BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

Harnessing Heat From The Earth

Seeking alternate sources of energy, scientists have literally searched high and low - from the sun to the depths of the earth. Progress in the harnessing of solar energy has been well-publicized, but how many people are aware that about half of San Francisco's electricity is produced by geothermal energy from nearby steam reservoirs called the Geysers? And how many are aware that BNL is in the forefront of efforts to harness other geothermal sources for the future?

Since 1974, projects involving geothermal materials have been under way at BNL. As an outgrowth of this work, in 1979 DOE asked BNL to serve as technical coordinator of the materials development phase of its Geothermal Materials Project. At the Lab, Lawrence Kukacka and Daniel van Rooyen were assigned to lead research efforts, coordinate research with other laboratories and industry, and help to create industry standards. Specifically, in this search for materials that will stand up to hostile geothermal environments, Kukacka and his group are concerned with non-metallic materials, while metals are researched by van Rooyen and his team.

A Geothermal Primer

Geothermal is heat from the earth, created by the radioactive decay of rocks or by magma deposits. As the earth's depth increases its temperature generally rises at a rate of about 30°C per kilometer (90°F per mile). Fortunately, in some places, the thermal gradients are considerably higher than this and economically recoverable geothermal energy exists. In these regions of youthful volcanism, crustal rifting and recent mountain building, it is economically feasible to harness the earth's heat to either drive turbines and generate electricity (150°C minimum) or for industrial purposes and home heating (60°C minimum).

Hot spring areas such as the Geysers are the most operational geothermal sources because steam is available less than 10,000 feet from the earth's surface and is accessible by using current technology. Unfortunately, more expensive or as yet undeveloped technologies are required to reach and tap the three other principal types of geothermal resources: geopressured mixtures of high temperature water and natural gas; hot dry rock; and hydrothermal energy, an underground mixture of wet steam and brine.

Using Hydrothermal Energy

Despite the slower rate of technological development of these latter sources, van Rooyen said, "We're already in the practical phase of using hydrothermal energy, and this is where most efforts are concentrated." Drilling is only the first step in harnessing this resource; after that, the brine and steam mixture must be brought up, utilized and returned to the earth.

At each stage, materials are called upon to perform in environments that are much more hostile than those encountered in oil and gas production. Geothermal brine contains corrosive salts which quickly damage or destroy most conventional substances. Extremely hard rocks and high temperatures also require special materials to overcome their destructive properties during the drilling process. In spite of these obstacles, both Kukacka and van Rooyen have succeeded in developing improved materials for geothermal use.

Making New Metals

For example, van Rooyen's group has developed a steel with extremely high corrosion resistance which would cost less to produce than other alloys with similar properties. This steel appears to maintain its resistance even in the most aggressive geothermal environments. It is still hard to generalize about the resistance of other materials that may be used in the various components of geothermal systems, because the characteristics of the rock, brine, steam condensate, and so forth, with which they come into contact differ from one geothermal location to another.

Thus, van Rooyen and his team - Robin Bandy, Carl Czajkowski, Cliff Schnepf and Al Lewandowski - are undertaking studies to gain the knowledge necessary to develop other effective geothermal materials. In one study, they are examining many brines to see how individual variables cause different forms of corrosion damage. In another study of methods of protecting metals against corrosion, they are experimenting with cathodic protection - a direct electric current applied to the metal which is used successfully in other systems.

Polymer Concrete and Cement

Kukacka's group, which includes Jack Fontana, Walter Reems, Neil Carcillo, George Arnold and Barry Galen, has developed a concrete polymer material which functions well in geothermal environments. Applications as well cements and corrosion resistant liners appear promising. Controlled curing rates and subsequent high strength, hydrothermal stability, and low permeability characteristics make polymer cements good candidates for use in geothermal well completion systems. In this operation, cement is used to fill the space between the metal well casing and the rock formation to provide stability and an external corrosion protection to the well casing, and to isolate the geothermal fluid from lower temperature ground water.

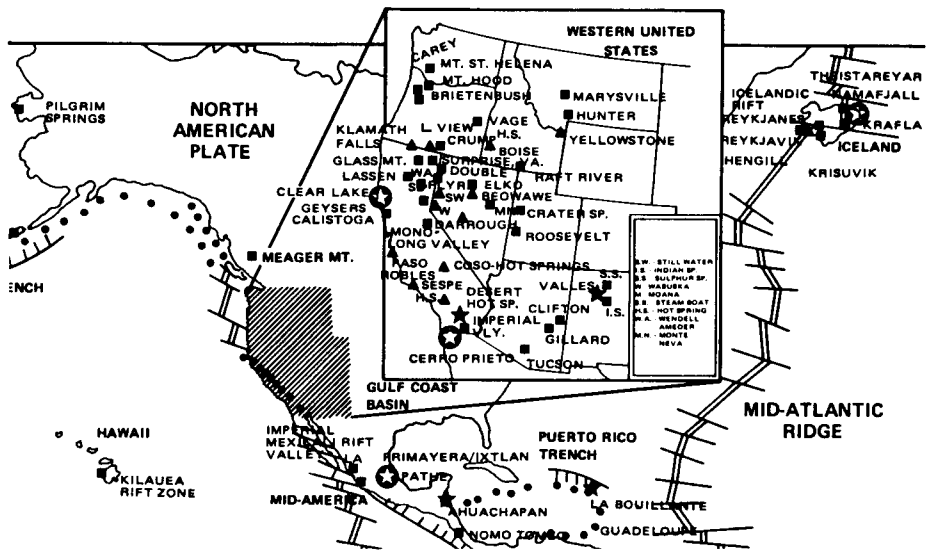
To test polymer concrete further, samples were recently placed in brine wells in Cerro Prieto, Mexico. During this two-year test, samples will be extracted from the wells periodically, then sent to the Mexican government, BNL, and the National Bureau of Standards for analysis and evaluation.

