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BROOKHAVEN NATIONAL LABORATORY

No Support for Cold Fusion From BNL/Yale Experiment

Roger Stoutenburgh

Clockwise, Alison Davenport, Kelvin Lynn and Hugh Isaacs observe an electrolytic cell in which they are conducting a cold fusion experiment.

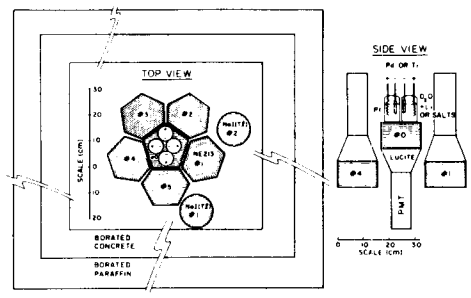
No evidence of room temperature fusion has been uncovered in a careful experiment by BNL scientists and their Yale University collaborators, it was announced last Friday.

If such a process — dubbed "cold fusion" — exists, neutrons would be emitted in what is expected to be one of the primary reactions. But, in a precise experiment, using extremely sensitive detectors, the BNL and Yale researchers saw no neutrons above the natural background level.

The BNL/Yale experiment was initiated to test claims of cold fusion made on March 23 by B. Stanley Pons from the University of Utah and his colleague Martin Fleischmann of the University of Southampton in England. Soon after, Steven Jones of Brigham Young University in Utah announced that he, too, had generated cold fusion, but on a much smaller scale than Fleischmann and Pons. Since then, hundreds of research teams around the world have been working feverishly to try to duplicate these experiments.

Over 20 experimental teams, including the BNL/Yale group, presented their results on cold fusion experiments at an American Physical Society meeting in Baltimore last Monday and Tuesday evenings. Peter Bond, Physics Department Chairman, who was at the meeting, said that all of the teams reported measurements of either neutrons or heat that were below the level reported by Pons and Fleischmann.

Particularly convincing, according to Bond, was the report from the California Institute of Technology. Said Bond, "Caltech analyzed Pons and Fleischmann's experiment and concluded that some of their techniques and their analytical methods were wrong. Their solution was not stirred,



Detector configuration for the BNL/Yale experiment on cold fusion.

and they placed their thermometer incorrectly. Further, their conclusion that the experiment generated four times as much heat as was put into it was based on a calculation using a hypothetical cell. When Caltech repeated the calorimetry experiment, they found no excess heat."

If Cold Fusion Exists

Why have so many researchers joined in the search for cold fusion? That's because, if cold fusion exists, the same energy-releasing process found in the sun may be replicated at room temperature by a simple, tabletop method, using easily available deuterium (heavy hydrogen) as the fuel.

Just three years after the Chernobyl disaster and close on the heels of the worst oil spill in history, the idea of an inexpensive, clean and unparalleled source of energy is most appealing.

But is it achievable? The BNL/Yale team, like others, now has its doubts.

Says BNL physicist Kelvin Lynn, "We did our experiment with great care and with extreme sensitivity, and the data do not confirm the Utah claims. We see a million times lower neutron flux than that estimated by Fleischmann and Pons." He adds that it is now up to Pons and Fleischmann to come forward with more details of their work, if they expect other researchers to be able to verify their claim.

Lynn, who holds a joint appointment in the Physics Department and the Department of Applied Science (DAS), worked on the experiment with Hugh Isaacs and Alison Davenport, both of DAS. Isaacs and Davenport are materials scientists who specialize in electrochemistry.

From April 7, when the experiment officially began, the three traveled back and forth to Yale University to monitor the experiment, which also involved Yale physicist Moshe Gai and his graduate students, Steve Rugari, Ralph France, Brian Lund and Zhiping Zhao.

1,000 Times More Sensitive

The experiment was conducted at the Arthur W. Wright Nuclear Structure Laboratory headed by D. Allan Bromley. It was set up at Yale because the detectors there are well over a thousand times more sensitive than the detectors used by either Utah team.

Cold fusion experiments are conceptually simple. In an electrolytic cell, two pieces of metal — one the cathode and the other the anode — are immersed in a solution containing heavy water — water made with deuterium rather than hydrogen. The metals are hooked up to a power supply, and the electric current causes the water to break up into deuterium and oxygen.

If cold fusion is occuring, then it may be that the deuterium atoms are diffusing into the cathode and are somehow fusing with other deuterium atoms, releasing various particles, such as neutrons, along with an enormous amount of heat.

(Continued on page 2)

The Search Continues

In spite of the generally negative results that have been reported in attempts to repeat the Utah results, cold fusion research at Brookhaven continues.

"What we've done is comparable to the Fleischmann-Pons work," says physicist Kelvin Lynn, a member of the BNL/Yale collaboration (see story this page), but one could argue that there is a different decay mechanism that produces x-rays, beta particles or lattice heating. A good scientist looks at every possibility."

At the Midnight Hour

For example, Harold Wiesmann, DAS, who has a number of different electrolytic cells bubbling away, was working past midnight two weeks ago when he saw a jump in neutron counts from one cell. It never happened again.

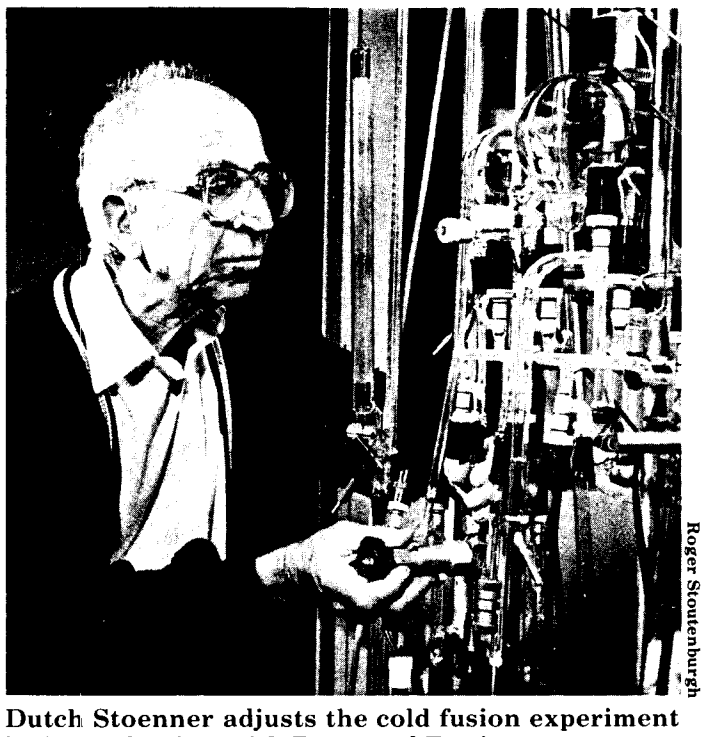
Two other DAS scientists, James Reilly and John Johnson, have not seen any neutrons that could be attributed to cold fusion. They have taken a somewhat different experimental approach by not using an electrolytic technique, but rather contacting the metals palladium, iron titanium and vanadium directly with deuterium gas to form the metal deuterides, and then subjecting the samples to various temperatures and pressures to facilitate movement of deuterium in and out of the solids.

