES SO. - 3-½ lg. room apt., full kitchen, refrigerator, carpet, full bath, 1 bdrm., no children, private entrance, own zone heating, must see!, 1 mo. security, $500/mo. pay all. Ext 4486 or 878-0480 eves.

Car Pools

RONKONKOMA - driver to join 3 person pool, 8:30-5:00, near exit 59 LIE. Victor, Ext. 2395.

NORTHPORT - Kings Park, Ft. Salonga area, need 1-2 riders, 8:30-5:00. Walt, Ext. 7154.

Wanted

OWNER/REPAIR MANUAL - 1976 Pontiac Trans Am, V-8, 400 engine. Paula, Ext. 4622.

COMPANION - woman to live-in with a grandma, 5 mi. from Lab. 924-3104.

PROFESSIONAL - jazz/rock guitarist, pianist or band wanting experienced flute accompanyment. Carol, Ext. 2907 or 698-8510 eves.

INFANT CAR SEAT - Dyn-o-mite model by Kantwet Questor. Ext. 4421 or 744-0722

EXERCISE BICYCLE - Ext. 3565.

CAR TRAILER - 4 wheel; also large metal turning lathe. Dick, Ext. 3499 or 589-9103.

MUSTANG - Pinto, Bobcat, 1974 or newer, for parts, does not have to run. Tony, Ext. 2023.

INFORMATION - on removal of Health Physics purple Eurotour bicycle from street sign in apartment area. Elvira, Ext. 4224.

CRIB - baby items. Raul, Ext 4331 or 282-3025.

BENCH SAW - 8 to 10 inch size, ½ to ¾ HP motor. Ext. 2793.

MEMBERS - Peconic Indoor Plant Society. For more information, call Sandy, 878-8907.

Ads for Services may be posted at the BERA Sales office.

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