A Matter of Cooperation

Mexico is only one country where geothermal energy is in use today and with which BNL is cooperating. Others include Iceland, Italy and New Zealand. "This international effort is very helpful to BNL," Kukacka said. "It gives us the opportunity to work with brines from all over the world and to learn from other countries who have more operating experience in the use of geothermal energy."

Despite recent reductions in DOE's

(Continued on page 2)



North American Geothermal Energy Resource Development

In Recognition Of BNL Support

Doug Humphrey

The Laboratory has been saluted twice recently for its active participation in the development of minority business. On Monday, April 20, Ernest P. Gonzalez, (second from left) president of Captree Chemical Corp., Farmingdale, L.I., a minority firm, presented an award to BNL for "dedicated support and cooperation in assisting minority business." On hand for the presentation of the handsome plaque were (from left) Tony Salvo, Small & Disadvantaged Business Liaison Officer, Associate Director Vincent O'Leary and Pat Van Wormer, Buyer. On April 10, at a meeting in Hasbrouck Heights, N.J., Tony Salvo accepted an award, on behalf of Brookhaven, from the Vendor Input Committee, an advisory committee to the Board of Directors of the NY/NJ Minority Purchasing Council. BNL was one of ten organizations to receive the Committee's 1980 award for commitment to minority business. In FY 1980, Brookhaven awarded $3 million worth of contracts to minority businesses. Over 70 firms participated and approximately 95% of the money went to firms in New York State. The Laboratory's goal was a 4% procurement level; 5.1% was actually reached.

Linking Legends To Lava

When Mt. St. Helens erupted last year, volcanoes once more became front page news and made everyone aware of their awesome presence.

A geologist who has long studied, and traveled extensively in search of volcanoes and the "geomyths"surrounding them, will talk about her quest at Brookhaven on April 30. She is Dorothy Vitaliano, geologist and author, who will lecture on "Volcanoes in the Archaeological Record" at 3:30 p.m. in Berkner Hall. Her talk is sponsored by the AUI Lectureship Committee.

Mrs. Vitaliano graduated from Barnard College and received a master's degree in geology from Columbia University. She became fascinated with the connection between geology and folklore during her 18 years as an abstracter and editor for the U.S. Geological Survey. Her interest in Atlantis and the Bronze Age eruption of Santorini, in particular, led to a book, "Legends of the Earth: Their Geological Origins" which was published in 1973 and nominated for a National Book Award. With her husband, who has recently retired as professor of geology at Indiana University, she continued archeological research on the Santorini eruption. This, in turn, led to her collaboration on another book "Atlantis: Fact or Fiction?" (1978).

Mrs. Vitaliano's travels have taken her to Europe, New Zealand and Australia, Iceland, Hawaii, Alaska, the U.K. and most recently, the Galapagos Islands. She is a fellow, and member-at-large of the Geology and Geography Committee of the AAAS, a fellow of the Geological Society of America, and a member of the Commission on Tephrochronology of INQUA (International Union of Quaternary Research).

Beginning at 3 p.m., refreshments will be served prior to the lecture.

Geothermal (Cont'd)

budgets, the geothermal work at BNL will continue but probably at a reduced level. The researchers will try to realize various geothermal goals of which a major one is to produce energy at a reasonable cost. For example, well drilling is now the most expensive part of the operation, costing from $500,000 to $1,000,000 per well. One DOE goal is to reduce the cost of wells by 50% by 1985. Another projection estimates that, by the year 2000, geothermal resources could account for energy contributions equivalent to 3.16 million barrels of oil per day. The efforts of van Rooyen's and Kukacka's groups help bring these goals within reach.

— Anita Cohen

Reminder

Both a BERA-sponsored concert and a BNL Lecture are on the Laboratory calendar for next week.

The concert, scheduled for Monday, April 27 at 8:30 p.m. in Berkner Hall, will feature a presentation of piano duets by Long Island pianists Doris Anne McMullen and Dwana Holroyd. Tickets are $5 general admission, $4 for students and senior citizens, and $3 for those under 18. No reservations are necessary and tickets will be available at the door.

"Metal Hydrides and Hydrogen Storage" is the subject of the next BNL Lecture which James Reilly will present on Wednesday, April 29 at 8 p.m. in Berkner Hall. Reilly, a chemist, is Group Leader of the Metal Hydrides Group in DEE's Basic Energy Sciences Division.

Gardener Training

Cooperative Extension - Suffolk County is again offering the Master Gardener Training Program to residents who are interested in home gardening and willing to share their knowledge with others in their communities.

The Master Gardener program is a joint effort of volunteers from the community, as well as the staff of Cooperative Extension and Cornell University.

