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BROOKHAVEN NATIONAL LABORATORY

The ATGC's Of A Virus

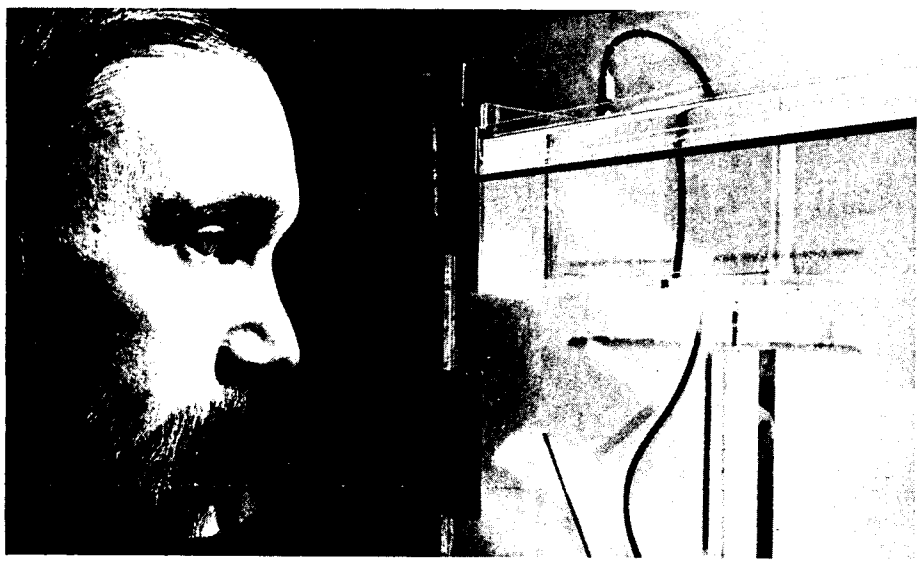
Barbara Lade and John Dunn reading sequence films of T7 DNA.

It starts TCTCACAGTGTA and goes on seemingly endlessly. But not forever. It stops precisely at a T, number 39,936, and the order of all the A's, T's, G's and C's in between are known.

You can check it out with molecular biologist John Dunn, who has determined the entire sequence of T7 DNA. Dunn, with technicians Willy Crockett and Barbara Lade, all in the Biology Department, recently completed the sequence after more than two years of intensive work.

Their achievement comes soon after scientists in England published the whole sequence of human mitochondrial DNA. Up until now, the mitochondrial DNA sequence, with 16,569 residues, was the longest DNA sequence to be determined.

Actually, the entire T7 sequence is two times 39,936 since the DNA molecule is really two strands, each 39,936 residues long, wrapped around each other to form the familiar DNA double-helix. An A (adenine) in one strand is always paired with a T (thymine) in the other strand, while a G (guanine) only pairs with a C (cytosine). These base pairs are the fundamental components of all DNA. The order of the bases determines function, just as letters of the alphabet are used to spell words.



Willy Crockett checking electrophoresis of the chemical reactions on a sequencing gel.

In the case of T7, the sequence of bases in its DNA makes it a bacteriophage, a bacteria-eating virus. Dunn says its growth cycle is about twenty minutes, making it ideal for studying fundamental biological processes such as gene expression, DNA replication and how mutations arise.

"In order to exploit the full potential of this system, one has to know the DNA sequence," says Dunn. "We started with a specific question, an interest in only one region. But when we finished sequencing that region, well, there was another interesting region. A year and a half ago, we came to the conclusion that we really could do the entire molecule, and why don't we do it, and then yes, let's go ahead."

Briefly, this is the technique used by Dunn. The first step is to use enzymes that cut the DNA wherever particular sequences occur, for example, at each grouping of GTTAAC. One end of each of the resulting fragments is labeled with radioactive phosphorus. Then each single-labeled fragment is subjected to five different chemical reactions that cause the DNA to break only at specific bases. These smaller fragments are then electrophoresed on polyacrylamide gels, where they separate according to length. Finally autoradiographs of the gels are made, using X-ray film.

The film shows a pattern — resembling rungs of a ladder — from which a sequence is read. Several hundred fragments and X-ray films later, the final sequence is derived.

Biologists at Brookhaven Lab have been working with T7 bacteriophage since the mid-60's. Dunn credits in particular Bill Studier, also in the Biology Department, for his genetic work on T7, research that greatly aided the sequencing of T7 DNA. Comparing the sequence with what was already known about T7's genetic structure was very helpful because, as Dunn says, "In the final analysis, the sequence has to agree with the genetics, and it does."

Now that the sequence is known, one can in theory go in like surgeon who knows anatomy, slice out and then clone regions of the DNA one wants to study. "T7 has about 50 genes," says Dunn. "The functions of many are known, but about some we know very little. Being able to clone individual genes will be a big help in determining their function."