For an experiment yet to start, Reilly has given what may prove to be an unusual sample of deuterium gas to Raymond Davis Jr. and Dutch Stoenner, both in Chemistry. The gas came from a cylinder containing iron-titanium deuteride, which has been undisturbed for seven years. (This metal deuteride is a convenient means of storing deuterium.) If there is an excess of tritium in the sample, as compared to gas from a regular deuterium cylinder, that will be an indication of cold fusion reactions.

Also in the Chemistry Department, various other experiments have been devised and are now in progress, including one by Walter Kunnmann and John Larese.

LEGS Is in the Running

Reilly has also lent a hand to a collaborative effort by a DAS group headed by Stephen Feldberg and a Physics group headed by Andrew Sandorfi. The experiment is set up at the Laser Electron Gamma Source (LEGS) beam line



Roger Stoutenburgh

Dutch Stoenner adjusts the cold fusion experiment he is conducting with Raymond Davis.

at the National Synchrotron Light Source, using a sodium iodide crystal as a detector for gamma rays.

Says Feldberg, "The detector can scan a wide energy range of gammas, and although we are interested in any gammas we might find, we are particularly looking for the high energy gammas associated with the production of helium-4, one mechanism by which cold fusion could occur."

Feldberg also intends to work with Isaacs in putting together a calorimetry experiment, in which they will measure watts of power, as Pons and Fleischmann claim to have done.

Lynn hopes to repeat a quick experiment he did at the Alternating Gradient Synchrotron, with Marc Weber, Physics, and W. Jack Kossler, of the College of William and Mary. They were looking for a reaction of protons and

(Continued on page 2)

Meeting the Computer Hands-On

Roger Stoutenburgh

Michelle Cummings guides a student in the use of a light pen to produce color in the painting program she is teaching this group of young computer students.

Though computers may be taken for granted around the Lab, there are many people — adults and children alike — who have never touched a computer's keyboard.

But BNL is doing something about that — offering computer courses for children who can't wait to get their hands on a computer, and for adults who would like to become computer literate or overcome their fear of the new technology.

The students hone their skills at Riverhead's First Baptist Church, which houses 12 Commodore 64 computers purchased through BNL's Office of Educational Programs and two that came from the Riverhead community. Frances Ligon of the Affirmative Action Office coordinates the program, along with four BNL volunteers who teach the participants how to use the equipment: Michelle Cummings, Management Information Systems Division; Bill Higinbotham, Computing & Communications Division (CCD); Alvis Nash, Contracts & Procurement Division; and Edwin Taylor, CCD.

Students also come on a voluntary basis. In the session that concluded on April 25, fifteen Riverhead kids ages 7 to 15 learned the basics of the BASIC programming language every Tuesday evening for six weeks.

The 25 adults who met on Wednesday evenings came from Greenport, Riverhead, Shoreham, Southold and Wading River. From the BNL'ers, they learned how to handle computer equipment, from assembly to operation, and were introduced to different types of programs, such as spreadsheets, word processors and data bases. After completing the four-week session, they were encouraged to take further computer courses at other locations.

BNL Firefighters Discover One, Help Extinguish Two Brush Fires

The call came into BNL's Firehouse, Bldg. 599, at 1:30 p.m. on Wednesday, April 26, on the Suffolk County fire frequency: A fire had been spotted at the intersection of Pine Bark and Deer Leep, at the north end of Lab property.

So, of course, BNL's Fire & Rescue Group, of the Safety & Environmental Protection Division, responded. Just two days before, members of the group had been called out to provide mutual aid for a fire near the site in Manorville.

This time, Engine 3 was sent into action: It is a four-wheel-drive, off-road truck, and was commanded by Sergeant Antonino Realmuto, driven by Firefighter Joseph Gallitelli, and manned by Firefighter Gary Schaum.

As the fire-stricken part of the site is inaccessible by Lab roads, Engine 3 had to be driven off site on the Long Island Lighting Company's right-of-way at the northwest corner of the Lab. Upon reaching the intersection of Route 25, however, the three BNL firemen discovered another brush fire in Ridge — and proceeded to fight that one, while putting in the call for another BNL truck to tend to the original fire.

"We did an excellent initial attack and almost put a stop to the fire we found — but there was 50 feet of it we couldn't reach with our lines," reports Realmuto. "If we had a brush truck, we could have gotten it all."

The second call was answered by Engine 2, a class A pumper, staffed by Sergeant Charles LaSalla, and Firefighters James Yerry and Daniel Harrow. After working with the Ridge Fire Department to put out the Pine & Deer fire, the three joined their BNL colleagues and those from about a dozen other companies fighting the fire off Route 25.

BNL's Plant Engineering (PE) Division also got the call to assist in fighting this fire — so they brought out the heavy equipment. A bulldozer, run by John Popielaski, and two payloaders, operated by the rotating crew of Kerry Botts, Michael Curtis and Edward Durham, were instrumental in clearing roads for the fire trucks, as they followed the southeast moving fire into Peconic River County Park, and in plowing the fire under.

"With directions from our own Captain Michael Carroll, the heavy equipment took care of the bulk of the fire," says Realmuto.