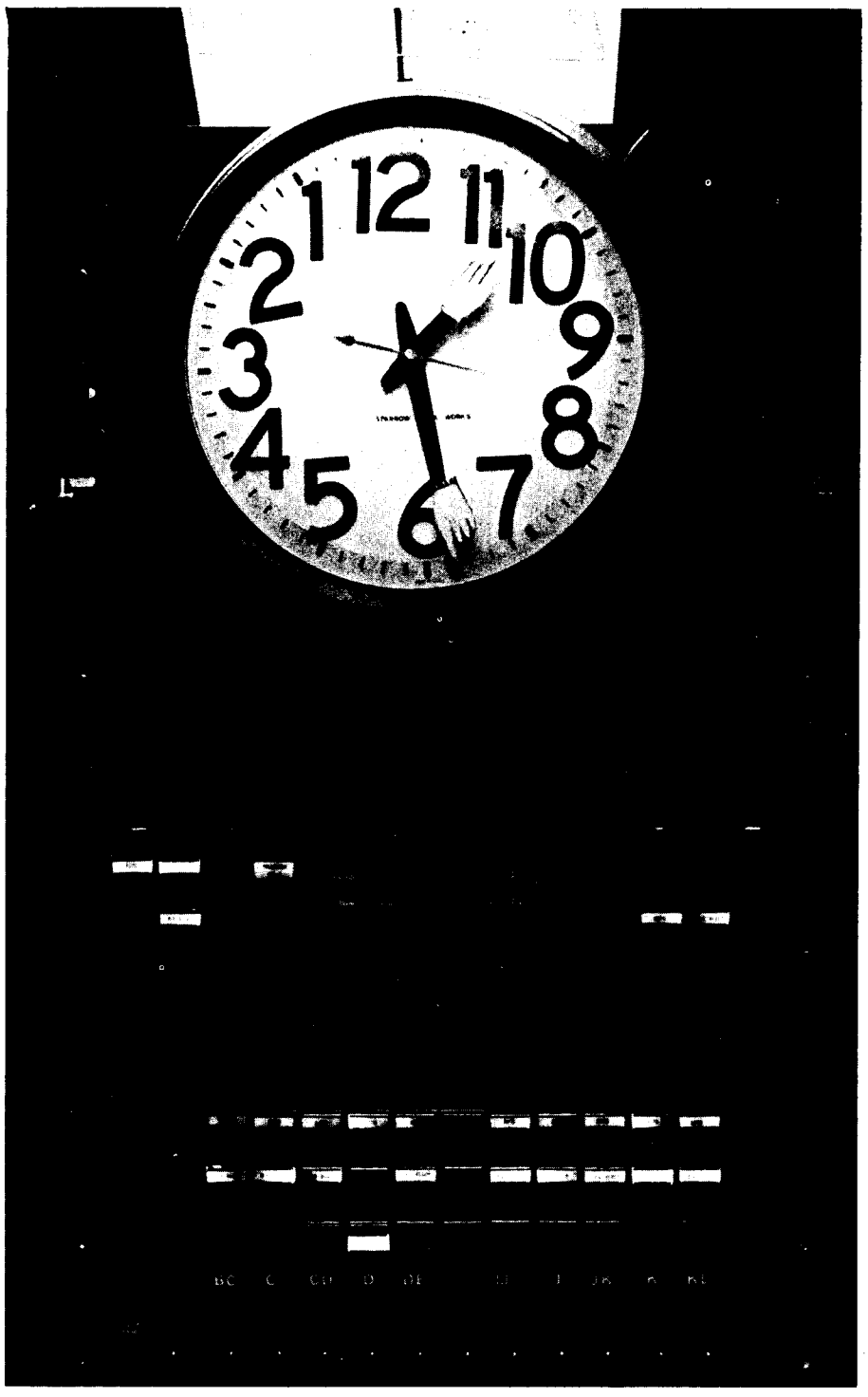
At in-depth training sessions on home gardening, volunteers will be trained by extension specialists and county agents to answer homeowners' requests for home gardening information.

The training program starts June 10 and runs until late August. It will include an all-day class every Wednesday at Cooperative Extension headquarters in Riverhead.

Those who are interested in volunteering for the program should contact Caroline T. Kiang, Cooperative Extension - Suffolk County, 246 Griffing Avenue, Riverhead, NY 11901 (telephone 727-7850).

SUNY Needs Hosts

The School of Social Welfare at SUNY, Stony Brook, is offering an International Social Work Program from April 29 through August 15. Experienced social workers from all over the world will participate. To provide these people with the opportunity to share American culture and family life, the program is seeking families to host the social workers for about 1½ months. Anyone who is interested and who lives within walking distance of the campus should contact Dr. Dorothy Headley Knox, 246-2249.



Doug Humphrey

Spring Forward???

When the rest of us set our clocks ahead one hour Sunday morning to conform with Daylight Saving Time, Paul Sparrow will set this clock back. But we'll all end up with the same thing: one less hour of sleep Sunday morning.

This particular clock is located in the control room of the AGS. Sparrow, who describes himself as "obsessed with time," built the clock shortly after he joined the department 15 years ago. Since then, he has made a number of similar clocks to serve as farewell gifts or to decorate some BNL offices.

The Lab's AGS is an unusual accelerator because the proton beam goes in what is generally called a counterclockwise direction. However, as those in the AGS control room are quick to point out, with Sparrow's clock, the beam goes in a clockwise direction! By definition, clockwise is the direction in which the hands of a clock move. Since the beam in the AGS goes in the same direction as the hands of *this* clock, the AGS beam goes in a clockwise direction.

Why are the hands of the clock gloved? "We just thought Mickey Mouse should be included," Sparrow said. These are the original hands made by Bill Cahill, who now works at ISABELLE. The clock, however, is not the original clock. That one was repaired a few times before it finally wore out. When Sparrow built its replacement, he affixed his logo, "Sparrow Clock Works," and the old hands, because, he said, "I thought I should keep something original."

Sparrow also built the digital clock on the control panel. The observant will note that the two clocks differ by about one minute. The digital clock is more accurate. With its built-in batteries, it is not affected by power failures and usually does not need to be reset. However, Daylight Saving Time will give Sparrow an opportunity to synchronize his clocks.

Don't forget to reset yours!

— Anita Cohen

CREF Values

April	$41.82	May	43.70
June	44.81	July	47.84
August	48.04	September	48.75
October	49.13	November	53.19
December	51.77	January	50.20
February	51.21		

March $52.85

Selected Reading

Science 212 (4492) 17 April 1981
Space science in the year of the shuttle. M. Mitchell Waldrop. 316-18.

New England Journal of Medicine 304 (16) April 16, 1981
Public health versus personal medical care: the dilemma of post-Mao China. Robert J. Blendon. 981-2.

New Scientist 90 (1248) April 9, 1981
CERN pushes open the door to a new physics. 139.
To space and back. Dick S. Lewis & Mark Hewish. 146-151.

Science 212 (4493) April 24, 1981
Energy conservation: the debate begins. Colin Norman. 424.

Scientific American 244 (4) April 1981
Ancient Oared Warships. Vernard Foley and Werner Soedel. 148-163

New England Journal of Medicine 304 (11) March 1981
Coffee and Cancer of the Pancreas. Brian Mac Mahon, M.D. et al. 630-633

Patents Awarded

Neal Carciello, Lawrence Kukacka and **Jack Fontana,** all in the Department of Energy and Environment, and **Arkady Zeldin,** a former BNL employee, were awarded U.S. Patent #4,231,917 for developing high temperature organosiloxane polymer concrete compositions having thermal stability and only minor loss of mechanical characteristics at temperatures in excess of 260°C. These composites may be particularly useful as well cementing material in geothermal wells and deep oil wells.