Besides cloning genes, Dunn is most interested in using the sequence as an aid in purifying the proteins that these genes code for, one the T7 DNA enters a bacterial cell. In the lab the T7 virus is grown in *E. coli* cells, a bacterium commonly found in human intestines. One end of the virus DNA enters the cell first, carrying with it the information for making a protein that inactivates the cell's system for destroying

(Continued on page 2)

Human Embryo And Gene Manipulation

—Photos this page by Humphrey

By R. Daniel Benz

R. Daniel Benz is on the staff of BNL's Medical Research Center, where his current research is cytogenetic toxicology. His work involves developing a technique for evaluating chromosome effects on human cells exposed to pollutants. Benz holds a Ph.D. in Biophysics from the University of California, Berkeley. He came to BNL in 1980.

In 1966 I became aware that human embryo and genetic manipulation was going to be possible in the near future, and I became concerned that the ethical implications should be fully explored before the practices became widespread. I was, and still am, convinced that the technology to specifically change the genetic make-up of a person could pose more of a moral problem about the future of humanity than even a nuclear war. This field is not my prime area of research but has been an avocation for over fifteen years.

In January of this year, I organized a symposium at the annual meeting of the American Association for the Advancement of Science to bring together top scientific and ethics experts in these fields. Participants included Dr. John D. Biggers, Harvard Medical School; Dr. W. French Anderson, National Heart, Lung and Blood Institute; Dr. LeRoy Walter, Kennedy Institute of Ethics; and Dr. Ruth Hubbard, Department of Biology, Harvard University. This meeting is traditionally heavily covered by the press. I wanted to let the general population know what the state of the art and ethical concerns of human embryo and gene manipulation are so that everyone would have a chance to know what is happening and could decide for themselves how they feel about it.

Human *In Vitro* Fertilization and Embryo Transfer

The methods for *in vitro* fertilization are simple to describe if not so simple to accomplish. An ovum is removed from a woman by laproscopy and is placed in a glass dish containing nutrient medium. The egg is then fertilized with sperm and allowed to divide a few times *in vitro*. This embryo is then retransferred back into the mother's uterus and, with luck, it implants and the pregnancy proceeds to term. It is also possible now to freeze the embryo before retransfer and save it for later use. One could determine the sex of the embryo before use or one could make identical twins (or triplets, etc.) of the embryo before retransfer.

In vitro fertilization is for women who normally are unable to conceive because eggs cannot get to their uteri for some reason. The first "test tube" baby, Louise Brown, was born in England in 1978. This procedure is now routine in England (about 80 babies) and Australia (about 60 babies), and the first baby conceived *in vitro* in the U.S. was born in December, 1981. The American baby was the subject of a NOVA program on Public Television last month.

A number of ethical concerns surround this procedure. There is no technical reason why the woman donating the egg, the man donating the sperm or the woman who carries the baby need even know each other. This raises questions as to parentage and family. Currently this technique is used only with married couples. If a fertilized egg is *not* re-implanted is it a form of murder? What if the embryo is obviously defective? It has been suggested that since it is permissible to not use heroic efforts to save a life that would not survive on its own without mechanical maintenance, it would not be morally wrong to discard defective embryos.

R. Daniel Benz - "you are, you are, you are. . . ."

As for the risk of causing birth defects with this technique, the experience to date is that although the methods do not always "work," neither do the "natural" procedures. There is now a very small data sample, but it appears that no more birth defects are seen after *in vitro* fertilization than are seen after the "natural" process.

Finally, there will long be a greater demand for this service than can be supplied. Who should be allowed access to it? Only the rich? Should this be covered by medical insurance?

Cloning People

If you would like a few copies of yourself, take a few cells from your body (it probably doesn't matter which ones), remove the nuclei (which contains the DNA), obtain a few human eggs, remove the nuclei from them, and insert your own nuclei. Then implant the eggs in a few women, wait nine months, and there you are, you, you are, you are....

Such a procedure has been used with insects, fish, frogs and even mice but not yet with humans, although there is no reason why it couldn't be

(Continued on page 2)

ATGC's (Cont'd)

foreign DNA. As more of the DNA enters, another protein is made that prevents the cell from reading its own DNA, and still another makes sure that only T7 DNA is read. From then on, the T7 DNA is in complete control. In twenty minutes, the cell totally disintegrates, releasing a hundred new virus particles.

"We knew for the most part what the virus did, but now we have a better idea of how it does it and what sequences are important for activating genes, DNA replication, and so on," says Dunn.