Carroll and BNL Fire Chief Frederick Strier worked on the firefighting strategy from the fire's command post. And PE's Heavy Equipment Supervisor John Niemczyk, General Supervisor Roy Barone and Site Supervisor Roy McWilliams oversaw the heavy equipment operation from the road.

With the fire mostly out, BNL's firefighting manpower and equipment were released from service at 6:40 p.m.

Peter Horton

BNL Firefighter James Yerry (second from right) refills the 500-gallon, high-pressure water tank of BNL's Engine 3 from a Mastic Fire Department water tanker. When used to douse a blaze, each Engine 3 tankful lasts half an hour.

Cold Fusion (cont'd)

As described by Davenport, the BNL/Yale configuration consisted of four different cells running concurrently. They used electrodes made of either palladium or titanium. And they tried solutions made of either lithium deuteroxide, used by Fleischmann and Pons, or the "soup" of chemicals used by Jones.

The four cells sat on one central detector, below which five more detectors were arranged in a pentagon. Two gamma ray detectors sat close by, and two cosmic ray detectors were placed above the cells.

The entire configuration was shielded from background neutrons by slabs of borated concrete around the sides, an additional layer of borated paraffin around the sides, and paraffin over the top as well.

"We ran the experiment with the cells on, then off. We took the cells away from the detectors, then brought them back. We devised numerous ways to test the reaction," says Davenport.

BNL scientists tell the story of a particular analysis in which the data showed only two neutrons. The researchers promptly named them Pons and Jones, for the two announcements that precipitated all the furor over cold fusion.

It took three weeks for the BNL/Yale team to be sure enough of their data to put it into an abstract. Their estimated cold fusion rate is less than 10^{-25} fusions per deuteron pair per second.

Even though this lower limit may be further reduced with more analysis of the data, the bottom line is that the BNL/Yale experiment sees no neutrons above background.

Still, Lynn is excited about the cold fusion work. "It's brought together nuclear physicists, solid state physicists and electrochemists, all working on potentially the most interesting physics we've seen in a long time," he says. "We may not end up with cold fusion in the kitchen, but there may be other results down the road."

— Mona S. Rowe

The Search (cont'd)

deuterium atoms, which would have resulted in helium-3 and gamma rays, and they were also looking for a muon spin-rotation spectrum. And Weber is spearheading an effort with Lynn, Wiesmann and Isaacs, to measure x-rays induced by charged particles as well as the charged particles themselves.

In addition, many of the Lab's theoretical physicists have taken a hard look at the phenomenon of cold fusion.

In all, everyone has put in long hours, working late into the night and on weekends, because they must also keep up their regular research.

"The payoff is so great that we just have to look for it," says Feldberg.

Adds Reilly, "If it's true, it would be revolutionary. But that's a *big* if!"

— Mona S. Rowe

Science Teachers in Attendance

Roger Stoutenburgh

It was very appropriate that BNL's Office of Educational Programs (OEP) invited the Suffolk County Science Teachers Association to hold its annual meeting at the Lab last Friday, during National Science & Technology Week. Some of the 175 science teachers in attendance during the day-long session are pictured in Berkner Hall, before an exhibit highlighting Brookhaven's student programs, which are offered through OEP and BNL's Tour Program in the Public Affairs Office. BNL's Senior Physicist Keith Jones (right), Department of Applied Sciences, is seen chatting with the group after presenting them with a workshop on atomic physics.

team safety

The Team Safety Program is alive and well and living in Berkner Hall. Since the last report, there have been nine 3-time winners and one double winner. The spring season is a solid one.

There was one upset on the field: a back injury sent the Refrigeration and Air Conditioning Team to the showers. Back injuries have been very difficult problems for the teams to deal with. Players with recognized back problems should use special care in protecting themselves from repeat injuries.

Four-time winners are only a few weeks away. There is no truth to the rumor on the field that the Team Safety jackets were made by Pierre Cardin. It is also not true that the jackets are green. A special thanks from the commissioner to Frank, for the emblem design.

Keep up the safe work.

Focus on Software

SPRINT & Paradox

This morning, Borland International will demonstrate two software packages: SPRINT, their word-processing program, and Paradox 3.0, their upgraded data-base management system. The demonstrations will take place in the Personnel Training Room, Bldg. 459, from 10 a.m. to noon.

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66 . . . 77 . . . 8x?

The Fortran Standards Committee, known as X3J3, which is now putting the finishing touches to the 8x standard, will meet in Port Jefferson during the week of May 8. Jerrold L. Wagener, the vice-chairman of the committee, will hold a Fortran Forum at BNL on Wednesday, May 10, at 2:30 p.m., in Room B, Berkner Hall.

Wagener will present the major additions to the language, concentrating primarily on its "module" and data structure features. He will summarize the major needs of contemporary scientific computation and outline the ways in which Fortran 8x addresses these needs.

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Artificial Intelligence

The Inference Corporation of Norwalk, Connecticut, will present a lecture and demonstration of ART, an expert system, to the BNL Artificial Intelligence Interest Group on Thursday, May 11, 9:30 a.m. until noon, in the upstairs conference room, Bldg. 515. Refreshments will be served. Everyone is welcome. For more information, call Ralph Fullwood, Ext. 2180.

Basketball

Championship Game

Longshots 77		Knicks 60	
R. Bersak	24	W. Cummings	29
T. Mayo	21	F. Thompson	11
S. Alonzo	14	G. Thompson	8
G. Mack	9	L. Walcott	5
J. Wells	3	T. Mendez	4
B. Rowley	2	B. Turner	3
S. Springston	2		
M. Malone	2		

Three-point shots: Cummings (3), G. Thompson

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ANITA COHEN, Editor
MARSHA BELFORD, Assistant Editor
LIZ SEUBERT, Reporter

35 Brookhaven Ave., Upton, N.Y. 11973
(516)282-2345

World Premiere Tonight — Palmore in Major Role

When Rosa Palmore sang her solo in the Gospel Extravaganza last February, she was looking forward to sharing a wonderful experience with the Berkner Hall audience. What she did not expect was that she would be "discovered."