U.S. Patent #4,231,771 was granted to **Warren E. Winsche,** Deputy Director, for inventing an effective, low-cost, high volume inertial separator that removes particulate matter from combustion gases produced in the burning of powdered coal. Improved separation is in part accomplished by an increase in separation area and a shortened time-of-flight to the collecting surfaces.

Myron Strongin and **Arup K. Ghosh,** Physics Department, and **Harold J. Wiesmann, Edward B. Rock** and **Harry A. Lutz,** former BNL employees, were awarded U.S. Patent #4,237,151 for inventing a method of producing hydrogenated amorphous silicon by passing silane gas through a tungsten tube in a vacuum to form a flux of atomic hydrogen and atomic silicon. The flux is then deposited onto a substrate situated outside the tungsten tube to form hydrogenated amorphous silicon.

U.S. Patent #4,237,150 was issued to **Harold J. Wiesmann,** a former BNL employee in Physics, for inventing a method of producing hydrogenated amorphous silicon by thermally decomposing silane or other gases comprising hydrogen and silicon, from a heated tungsten or carbon foil in a vacuum. A gaseous mixture of atomic hydrogen and atomic silicon is formed and deposited onto a substrate to form hydrogenated amorphous silicon. An ammonia atmosphere in the vacuum chamber enhances the photoconductivity of the hydrogenated amorphous silicon film.

Retirees

Charlotte Rappe retires today from her position as Senior Clerk in the Supply & Materiel Division. She came to the Lab in 1962, and begins her retirement vacationing in Florida with her husband.

George M. Guydish has been with the Lab since 1955. He retires April 30 from his position as a Rigger, Group Leader in Plant Engineering. Guydish is planning to spend time with his grandchildren, visit Pennsylvania, and otherwise "play it by ear."

Equipment Demo

Gould, distributors of process components, will display some of the products which they supply, on Tuesday, April 28, from 10 a.m. to 5 p.m. in Room D, Berkner Hall. The following companies will be represented: Boston Gear, Imperial-Eastman, Contromatics, Gemini Valve Inc., and Marsh Instrument Co. Coffee and refreshments will be served.

Degree Days

April						
13	14	15	16	17	18	19
21.5	21.5	25.2	24.2	15.2	2.5	13.2

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Letters To The Editor

To the Editor:

I enjoyed reading the piece "Choosing the Laboratory Site" in the April 3 Brookhaven Bulletin, as it brought back fond memories of those early days.

There is one amusing point that Norm Ramsey forgot to mention. In considering the Sandy Hook site at all, and in commissioning the engineering study by Stone and Webster the Army people didn't do their home work. When Sandy Hook was given to the government around the middle of the 19th century, it was stipulated that the site be used for a fort to defend the entrance to New York harbor. And if it were not so used, the land would revert to the state of New Jersey for a public park (which it now is).

— J.B.H. Kuper

Secretarial Science

Freida Guidas of the National Secretarial Association will speak on such topics as her organization and women in business on Wednesday, April 28, at 12 noon in the Auditorium of Berkner Hall. All clerical and secretarial staff are invited. Your attendance will determine future speakers, so come on over!

Tennis

The Tennis Committee challenges the men and women of BNL to compete against each other through the Tennis Ladder, beginning May 11. Sign-up sheets and ladder rules are now posted at the BERA Sales Office. Player rankings will be assigned according to the order of sign-up and will be posted by May 8. During the first three weeks of play, until June 1, members of the Tennis Ladder are allowed one free challenge; thereafter, all challenges are as per posted rules. The ladder will be run this year by Tennis Committee members Tom Luhman and Marie Susa.

Copies of the USTA publication, *The Rules of Tennis* (revised 1981), are available from the BERA Sales Office at 10¢ per copy.

For answers to questions or general assistance, contact any of the members of the Tennis Committee: Gail Williams (Chairman), John Elmore, Eena-Mai Franz, Georgia Irving, Andy Kevey, Tom Luhman, Larry Passell, Ed Platner, Steve Shapiro and Marie Susa.

Arrivals & Departures

Arrivals

None

Departures

Thomas K. Rudolf .....Accelerator
Gordon L. Smith .....Plant Engineering
Claudia E. Sykes .....Fiscal

Volleyball

Mixed League

A Division

Playoff: From the toss of the coin it was all No Names as they won 15-6 and 15-11 over High Society. Congratulations to the following: Kristien Chung, Jeanne Danko, John Elmore, Diane Grady, Cindy Grier, Don Litcher, Annette Waldron, Dennis Weygand.

B Division

The Leftovers won 15-7 and 15-4 over Puff & Stuff for the second half winners. They then proceeded to win the divisional championship over TNT with games of 13-15, 15-9, and 15-5. Congratulations to the following: Laura Genovese, Stu Kern, Patty O'Connor, Jim Rowehl, Rick Parson, Mike Pick, Tony Salvo, A. Waldron, and Madeline Windsor.

Open League

An all star game was held with Tony Beck (the North Team) and Tom Owens (the South Team) choosing their teammates. The South team won the first two games, but the North Team came back to win the next three to win the match. Congratulations to the North Team's members: Tony Beck (Captain), Chuck Calef, Bob Casey, Randy Johnson, Jackie Howe, Don Litcher, Jim Rowehl, Dennis Weygand. Congratulations also to the South Team for their part in the match: Tom Owens (Captain), Betsy Cuthbert, Steve Howe, Steve Munson, John Nagy, Tom Petty, Om Singh, and Dominic Ninivaggi.

Bowling

Pink League

Great series by Deb Johnson 513, Karen Alberico 493 and Mary-Grace Meier 470. Good single games by Denise Miesell 187, Helen Keeley 185, Millie Connelly 182, Ellie Kristiansen 175, Fran Nusz 169, Marge Stoeckel 156, Fran Briening 155/153, Madeline Windsor 151.