"With sequencing, cloning, and other techniques, we can go in and change individual bases in the DNA and see what happens. We can manipulate this DNA, a thread of life, almost at will." —Mona S. Rowe

Holiday Shutdown: Facts & Figures

The figures have now been rounded up to define the impact of the Lab's shutdown during the last week of December 1981. In hard cash, the savings work out to $93,395. This figure was arrived at by calculating the savings in salaries, decreased use of telephones, power and fuel.

Additional, but less definable amounts were also realized in that 987 fewer documents were processed by the Contracts & Procurements Division, and 13,931 less stores issues generated during December 1981 and January 1982, compared to the same period the previous year.

Dresselhaus To Give Lecture

Professor Mildred S. Dresselhaus of MIT, president-elect of the American Physical Society, will speak on "The Physics of Graphite Intercalation Compounds" at 1:30 p.m., Thursday, March 25, in the Physics Seminar Room. The talk, sponsored by the Women-In-Science, is open to the entire Laboratory community.

Dr. Dresselhaus is an eminent solid state physicist whose research interests include semiconductors, semimetals, and metals. Her lecture will focus on the structural, electronic, magnetic, and superconducting properties of intercalated graphite. Pure graphite, a form of carbon comprised of loosely bound sheets, has good electrical conductivity. Inserting or intercalating between the sheets atoms and molecules which donate or accept electrons alters the physical properties of the graphite.

Dr. Dresselhaus is the director of the MIT Center for Material Science and Engineering and occupies an endowed chair in the Department of Electrical Engineering. In recognition of her professional achievements, she was elected to the National Academy of Engineering in 1974.

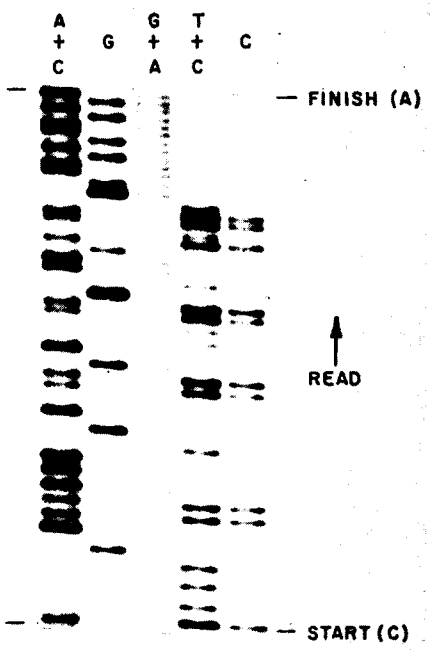
Mildred Dresselhaus

A buffet dinner open to all will be served at 5:30 p.m. in Room A, Berkner Hall. The cost is $6.50. Please reserve by calling the cafeteria management at Ext. 3541. A cash bar will precede the dinner.

Getting Around The Bases

Molecular biologist John Dunn and technicians Willy Crockett and Barbara Lade spent long hours reading X-ray films of T7 DNA sequencing gels, determining the precise order of the bases A (adenine), T (thymine), G (guanine) and C (cytosine).

Dunn says reading the sequence off the film is no great mystery, and anyone can do it. Try your hand at reading this small region of the 39,936 base pair long sequence of T7 DNA. To get you going, here is how to do the first one at the bottom: Reading across the starting row, bands appear in column A+C, column T+C and column C. (No bands appear in the other two columns, so they can be ignored.) The band in column A+C can be read as either A or C, the band in column T+C can be read as either T or C, and the band in column C is read as C . Since C is common to all the columns in which bands appear, this row is read as C. Note that if a row contains a band only in the T+C column (all other columns are blank), the row is read as T. Answer: (CTTTGACC-AAATGATCCGATTCCGTAAGCT-CCTGGAA GAGAAGAGA)



She's The Center Of The Center

The Brookhaven Center is many things to many people: a home away from home for visiting scientists, the perfect spot to unwind after a day's work, a place for the Laboratory community to meet, an after the game gathering place. The Tap Room is also where you'll find Aurora Henck.

Doug Humphrey

Helen Henck

Known to all as Helen, she has been barmaid there since 1979.

While her main function at the Center is to serve drinks, Helen often acts as a surrogate mother to her customers — regulars and newcomers alike. Visitors to the Lab may seek companionship at the Center and Helen sees to it that they are not lonely for very long. "I fuss over them," she says, "I enjoy making the newcomers relax and I introduce them to my regular customers."

On at least one occasion, this motherly instinct has made a Cupid out of Helen. She recalls, "I introduced a new physicist to a good customer and friend. It was love at first sight. Now they're happily married"

Helen, who was born in Puerto Rico, first came to BNL in 1951 as a cashier in the original cafeteria. She left after about two years to raise her family, returning to the Brookhaven Center in 1964 as a waitress for the Luncheon Club, which provided Lab employees with a pleasant atmosphere in which to enjoy good food and good discussion. There, Helen worked side by side with Marian Harrison, until the Luncheon Club became obsolete in 1970. Marian became secretary to Roy Johanessen who manages the cafeteria and the Brookhaven Center for the Saga Food Company.