By day, Palmore is a senior secretary in the Personnel Division. But in her spare time, she sings alto with the Joseph Brown Choraleers of the First Baptist Church of Riverhead, as well as directing their Youth Ensemble. Annually, she joins the East End Choir, with which she appeared in the Gospel Extravaganza sponsored by the BERA Afro-American Culture Club.

Since she loves to sing, when a mysterious stranger came up to her after her Gospel performance and asked her to try out for a musical having its world premiere in May, she took him up on his suggestion.

The stranger was Ricardo Pitts-Wiley, a 1989 East End Black Artist in Residence. A professional actor, composer and playwright from Rhode Island, he had come to Long Island to help unify the East End's cultural development. His response was to collaborate on a play with musician Robert Schleeter of Boston. Called *The Spirit Warrior's Dream*, the musical was designed to be performed by East End Long Islanders.

Palmore's audition won her a leading role — Makeda, the Spirit Warrior, who defends the spirits and dreams of mankind against the devastation planned by Train, the play's Dream Killer.

"It's great theater, and the music is fantastic," says Palmore. "All the songs are original and really say something. Some are in country and western style, some contemporary music. It's an exciting mixture — and it works."

Palmore, who has lived in Riverhead since childhood, joined the Laboratory's secretarial pool six years ago. After six months of pool work, much of it in the Affirmative Action Office, she became an office services assistant in the energy library in the Department of Applied Science (DAS). Later, she also worked part-time as a secretary for DAS's International Energy Agency Group — where she helped organize conferences and six-week energy management courses for officials from governments of developing countries.

"Running conferences and courses made me realize how much I like working with people — making sure that everyday things go smoothly, and finding ways to solve special problems," says Palmore. So when a position opened in the Employment Group in the Personnel Division, she applied for it, and transferred there in November 1987.

Roger Stoutenburgh

Rosa Palmore, framed by "the River," the inspiration for one of the songs she will sing as the Spirit Warrior.

Busy with her job, and her family of husband Anthony and two sons, Brent and Anthony Jr., Palmore finds it hard to make time for her singing —and now, acting. "But somehow you can fit things in if you feel they are worthwhile," she said. "I'm sure people will enjoy seeing this play. All of us are certainly enjoying making it happen."

— Liz Seubert

To Catch the Show

The world première performance of *The Spirit Warrior's Dream* will be given tonight, at 8 p.m., at the Fine Arts Theatre on the Southampton Campus of Long Island University.

To help defray costs and keep prices of remaining shows affordable, tonight's tickets are $100 each. On all other nights, tickets are $8 in advance and $10 at the door; children under 12 pay $6.

Shows will follow on Saturday, May 6, at 8 p.m. and Sunday, May 7, at 3 p.m. Next week, the play will move to Riverhead High School, with shows on Friday, May 12, and Saturday, May 13, at 8 p.m.; and Sunday, May 14, at 3 p.m.

Advance tickets are available through the East End Arts Council, 727-0900; Southampton College, 283-4000, Ext. 427; the First Baptist Church of Riverhead, 727-3446; and Suffolk County Community College, Eastern Campus, 369-2600.

Service Awards

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

Thirty Years

Dennis D. Greenberg ..... Medical
Martin S. Zucker ..... Nuc. Energy

Twenty-five Years

John J. Brennan ..... Plant Eng.
Leonard D. Hamilton .... App. Science
Hank C. Hsieh ..... NSLS
Raymond H. Mayo ..... Plant Eng.
Robert H. Tallon ..... AGS
Jack Van't Hof ..... Biology

Twenty Years

Georgia L. Irving ..... Director's Off.
Cornelius Jackson ... Photo. & G. Arts
Jeanne R. Wysocki ..... Biology

Ten Years

Selestine E. Brown ..... Staff Serv.
Philip M. Cerniglia ..... Nuc. Energy
Natalie I. Feng ..... Biology
Donna M. Grabowski ..... Instrum.
Arthur F. Greene ..... Accel. Dev.
Anna E. Grego ..... Plant Eng.
Francis X. Karl ..... AGS
Harry Kimmerling ..... Cent. Shops
Anthony Lenhard ..... NSLS
Robert M. Medina ..... Plant Eng.
Florence C. O'Brien ..... App. Science
Charles E. Pearson ..... AGS
William V. Rabatin ..... S&EP
Louis R. Russo ..... Accel. Dev.
Om V. Singh ..... NSLS
Michael M. Stachnik Jr. ... Plant Eng.
John Tighe ..... Fiscal
Arlean Vanslyke ..... App. Science
Sharon Zuhoski ..... App. Science

Arrivals & Departures

Arrivals

Paul M. Coleman ..... Plant Eng.
James A. Widgren ..... Physics

Departures

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

Andris Garsils ..... DNE
Sophie P. Kostuk ..... Chemistry
Vincent J. Kovarik ..... Accel. Dev.
Sergio Moehlecke ..... DAS
Frederick W. Paffrath ..... Physics
Paul T. Singer ..... Biology
Karl H. Walther ..... Chemistry

Cafeteria Menu

Week of May 8

Monday, May 8

Soup: Tomato lentil	(cup)	.75
	(bowl)	.95
Eggplant rolantini w/garlic bread		3.10
Meat loaf Wellington w/pot. or veg.		3.10
Lite-line: Chef's salad		2.85
Hot deli: Meatball hero		2.85

Tuesday, May 9

Soup: Cream of broccoli	(cup)	.75
	(bowl)	.95
Seafood Newburg		3.10
Beef w/broccoli		3.10
Lite-line: Stuffed baked potatoes		2.85
Hot deli: Monte Cristo		2.85

Wednesday, May 10

Soup: Black bean	(cup)	.75
	(bowl)	.95
Beef Burgundy w/egg noodles		3.10
Fettuccine carbonara		3.10
Lite-line: Orange & pineapple chicken		3.10
Hot deli: Open-faced turkey sandwich		2.85

Thursday, May 11

Soup: Wonton	(cup)	.75
	(bowl)	.95
Sausage & peppers		3.10
Turkey supreme		3.10
Lite-line: Tri-pasta salad w/shrimp		2.85
Hot deli: Western hero		2.85

Friday, May 12

Soup: Seaside chowder	(cup)	.75
	(bowl)	.95
BBQ spareribs w/pot. or veg.		4.25
Stuffed baby sole roll-ups w/pot. or veg.		3.10
Lite-line: Tuna & broccoli casserole		2.95
Hot deli: Welsh rarebit		2.85

Tune in to Tune In!