Red League

The 76'ers won 8-3 over the Freon Loaders. J. Petro (214-224) grossed 678, J. Connelly (228) 619 and L. Schairer 609. The Designers won 7-4 in a match with the Old Timers. J. Ferrero (212) grossed 631, J. Ferrante 601 and J. Roesler 631. R. Smol rolled a 201 game. The Sandbaggers only managed 4 from the Trouble Shooters. R. Jones rolled a 220, C. Bohnenblusch (211) grossed 638 and K. Riker 615. Isa Team took 3 from the Light Source with E. Sperry IV (203) grossing 649, M. Iarocci (218) 628. The Sparks took 11 from the Strangers with F. Pond (202) grossing 623.

Purple & White League

The Gropers won all 7 giving them a four point lead in first place. High game and series was rolled by Jim Petro with 197/234/186-617. Other good games were bowled by Ken Riker 226/207, Ted Erickson 209, Ed Sperry 205, Jim Griffin 200, Caryl MacDougall 204/203, Joyce Pinelli 197, Kathy Griffin 192.

Green League

The Light Source extended their lead as they took 8 from Isa Team. N. Fewell rolled a 202 and A. Almasy 233. The Blue Jays won 11 from Old Timers II. H. Marshall had a 223-582/666 gross series. The Sparks took 11 from the Strangers. B. Kristiansen rolled games of 206/244 for a 631 scratch 730 gross series. The Pinball Wizards split 6-1/2 - 4-1/2 with the Phoubars and the Trouble Shooters won 7 from the Sandbaggers.

L.I. Industrial Tournament

High games by Sharon Smith 208/177, Renie Rosati 182/181, Helen Keeley 175, and Renee Flack 155, kept BNL in 8th place overall.

R/C Airplane Club

A meeting of the R/C Model Airplane Club has been scheduled for Friday, May 1, at noon in Room D, Berkner Hall, to discuss an open house, display and movie. Anyone interested is welcome to attend. For more information, call Manny Santos, Ext. 2022.

Aviation Club

The BNL Aviation Club is sponsoring a triple feature which will open at Berkner Hall on Thursday, April 30 at 7:30 p.m. The main attraction is the movie "To Fly" which has also been shown at the Space Museum in Washington, D.C. The two other movies on the agenda are "The Nuclear Ship Savannah" and "Story of Camp Century," a tale of life under the Artic ice cap. Everyone is welcome to attend.

To Your Health!

About Caffeine

Large doses of caffeine can cause restlessness, irritability, sleeplessness, and nervousness. For some, even a small amount of caffeine, especially at bedtime, can cause problems such as the inability to fall asleep, or wakefulness in the middle of the night or early morning and being unable to return to sleep. In addition, caffeine can cause cardiac symptoms such as a fast heart rate, palpitations, and a "fluttery" feeling in the chest. There is also some recent evidence that caffeine may adversely affect the unborn fetus.

For most people, withdrawal from caffeine, or reducing caffeine intake, can be done quite easily and with no ill effects. For others, especially those who are accustomed to consuming large quantities of caffeine (usually exceeding 500-600 mg/day or 5-8 cups of coffee), abrupt withdrawal may cause a phenomenon called the Caffeine Withdrawal Headache. Such a headache usually begins approximately 18 hours after the most recent intake of caffeine. It usually starts with a feeling of fullness in the head and rapidly progresses to a painful throbbing headache peaking 3-6 hours after onset. Sometimes this pain lasts 1-3 days and is often attributed to tension. Symptomatic relief from the headache may be obtained from a non-narcotic pain reliever alone (aspirin or tylenol), or in combination with an analgesic containing caffeine such as excedrin or anacin. Cutting down on caffeine consumption over a period of a few days might help to prevent the formation of the headache.

An average cup of instant coffee contains approximately 60-65 mg of caffeine, while percolated coffee ranges from 97 to 125 mg/cup. Tea contains an average of 20-60 mg of caffeine per cup depending on the length of brewing time and the brand of tea. In addition there is caffeine in cola drinks, cocoa and chocolate. A young child who drinks 12 ounces of cola, Dr. Pepper, or Mountain Dew has a caffeine intake comparable to that of an adult who drinks 4 cups of coffee, since caffeine dosage is related to body size and weight. Following is a partial list of the caffeine content of some common beverages and medications that contain caffeine. For a more complete list stop by the clinic.

— Caroline Kramer, R.N.

Caffeine Sources	Caffeine Content mg/serving
Coffee beverages:	
Brewed, ground	85/cup (range 85-200/cup)
percolated	110/cup (range 97-125/cup)
dripolated	146/cup (range 137-153/cup)
instant	60-65/cup
instant, decaffeinated	3/cup
Tea beverages (bagged and loose teas brewed 5 minutes)	40/cup (range 20-60)
Cocoa, hot chocolate beverages	13/cup (range 6-42)
Cola beverages, Mountain Dew, Sunkist Orange Soda	47/12 ounces (range 30-70/12 oz)
Drugs:	
Aspirin compound-phenacetin-caffeine	32/pill
Bromo Seltzer	32/pill
Cope, Midol, etc.	32/pill
Fiorinal	40/pill
Excedrin, Anacin	60/pill
Pre-Mens	66/pill
No Doz, Vivarin	100-200/pill
Dristan, Sinarest	30/pill

Golf

The first BGA tournament will be held at Swan Lake golf course in Manorville on May 13, with tee off times from 11:30-12:30. The Calloway handicap system will be used to score results, so an established handicap is not necessary to win. All BNL employees and spouses are welcome to play. To obtain a tee off time, contact Les Lawrence, Ext. 4107, Bldg. 515. Entry fees must be received before May 7. A $6.00 greens fee will be payable at the course.

Cafeteria Menu

Week Ending May 1, 1981

Monday, April 27

French onion soup	(cup)	.55
	(bowl)	.65
Corned beef & cabbage		1.60
Baked lasagna & 1 veg.		1.55
Hot Deli — Fishwich	(on bread)	1.55
	(on roll)	1.65

Tuesday, April 28

Cream of green split pea soup	(cup)	.55
	(bowl)	.65
Roasted top round of beef & 1 veg.		1.65
Seafood creole w/rice		1.60
Hot Deli — Sausage hero		1.70

Wednesday, April 29

Chicken vegetable soup	(cup)	.55
	(bowl)	.65
Turkey divan		1.60
Beef hash & 1 veg.		1.55
Hot Deli — Roasted fresh ham w/barbeque sauce	(on bread)	1.65
	(on roll)	1.75

Thursday, April 30

Navy bean soup	(cup)	.55
	(bowl)	.65
Southern fried chicken & 1 veg.		1.55
Western-type chili w/rice		1.55
Hot Deli — Pastrami	(on bread)	1.65
	(on roll)	1.75

Friday, May 1

New England clam chowder	(cup)	.55
	(bowl)	. 65
Yankee pot roast & 1 veg.		1.60
Broiled fillet of fish		1.55
Hot Deli — Roasted turkey breast	(on bread)	1.65
	(on roll)	1.75

Classified Advertisements

Autos & Auto Supplies

74 AMC GREMLIN - a/t, low mi, immac. Steve, 884-1945.

76 GRAND PRIX - sun roof, a/c, full power, radials, am/fm, very good cond. Asking $3,300. Ext. 2907 or 727-3167 after 5 p.m.

73 PLYMOUTH - Satellite, needs some body work, good running cond. $800. Bob, 744-5936 or Barbara, 473-8060 after 6 p.m.

72 FORD BRONCO - 4 wheel drive, 5 extra tires. $1,250. 732-3350.

ALTERNATOR - 60 Amp Chrysler. $15. Frank Rumph, Ext. 5107 or 588-3565.

76 RENAULT - R5GL, very good cond, low 40's over 30 mpg, reg gas. $1,875. Ext. 2051/4548.

MINI BIKE - new 5 hp Tecumpsa eng, excel buy at $165. Chris, 472-2245.

76 DATSUN 280Z - excel cond, a/c, am/fm cassette, new brakes, sunroof. Chip, Ext. 2946.

77 YAMAHA - 360cc, elec start, luggage rack, blue, 7500 mi, like new. $995. John, Ext 4185 or 929-8204.

76 VOLARE - 4 spd trans, p/s, a/c, am/fm stereo cassette, good cond. 286-1214.

MINI BIKE - new eng and clutch, excel cond. $150. Vince, Ext. 4660.

17' MONITOR TRAILER - a/c, heat, refrig, hot water, screened awning, hitch, extras. $1,600. 286-2314 after 6 p.m.

70 KAWASKAI - motorcycle, 500cc, like new. Asking $650. Ext. 2231.

76 HONDA - XL350 motorcycle, new clutch, battery, and tune-up, excel. $650. 744-7406 eves.

76 AMF SCAMPER - mini motor home, CB, am/fm, rear bath, 17,000 mi, 3 way Frig, p/s, p/b, a/t, a/c. $10,500. Jim, Ext. 4040 or 289-0876.

LOCKING GAS CAP - snap on type. $5. Ext. 4034.

SNOW TIRES - (2) Goodyear E78-14, 2,500 mi used. $35. Ext. 4690 or 7664.

74 VW GHIA - conv, am/fm, 59,000 mi, A-1 cond, orig owner, good gas mi. Al, Ext. 4867 or 298-5402.

1975 AND UP - Ford van front coil springs, heavy duty rating, brand new cond. $35/pr. Ext. 2323.

77 CHEVY NOVA - 4 dr sedan, V6, a/t, p/s, p/b, 66,000 mi. $2,200. Ext. 4690/7664.

75 FORD F-250 CAMPER - Special Pick-up truck w/10½' Hornet Camper slide-on, self-contained, many extras. Will sell camper separately. 929-4840.

73 DUSTER - 6 cyl, 58,000 mi, clean, slight body damage. $900. 878-4474 after 5 p.m.

SHOP MANUAL - for Volvo 1971, $5; (2) snow tires 6.85x15, $5 ea. Slavin, 941-9242.

73 CHEVY MALIBU - 4 dr, a/t, p/s, p/b, am/fm, low mi, snows incl, excel running cond. $995. Ext. 5091.

AUTO TRANSMISSION - and rear end for '70 Plymouth Valiant, $50 ea; Welder 200 amp Dayton, $200; 8' pick-up bed '72 Chevy light blue, $150. John, TU-4-4136.

74 HONDA - No. 450 motorcycle, like new, 13,000 mi. $800. 727-0139 after 6 p.m.

70 OPEL GT - 4 cyl, good cond, 32 mpg, new brakes, clutch. $1,500. Neil, 281-1795.

66 BRONCO DRIVETRAIN ONLY - w/transfer case Vette 6 rims w/4 Tas. $200. 744-3968 or 473-2318 after 6 p.m.

80 MOTORCYCLE - Honda Twinstar, brand new, many extras. Ext. 2482.

74 GRAND PRIX - a/c, am/fm stereo, many new parts, very good cond. $1,200. Knight, Ext. 2502.

Boats & Marine Supplies

28' LUHRS - inboard cabin, camper back, V8, w/accessories, water ready. $2,075. Ext. 4188 or HR-2-2750.

TWO ANCHORS - 7 lb Danforth style, new, $15; Navy anchor, 10 lb, used, $10. Brian, Ext. 4121.

1978 MERCURY OUTBOARD - long shaft manual stainless steel prop. $950. 286-3335 after 6 p.m.

Yard Sales

YARD SALE - April 24 & 25, 10 a.m. to 4 p.m., last block of Maple Road, Wading River. 929-3310.

YARD SALE - Sat & Sun., April 25 & 26 at 183 Hampton Ave. Mastic. 281-4371.

YARD SALE - April 25, 9 a.m. to 4 p.m., (rain date May 2nd) Lake Ave., Center Moriches. (follow the signs).

YARD SALE - April 25 & 26, Sat. & Sun., 10 a.m. to 4 p.m., (rain date May 2 & 3) Multi-family, dead-end, Shannon Blvd. Yaphank.