How can you question a Lab practice, get a written reply and remain anonymous in the process? Use an orange Tune In! form. If you can't find a form, call BNL's mailroom, Ext. 2534, or Public Affairs, Ext. 2345.

Film badges will be changed tomorrow. Please place your badge in its assigned rack space before leaving work today.

Leap Into Spring Tomorrow Night

Let BNL's Alan Bieber and the four other members of the Conover traditional music band whisk you off your feet and onto the dance floor during the "Leap Into Spring!" benefit dance tomorrow at 8 p.m.

You need no prior contradancing experience, and you don't have to bring a partner. For $5 admission, Margaret Conover and David Conover will walk you through the steps in order before each dance and repeat the dance directions as you go. And you'll meet new partners during each dance, as the lines of men and women move in opposite directions.

Tickets can be purchased today in Berkner Hall, from 11:30 a.m. to 1 p.m., or tomorrow night at the door. Dance proceeds will benefit the Renate W. Chasman Scholarship Fund, sponsored by Brookhaven Women in Science.

The Conover band: (back, from left) Erik Marten, fiddle; Alan Bieber, recorder and tin whistle; David Conover, caller; (front, from left) Margaret Conover, caller; and Judy Ogden, wind instruments.

Bowling

White League

Al Pinelli had a 233, Ed Sperry 218, Ed Sperry IV 213, Ken Riker 211, Ted Erickson 209, Marilyn Picinich 194, Gerry Riker 188/188, Mary Addessi 181, Lynne Warkentien 180. Hook or Crook are the second-half winners.

Purple League

John McCarthy had a 216, Marsha Kipperman 206, Cheryl Miezianka 200, Caryl MacDougall 194, Gail Schuman 192/188, John Niemczyk converted the 3/7 split and Lynette Finlay the 5/7. The Looney Tunes are the second-half winners.

Pink League

Kathy Folkers had a 194, Sandy Asselta 187, Maryann Reynolds 176/173.

Red/Green League

Ed Meier had a 220, Harry Dawson 216/203/608 scratch, Ken Asselta 215, Joe Ferrante 212, Ken Riker 211, James Morris 207, Andy Warkentien 206, Jim Roesler 203/201, Ron Mulderig 203.

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 and/or appropriate bargaining unit, 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 Employment Manager, Ext. 2882.

LABORATORY RECRUITMENT - Opportunities for laboratory employees only.

4030. LAMP CLEANER - (temporary - 5-15/89-10/1/89). Plant Engineering Division.

4031. CLERICAL POSITION - (term appointment) Requires a good knowledge of office practices including IPAP/J-CARS data-entry systems. Previous experience involving A/P and billing desired. Familiarity with word processing helpful. Additional duties to include distributing mail, typing and answering telephones. (Reposting of Job No. 4027). Accelerator Development Department.

4032. RESIDENCE CUSTODIANS - (temporary - 5/8/89-10/6/89). Staff Services Division.

4033. SECRETARIAL POSITION - Requires AAS in secretarial science or equivalent experience and a good knowledge of Laboratory policies and procedures. Will perform diverse secretarial duties for Neutral Beam Division. IBM/PC experience required. TeX experience desired. Ability to obtain and maintain DOE Q clearance required. Department of Nuclear Energy.

OPEN RECRUITMENT - Opportunities for laboratory employees and outside applicants.

4034. CARPENTER - (temporary position) Under minimum supervision, lays out, constructs, modifies and maintains buildings and component parts from construction drawings, rough sketches or verbal instruction. Works with wood, wood substitutes, combination materials and flooring, roofing and wall materials. Plant Engineering Division.

4035. TECHNICAL POSITION - Requires AAS in electronics or equivalent, plus experience in the following areas: digital equipment, helium leak testing, vacuum and cryogenics, high-pressure gases and a working knowledge of mechanical assembly. Must be able to qualify and maintain facility operating qualification through written exams and to obtain and maintain a security clearance. Reactor Division.

4036. ENGINEERING POSITION - Requires BS in chemical engineering, MS preferred, two to four years' minimum experience in process engineering or process-oriented research, and background in waste stream purification and/or sludge solidification. Will conduct technical and economic studies on new and innovative processes, with emphasis on the design and fabrication of bench-scale to pilot-plant programs related to the encapsulation of low-level radioactive and hazardous wastes. Department of Nuclear Energy.

4037. HEALTH PROMOTION SPECIALIST - (part-time) Requires BS degree in health education/physiology or closely related field, excellent communication skills and experience in the design and implementation of work-site wellness programs. Will maintain a disease prevention/health maintenance program for employees. Experience in health counseling and health-risk assessment necessary. Occupational Medicine Clinic.

Motor Vehicles & Supplies

88 DIRT BIKE KX125 - many extras, fast, excel. cond., asking. $1,600. Ext. 4672/4904 days or 929-4753 eves.

87 SUZUKI SAMURAI - 4wd, silver, low mi., perfect cond., 5 yr./50k mi. warranty, asking $7,400. Dick, Ext. 4313 or 722-4094 after 6 p.m.

87 MAZDA PICKUP B-2000SE - 5-spd., bed liner, cap, am/fm, sliding window, black, excel. cond., $6,000. Gary, 821-3244.

86 FORD MUSTANG GT - am/fm cass., p/s, p/b, 44k mi., excel. cond., $8,500. John B., Ext. 4028.

86 HONDA CIVIC SI - h/b, 5-spd., excel. cond., $4,800. Chris, Ext. 2022 or 395-6112.

Boats & Marine Supplies

25' LANCER SLOOP - 1977, shoal keel, new Genoa, new Evinrude, 9.9 electric start, must sell, $4,900. 289-8693.

24' SEA RAY - 1976 fiberglass Merc. I/O outdrive, rebuilt, stand-up head, sink, stove, VHF, depth-finder, compass, $12,000. 744-9003 after 6 p.m.

23' COLUMBIA SAILBOAT - 1976, 1986 Yamaha 6 h.p., very clean, must see. 924-2016 after 6 p.m.