Miscellaneous

TYPEWRITER - Smith Corona Galaxie II, portable w/carrying case. $40; Electric heaters (5) Edison fan-forced, 1500 W, $30. ea. Claire, 281-2002.

TV - Magnavox 24" color console, $120; Cassette corder Sony mono, am/fm, 2 way speaker. $40. Ext. 4690/7664.

BOY'S SUIT - navy blue, 3 pc. Communion suit, sz. 8, worn twice. Orig. $45. Asking $20. Donna, Ext. 4007.

DINING ROOM SET - 4 chairs, table, china closet. $450. 588-2477.

FIREPLACE - Hydro-hearth. $50. Frank Rumph, Ext. 5107 or 588-3565.

BABY CRIB - w/mattress, good cond, $50; twin mattress & boxspring, $25. Ext. 3469 or 281-4371.

TUNER - am/fm, $10. Pete, Ext. 4782 or 289-7218.

INDIAN HEAD PENNIES - Most dates 1880-1899. Greg, Ext. 7960 or 2370.

PIANO - Antique mahogany upright, excel completely reconditioned inside & out. Ext. 7667 or 751-4985.

EASTERN AIRLINES - half/fare coupon, N.Y. to L.A./S.F., best offer above $40; 8'x12' rug, off white, best offer above $50. Anand, Ext. 2117 or 928-5529 eves.

8 TRACK PLAYER - good cond, like new. Ext. 3431 or 744-9677.

SCOTTS - large drop flow fertilizer spreader, $15. Frank, Ext. 2047.

AIR COND - window type 27"w x 20.5"d x 16.5"h Fedders 115 VAC, 11.4 Amps, 12,000 BTU, $50. U-Pick up. Nick, Ext. 3458.

SPEED SKATES - men's size 10½, $12; women's & men's figure skates, sz. 6-10, $10. ea. All excel cond. Bob, Ext. 4201.

LAWN SWEEPER - Parker, gas powered, like new. 286-2314 after 6 p.m.

TV - 19" RCA B&W portable w/stand, excel cond. $75. Brian, Ext. 4121.

FRENCH BOOKS - and texts, 13 different; Popular Mechanics magazine (1957-1974 complete) Dennis, Ext. 4259 or 736-2534 after 6 p.m.

HOOVER UPRIGHT VACCUM - $20; cocktail and end tables. $60. 736-2618.

FREE - (need repair) washer; electric range; dishwasher; swing set; doghouse. U-Cart. Mark or Sandy, Ext. 4315 or 924-0425.

SLATE - ½ pallet, all sz., all shapes, make offer. 821-0275 after 6 or wkends.

MACHINIST'S TOOLS - & kit, plus form tools for shaping & slotting. Make offer. Hal, Ext. 2522.

BICYCLE - 21" Motorbecane, vitus D/B frame, excel components, brand new cond. Ext. 5221.

PACHYSANDRA - excel ground cover, healthy plants 25 for $3. 929-4522.

TICKETS - (2) for May 23rd matinee in URIS Theatre for Pirates of Penzance. Ist row, $25. ea. Ext. 3701 or 751-8128.

DOORS - exterior, new 2'8" x 6'8" x 1-¾" (3) windows L + R prehung fir, $110. ea. 924-6582.

AIR TIGHT - wood burning stove, brick lined firebox, glass view, excel cond. Sacrifice sale. 475-6938.

GAS WELDING EQUIPMENT - various pieces. Ask for John, TU 4-4136.

LONDON FOG - Lady's raincoat, like new, sz 12 w/zipout lining, was $100. Asking $35. Susan, Ext. 7235 Tues. & Thurs.

SB-400 TRANSMITTER - RF Speech Processor, recently retubed, excel DX record, perfect cond. Ext. 3311.

REFRIG - GE 19cu. ft. side by side, Avocado, 4 yrs. old, perfect cond. Best offer. Ann, Ext. 4959.

HEMLOCKS - 8' $10. ea. or 3 for $25. U-dig. Northport. Walt, Ext. 7154.

FOR ADOPTION - Dog/collie mix, 7 yrs. old; Cats: orange persian mix; calico female, spayed. Regina, 698-3952.

HI-RISER - and royal blue cover w/bolsters, $60; crib & mattress, $25; child gates, $3; Fisher Price "busy box", $5. Lois, 289-8167.

AFGHAN - hand crocheted, cranberry, navy, off-white, new $85. Must see. Kurt, Ext. 4116 or 821-0104.

TIRE - w/rim 7.50x14, $10; Golf clubs No. 9, $2. ea; baby bouncer, $3. Susan, Ext. 4267.

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

PT JEFF VICINITY - 7 yrs old contemp 5 bdrm, 2 fam rm, 3 full baths, 2 car garage, ½ wooded acre. $13,700 cash over. 9½% assumable mortg. 928-5280 after 8 p.m.

FARMINGVILLE - ranch, 3 bdrms, 2½ car garage, custom interior. M/D poss. $49,500. 249-3700 days.

SHOREHAM - custom built Colonial, ½ acre, 5 bdrms, fam rm, fp, 2 car garage, in new cond. 8½% assumable mortgage, low taxes. $88,000. 821-0275 after 6 or wkends.

HUNTER MT. VICINITY - young 24'x24' cabin, scenic wooded 2 acres, Franklin fp, appl, chemical toilet, 2 sheds, partially furnished, paved road, 45 min from Hunter Mt, excel hunting. $13,500. 698-3952 p.m.

YAPHANK - ranch, lakefront acre, 3 bdrm, eik, l/r, d/r, den, fp, fin bsmt, garage, deck, shed, circular driveway, landscaped. $72,000. 862-6259 after 6 p.m.

BELLPORT VILLAGE - 4 bdrm high ranch, l/r, f/r, eik, appl, lg deck, 1½ baths, short walk to schools, tennis, golf. Will hold first mortgage. $43,000. Ext. 3502 or 286-8166 after 5 p.m.