22' CATALINA SAILBOAT - 3 sails, trailer & motor, good cond., asking $4,800. 929-8912.

21' FORMULA - 185 h.p. Mercruiser I/O, cuddy, large cockpit, outdrive needs work, hull good, $850. Bob, Ext. 7790.

20' GRADY WHITE - 1976, walk-around cuddy, 165 FWC, I/O w/sytex rec., tandem trailer w/power winch, A-1 cond., $8,750. 941-4586.

20' AQUASPORT OSPREY - 1977, center console, 1978 Merc. 150 h.p., 1985 Cox trailer w/power winch, $5,500 neg. Gary, 821-3244.

19' BAYLINER - 1984, Bowrider & trailer, 125 h.p. Volvo I/O, many options, rarely used, must be seen, $6,500. Don, Ext. 2981.

18½' FIBERFORM SPEEDBOAT - rebuilt 120 h.p. OMC I/O, new in 1987 & 88, full canvas, battery, Shoreline trailer, D/F, more, $5,450. 567-1358.

17' LYMON - 1960, runabout, orig. 1959 Evinrude 50 h.p., good cond., $2,000. Roger, Ext. 7518 or 878-8847.

17' ARISTOCRAFT - 1965, fiberglass, rebuilt 60 h.p. Merc. I/O, very economical, excel. cond., w/trailer, ready to go, $1,600. Mark, Ext. 2599.

16' JOHN DORY - 25 h.p. Johnson, trailer, excel. cond., asking, $1,250. Mike, Ext. 4605 or 395-5991.

BOAT TRAILER - for 16' boat, galvanized, $75. 473-7739.

SUNFISH - w/trailer, $400; Grumman 15' canoe, w/flotation bags & life preservers, $250; new ⅜" chain, $1.50/ft. Ext. 7898.

14' ALUMINUM BOAT - 7½ h.p. Merc. motor & trailer, fully equipped, like new, $1,800. 289-5134 eves.

8' NORDIC DINGHY - w/oars, simulated lapstrake, excel. cond., $275. 473-4306.

SEA EAGLE SE9H - 5-pass. inflatable, oars, floorboards, motor mount, carrying bag, pump, like new, cost $489, asking $200. Don, Ext. 4747.

SAILING CANOE RIG - includes sail, mast, boom, gaff, rudder, lee boards, hardware, etc., Old Town, $400. Bob, Ext. 4044.

BOAT SLIP - 26'-30', Patchogue River, good location. 286-9685, leave message.

Tools, House & Garden

WATER PUMP - multistage jet, new motor, w/pressure tank, used three years, very good cond. 821-3925.

LAWN TRACTOR - Wheel Horse, w/Parker sweeper, excel. cond., $700. 298-4398 after 6 p.m.

GENERATOR - Winco, works, needs muffler, asking $125. Jim, Ext. 4986 or 475-5469.

ROTOTILLER - 5 h.p. Airens, front tines, $150. Rich, Ext. 3239 or 472-9034.

LAWN MOWERS - Calder, 22" cut, self drive, 1 year old, $100; Craftman, 21" cut, w/bag, $60. Dan, 698-7322 or Ext. 4987 eves.

SULKY - for 2-wheel Gravely tractor, reasonable. 363-7032.

LAWN MOWER - Craftsman II, 3.5 h.p., 20" cut, cast iron, cylinder liner, 2 years old, $150. Wick, 758-6773 eves.

GARAGE DOOR - 16', 7 years old, complete w/tracks & lock, good cond., $100. Carl, 929-5781.

TABLE SAW - 10" table, extensions & blades, $250. 727-7515.

LANDSCAPING TRAILER - 5'x9', 1 year old, like new, $700. 821-1042.

FENCE - #1 milled cedar stockade, brand-new, ten 5'hx8'w sections, $29/section. George, Ext. 5288 or 878-8177.

SHOWER ENCLOSURE - 36"x36" w/stone base & glass door, new, $250. Ext. 2462.

MEDICINE CABINETS - 2, wall opening, 14x18x3½, glass doors, almost new, excel. cond., $15/each. Don, Ext. 2981.

Sports, Hobbies & Pets

BICYCLE - Ross, 24" girl's, 3-spd., excel. cond., orig. $125, asking $60. Ext. 4449 or 751-8403 after 6 p.m.

BICYCLES - Schwinn World Sport, 10-spd., needs rim, $100; Ross, 10-spd., $75 neg.; rowing machine, $50 neg. Jim, Ext. 4986 or 475-5469.

BICYCLE - girl's, 20", w/training wheels, $25. 473-3604.

BICYCLE - girl's, 16", w/training wheels, $7. Walter, Ext. 3397.

BICYCLE - 3-spd., w/lock, asking $10. Wei, Ext. 4213.

BICYCLE - Royce Union, 5-spd., man's, $50. John, 744-8512.

DOG HOUSE - solid-frame construction, shingled roof, T111 siding, built to pet's needs. Henry, Ext. 4547 or 727-7227.

TENNIS RACQUETS - 2, Prince Graphite, new, midsize, $125/each; fiberglass surfboard, 6'8", $125. 589-0625.

DOG HOUSE - for medium to large dog, $10. Mike, Ext. 2052.

BICYCLE - Lotus Elan, 12-spd., never used, perfect cond., $100. 765-1075.

BASS GUITAR - Honda, used once, in original box, $70. Mark, Ext. 2599.

Miscellaneous

TICKET - one way, American, MacArthur, Cedar Rapids, Iowa via Chicago, 5/23/89, 12:25 p.m. arriving Chicago 1:52 p.m., $100 neg. 924-3236.

AUSTRALIAN OPALS - beautiful, reasonable. 363-7032.

TICKETS - 2, BAM, *Atys* by Paris Opera, May 19, $25/each. Bob, Ext. 4044.

NATIONAL GEOGRAPHIC - 330 issues, 1951-present, make offer. Ext. 4090.

HOT DOG TRUCK - mint cond., specs & photo avail. Anette, 325-8658.

CAR COAT - man's, suede, size 40, $45; woman's suede coat w/fur collar, size 18, $45. 924-2726.

Lost & Found

LOST - Bill Blass watch, gold trim w/black wrist band, left in men's locker room, sentimental value. Charles, Ext. 5211.

Free

KITTENS - three, 6 weeks old, two mixed colors, one gray. Dave, Ext. 3093 or 4173.

DOG - Labrador, black, male, 7 months old, loves children, good watch dog, has all shots. 286-0563 after 6 p.m.

DOG - Shepherd mix, playful, 2 years old, male, needs good home w/room to run. Frank, Ext. 2022.

DOG - 1 year old, good personality, good w/kids, needs home. 281-3093.

FIREWOOD - about 1 cord, you haul. Mike, Ext. 2052.

Yard Sales

MANOR PARK - multifamily, full-size bed, bookcase, starter piano, pool filter, much more, 118 Keller, May 6-7. Roger, Ext. 3578 or 395-1969.

Car Pools

E. NORTHPORT/COMMACK - driver needed for on-time car pool, 8:30 a.m.-5:00 p.m. Tony, Ext. 2050.

SOUTHOLD/GREENPORT - driver needed, on-time, free one-week trial. Ed, Ext 3293.

Real Estate

Real Estate advertised for sale or rent is available without regard for the race, color, creed, sex or national origin of the applicant.

For Rent

BROOKHAVEN - furn. 3-bdrm. house, eik, l/r, d/r, den, 2½ baths, screened porch, one-acre lot, avail. mid.-Aug. for 1 year, $1,000/mo. + 1 mo. sec., refs. 286-0263 eves.

NORTH SHIRLEY - 2-rm. apt., furn., eik, w/w/, bdrm. w/skylight, 5 min. to Lab, 1 person only, non-smoker, no pets, util. incl., sec., $475/mo. 281-8044.

PATCHOGUE - new studio apt., w/w, cable, new appliances, single working person, non-smoker, no pets, walk to village, $525 pays all. 475-9099.

SOUTH JAMESPORT - 3 bdrm., l/r, d/r, kit., porch, walk to beach, 25 min. to Lab, no pets, $550/mo. + util. Walt, Ext. 2241 or 698-0576 or 722-4636.

WESTHAMPTON BEACH/SPEONK - 2 bdrm., 1½ baths, 5 appliances, approx. 1,000 sq. ft., 8 mos. old, immed. occup, 1 mo. sec., $850 + util. Rich, Ext. 4834 or 588-0507.

For Sale

BLUE POINT - 3-bdrm. Cape, 2 baths, kitchen/dining area, l/r, TV rm., full bsmt., garage, 1 acre on dead end, vinyl siding, near school, church & beach. Joe, 363-6595.

CALVERTON - ranch, eik, d/r area, partly furn., 24x24 garage & deck, ½ acre, fenced, Exit 71, LIE, 20 min. to Lab, $122,500. 727-7515.

CORAM - 9-rm. Colonial, cul-de-sac, 4 bdrm., 2½ baths, fam. rm., f/p, eik, d/r, l/r, mud rm., in-ground pool & lawn sprinkler, 2-car garage, extras, $195,000. Ext. 2303 or 732-3902 after 5 p.m.

EAST SETAUKET - 4-bdrm. Colonial, l/r, d/r, family room, w/fp, eik, 1½ baths, full bsmt., 2-car garage, a/g pool, 0.42 acre, 3-V school district, $192,000. Cheng, Ext. 2958 or 473-6429.

HOLBROOK - 3-bdrm. townhouse, 5 appliances, w/w, 1½ baths, tennis court, swimming pool, clubhouse, private area w/gardened courtyard, 15 min. to BNL, $129,000. 472-3236 or Ext. 2873.

MANOR PARK - 4-5 bdrm. high ranch, 1½ bath, l/r, d/r, family rm., partially finished bsmt., garaged, ½ acre, South Manor SD, 5 min. from Lab, $150,000's. Roger, Ext. 3578 or 395-1969.

MATTITUCK - wooded lot, Dutch Colonial, ½ acre, 4 bdrm., 2 baths, full d/r, l/r w/fp, den, oak floors, full bsmt, encl. breezeway, 2-car gar., cul-de-sac, private creek, low taxes, $252,000. 298-5383.

MEDFORD - 3 bdrm. Colonial, l/r, d/r, family rm., eik, 1½ bath, 1-car garage, 0.42 acre, $147,000. Y. Farah, Ext. 4633 or 286-1571.

MIDDLE ISLAND - Artist Lake condo, 1 bdrm., l/r, kit., bath, a/c, new w/w, dw, pool, gas heat, 5 min. to Lab, sell for $80,000, or rent $700/mo., heat included, avail. May 10. Ext. 3144 or 698-5046 eves.

NORTH SHIRLEY - ½ acre lot, 75'x265', Manorville school & fire district, 5 min. to Lab, Manor Park area, nice neighborhood, $47,000. Jim, Ext. 2305 or 242-7590.

PATCHOGUE - new cedar/brick high ranch on private 1 acre + cul-de-sac, w/w, GE appliances; bonus! second kitchen to BNL employees, $185,000. 736-6687 eves.

RIDGE - must sell, 3 bdrm., large yard, market value $145,000, will accept best offer. Mike, Ext. 7865 or 821-6945 eves.

RIDGE - custom-built, 5-bdrm. Cape, 2 baths, 2-car garage, coal/wood stove, country kitchen, priv. ¼ acre, porch, deck, poss. M/D, 5 min to Lab, $140,000. 924-4749.

ROCKY POINT - 3-bdrm. ranch, 100'x100' lot, eik, w/skylight, Andersen windows, half bsmt., large fenced yard, SCWA water, under 5 yrs. old, mint cond., beach rights, all appli. incl. 821-3925.

ROCKY POINT - 3-bdrm. high ranch, l/r w/fp, d/r, large eik, c/ac, deck, 2-car garage w/rem. op. doors, bsmt., more, ⅓ acre, moving, must sell, $164,000. Kochman, 744-1057.

ROCKY POINT - Tides, 1 yr. young, 3-bdrm. contemporary, 2 baths, eik, fam. rm., l/r, d/r, 2-car garage, skylight, Andersen windows, cathedral ceilings, much more, $197,000. John, Ext. 4498.