For Rent

RIDGE - sublet for May-July, fully furnished 2 bdrm house, 5 min from Lab. $400. Cyrus, Ext. 4571 or 744-7904 eves.

MIDDLE ISLAND - 3 mi from Lab, 3 bdrm condo, 5 appl, central a/c, swim, tennis, etc. Ext. 4410 or 924-0054 after 6 p.m.

MIDDLE ISLAND - furnished room(s), 12 min from Lab, a block from Spring Lake Golf Course, priv entr, includes: util, refrig, washer/dryer, cooking facilities can be arranged. 924-7972.

MILLER PLACE - 3 bdrm house for July and August, no pets. Rent negotiable. 928-0821 after 5 p.m.

BERKSHIRES CHALET - 3 hrs from NYC, 3 bdrms, 2 baths, fully equipped kitchen, elec heat, deck w/spectacular view, near lake, hiking trails, near ski area, cross-country skiing on property, ½ hr from Tanglewood Theater. 929-6946 after 6 p.m.

E. SETAUKET - near SUNY, studio apt in priv home, priv entr, fp, a/c, w/w carpet. $275/mo pays all. 751-7491 eves.

Wanted

SPANISH LANGUAGE BOOKS - any kind, for Peace Corps couple establishing library, rural Chile. J. Wall, Ext. 3372.

TRAINS - Lionel, American Flyer, accessories, any cond, 6 rings, good price. Carole, Ext. 3362 or 924-4097 eves.

BASEBALL MITT - must be slightly used, men's size. Ext. 2514.

PORT-A-CRIB -286-0796.

ATARI GAME - that can be used on B&W or color TV, plus cartridges. Pete, Ext. 3297 or 821-9547.

MC DONALD COUPONS - numbers 500, 508, 509, 514, 524, 536 or 541. Negotiable. Tim, Ext. 3436.

ELECTRIC DRYER - reasonable. Dan, Ext. 3877 or 698-6120 after 6 p.m.

TUTOR - arithmetic and algebra, during eves. Janet, Ext. 2400.

BUSINESS ASSOCIATE - develop excel second income tax advantages, no investment. Call for appt. 698-5861 after 7:30 p.m.

FLY FISHING - paraphernalia rods, reels, bamboo, glass, flys/books. Check attics, barns, garages, basement. Bill, 286-9226.

HOUSE - rent 3 to 4 bdrms for 1 yr beginning Sept. Visiting scientist and family. Ext. 3786.

CAMPING EQUIPMENT - in good cond. Ext. 3126.

LOVING HOME - for one-eyed 2 yr old German Shepherd, spayed, good w/children, excel watchdog. 941-9423 eves.

GO CART FRAME - in good cond. Nate, 472-1289.

LARGE RUG - 10x15. Can you donate to a church group? Thanks. Claire, 281-2002.

INFANT CAR SEAT - 282-3176.

SALESPERSON - Part-time, for interview call 732-6647.

Car Pools

PATCHOGUE - to Lab via S. Country Rd, Bellport, on-time, room for paying rider. Alyce, Ext. 5203.

MASSAPEQUA/FARMINGDALE - points West meet off Exit 32 Southern State Pkwy. Plotkin, Ext. 4717.

THROGS NECK BRIDGE - meet at 6:50 a.m., need 2 or 3 more members. Dave, Ext. 7611.

SOUTHAMPTON COLLEGE - need to form or join a car pool from college. Mike Fricano, 283-6547.

E. SETAUKET/PT. JEFF. AREA - need 5th member. Ext. 7790.

Services

ROTOTILLING - new or existing gardens, lawns, $15/hr. Dave, Ext. 7517, 288-3011 eves.

MOTORCYCLE ACCESSORIES -for street and dirt, best prices, lab discounts. Ext. 2311.

GOURMET FRENCH COOKING CLASS - 2 seats available, 3 sessions. $36. Julia, 928-4926.

PROFESSIONAL TYPING - Debby, 727-5475.

CARPETS INSTALLED - quick dependable service, repairs, free estimates. Jim, 821-0187 after 5 p.m.

BABYSITTER - experienced, Wading River area. Lois, Ext. 2933 or 929-4753.

ASPHALT PAVING - and sealing. Bob, 475-4382.

WILL PICK UP - any scrap metal over 25 lbs. Ext. 4034.

BABYSITTING - mother will babysit 2 yrs or older, Mastic area, lots of TLC. Mary, 399-6128.

ROTOTILLING - garden, new lawn up to 1,000 sq/ft only $23.50 any area. Tom, Ext. 2011 or 325-1033.

PROFESSIONAL TYPING - Ext. 2484 or 289-9560 after 6 p.m.

SANDBLASTING TRAILERS - chassis, any kind equipment w/wo primer coat. Reasonable rates. 744-3968 after 4 p.m.

AFGHANS - custom made. Kurt, Ext. 4116 or 821-0104.

Classified Ad Policy

Deadline is 4:30 p.m. Friday for publication Friday of the following week.

1. The Brookhaven Bulletin's classified section may be used only by active and retired Laboratory employees.
2. All items for sale or rent must be the advertiser's property.
3. Ads for material acquired for resale in association with a full or part-time business cannot be accepted.
4. Ads for the sale or trade of firearms will not be accepted.
5. Ads not carried because of space restrictions will be held for publication in the next issue.
6. Ads are run only once and must be resubmitted if they are to be repeated. One ad per person per week.
7. **Property for sale or rent cannot be accepted on this form. Special Real Estate Ad Forms are available at the office of the Brookhaven Bulletin, Building 134.**

☐ For Sale: Autos & Auto Supplies ☐ For Sale: Boats & Marine Supplies ☐ For Sale: Miscellaneous ☐ Car Pools ☐ Lost & Found ☐ Services ☐ Wanted

Please print your ad below in 15 words or less using one word per block. Include name and phone number to call.

Note: The following must be completed for your ad to appear.

NAME (Please Print) .....

Employee's Signature ..... Life No. ..... Ext. .....

Send to: Brookhaven Bulletin, Building 134 (Ext. 2345)

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