SETAUKET - N. of 25A, 4-bdrm. contemporary Cape, skylights in kitchen, f/p, many custom extras, lovely country setting, ⅓ acre, mint cond. P.J. Vincent, 689-8675.

SETAUKET - 3-bdrm. L-ranch, Enchanted Woods, cul-de-sac, 2 baths, eik, l/r, d/r, rec. rm., wood floors, patio, bsmt., attic, 2-car gar., c/ac, ⅓ acre, 3V SD, $220,000. Ext. 5265 or 584-8339 after 6 p.m.

WADING RIVER - 3-bdrm. Cape, ½+ acre, 2 baths, den, d/r, l/r, fam. rm. w/fp, full fin. bsmt., SWR schools, $230,000. 929-6748 after 3 p.m.

WESTHAMPTON - 1-bdrm. condo, furnished, pool, excel. location, asking $130,000. Dick, Ext. 4313 or 722-4094.

WESTHAMPTON BEACH/SPEONK - Hampton Villas, 2-bdrm. townhouse, 1½ baths, c/ac, swimming pool, 5 appliances, $149,500. Rich, Ext. 4834 or 588-0507.

YAPHANK - 3-bdrm. townhouse, 2½ bath, f/p, bsmt., garage, patio, $135,500. 924-2726.

Wanted

HOUSEMATE - to share house in Stony Brook, $339/mo. + util. Jim, Ext. 2183 or 689-8284.

LAWN MOWERS - old, complete. Dan, 698-7322 or Ext. 4987 eves.

OUTBOARD MOTOR - 15 h.p., Evinrude or Johnson, short shaft. Joe, beeper 925 or 728-1859 eves.

CONTRIBUTIONS - Mrs. Carroll is leaving the Upton Nursery School. If you would like to contribute to her gift, call Karen, 473-6550.

APARTMENT - small Manhattan studio for college student, will consider rental or purchase. John, Ext. 7671 or 765-1299.

POOL SLIDE - for 4' above-ground pool. Terry, Ext. 4638 or 281-0360 after 6.

HOUSE TO RENT - nonsmoking family of four, SWR School Dist., 1 July. Per, Ext. 3322 or 744-9351.

KITCHEN CABINET - tall, 2-door, any color, cheap or free. 727-8600.

VCR - in good cond., also old-style push mower, cheap. Paul, Ext. 7697.

HOUSE TO RENT - 2-3 bdrm. house, in Shoreham, Rocky Point or Miller Place, must have oil/hot-water heating system. Ext. 2256 or 924-7383.

VCR - Tim, 744-2203.

TROMBONE - for beginner. 281-5565.

ROCK CLIMBING PARTNER - for 2-3 trips a year to Gunks, 5.8-5.9 climber prefers experienced climber but will train beginner. Jim, Ext. 7775.

MOTOR HOME TO RENT - for trip to Disney World, two adults w/three children. Barry, 2238.

SITTER - patient grandmother-type, to care for a 10-year-old handicapped boy, household work, live in Setauket, good salary. 689-9869.

GOLF BAG - lightweight; Karmann Ghia w/body in good cond., not necessarily running. Ext. 2346 or 286-8563.

ORGAN - used, for church. 399-4912.

BOAT - 12'-16', aluminum or whaler type, w/wo outboard. George, Ext. 5288.

Services

Services are listed in the first ***Bulletin*** *of every month as a courtesy to BNL employees. They are neither screened nor recommended by the Bulletin. Services forms are available in the Bulletin lobby, Bldg. 134.*

GIFTS - craft items, country hats, covered photo albums, picture frames, baskets, wreaths, and more. Karen, 821-3955 or Lois, 929-4753 eves.

HEAD PIECES - flowers & guest books for bridal & baby showers, custom-made, very reasonable. Victoria, 929-3048 after 6 p.m.

LOCKSMITH - full service, 10% BNL discount. Pete Security Locksmith, 399-2813 after 5 p.m.

HOME IMPROVEMENTS - extensions, dormers, gar. & bsmt. conversions, roofing, siding, skylights, blueprints, plans & permits. John, 475-6981.

BRICKWORK - patios, walks, swim pools, retaining walls, landscaping ties, Belgian block, 20 years exp., Lab discount. Tony, 698-9274.

COURIER SERVICE - will bring child to doctor, dentist, music lessons, take pet to vet, groomer, etc. 281-7844 eves.

BABY & CHILD MINDING - experienced 18-year-old, available this summer, before college in fall, loves kids. Ali, 286-8563.

SHEETROCKING & SPACKLING - free estimate. Kevin, 563-9855.

AIR CONDITIONING - residential/commercial, professional work, licensed & insured. Mark, 345-5365.

PARTY TENTS - for rent, we set up & take down. Fred Kuehl, 588-2268.

CLEANUPS - lawn maintenance, seeded & sod lawns. Randall, 821-1042.

PARTY GOODS - tents, bars, chairs, tables for outdoor parties, free delivery. 878-3546.

HANDYMAN - from blacktop driveways to new bathrooms, no job too large or small. Ted, 281-6375.

PHOTO/VIDEO - specialize in special effects and creativity. Ripp Bowman, 286-8594.

CEMENT WORK - patios, walkways, floors, curbs, driveways, free estimate. Jim, 475-5469.

RUG SHAMPOOING - very reasonable, Lab discount. 924-6019, leave message.

ROTOTILLING - Troybilt, gardens, lawns, custom work. Bob, 732-9517.

LAWNMOWER REPAIRS - reasonable prices. Dan, 698-7322.

TREE STUMP GRINDING - Bob, 727-2346.

ROOFER - repairs new roofs and re-roofs, free estimates, licensed & insured, guarantee, Lab discounts. 732-4679.

HOME IMPROVEMENTS - extensions, renovations, decks, windows/skylights, all general contracting, licensed & insured. Brian, 744-3068.

PLUMBING/HEATING REPAIRS - & installations; automatic lawn sprinklers, free estimates & appraisals, installations & repairs. Lou, 928-7042.

LAWNS CUT - & yard work, St. James to Wading River, neat, reliable. Tim, 744-2203 or 928-5230.

Ads left out of this issue due to lack of space need not be resubmitted to appear in the next issue.