Helen became the barmaid at the Center where she has become an institution to many employees who say simply, "She's great."

Also working at the Center is cook Ronnie Scott who prepares food to complement Helen's drinks. They are on duty every night except Saturday, from 5 to 11 p.m., to welcome everyone to the Brookhaven Center.

Lecture Reminder

Michael Murtagh will give a Brookhaven Lecture on Wednesday, March 17, at 8 p.m. He will speak about "Searching for Neutrino Oscillations."

Gene Manipulation (Continued)

done if somebody wanted to.

And that is the problem: There is no reason why anybody would want to. People are affected by their life-experiences as well as their genetic composition. To truly "duplicate" yourself, you would have to duplicate all your life history which is clearly not possible. Also, there is always the point that creating people the old-fashioned way is much less technically difficult and certainly a lot more fun.

In addition to this, genetic diversity is absolutely necessary for long-term species survival.

Genetic Engineering Of Human Embryos Or Adults

The techniques for adding new genes to embryos or cells of adults are also simple to describe if not so easy to do. The gene of interest is isolated and many copies are made in a test tube. Target cells are removed from the person or an embryo is obtained, and they are grown *in vitro*. The genes are then added to the cells by one of several methods and the cells are replaced into the adult, or the embryo is implanted for development.

Such techniques can be used to cure persons who have diseases caused by specific genetic defects such as beta-thalasemia, sickle cell anemia, diabetes, etc. But they might also be used for genetic "enhancement," e.g., to make someone have a better memory.

So far, specific genes have been transferred into mouse embryos and one group tried to cure several patients with beta-thalasemia but apparently did not succeed.

Ethical considerations can be divided into two classes. Few feel that curing people with specific genetic diseases is anything but laudatory. It has been said that "defective genes ought to be an endangered species," and that future generations would surely want this. In doing this procedure, the same rules would be applied that are commonly used to protect human patients in all medical practices and research.

But what about genetic "enhancement?" Should we add an "intelligence" gene to people if one is ever found? It was suggested that this type of engineering would surely require new, carefully made decisions but that the entire procedure should not be forbidden because it could be abused. One should not let people who can be cured die today because it *might* be possible to misuse the methods in the future. Society should plan well ahead for this possibility. Input should be obtained from *all* segments of our society, and not just the physicians and scientists or politicians.

This article is a necessarily over-simplified statement of the current science and ethics of human embryo and gene manipulation. I would be delighted to discuss any of these issues further with anyone interested.

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. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. Staff members should call Ext. 3484.

BNL 51304
Proc. of the Second Int'l. Symp. on the Production and Neutralization of Negative Hydrogen Ions and Beams. Oct. 6-10, 1980. Th. Sluyters

BNL 51306
Programs and Subroutines for Calculating Cadmium Body Burdens Based on a One-Compartment Model. C.V. Robinson, K.M. Novak

BNL 51309
Hydrogen Production from Small Hydropower Sites. Final Report. Air Products & Chemical, Inc.

BNL 51313
Marshall Islands: A Study of Diet and Living Patterns. J.R. Naidu, N.A. Greenhouse, G. Knight, E.C. Craighead

NUREG/CR-1862
NUREG-51315
Evaluation of Isotope Migration — Land Burial. Water Chemistry at Commercially Operated Low-Level Radioactive Waste Disposal Sites. Status Report Oct. 1979 — Sept. 1980. K.S. Czyscinski, A.J. Weiss

BNL 51319
Fuel Cell Applied Research: Electrocatalysis and Materials. Quarterly Report Jan. 1 — Mar. 31, 1980. S. Srinivasan, H.S. Isaacs, J. McBreen, W.E. O'Grady, H. Olender, L.J. Olmer, E.J.L. Schouler, K.V. Kordesch

BNL 51234
Estimates of Occupational Safety and Health Impacts Resulting from Large Scale Production of Major Photovoltaic Technologies. T. Owens, L. Ungers, T. Briggs

BNL 51331
A Comparison of Vegetation Patterns and Soil Nutrient Relations in an Oak-Pine Forest and a Mixed Deciduous Forest on Long Island, New York. S.C. Peterson, P.S. Curtis

BNL 51332
Role of Temperate Forest Heterogeneity in Determining the Population Ecology of *Peromyscus Leucopus*. B.G. Ormiston

NUREG/CR-1930
NUREG-51339
Index of Risk Exposure and Risk Acceptance Criteria. B. Miller, R.E. Hall

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New Procedure For Paper Pickup

Another efficiency measure which will also net the Lab some money has now been put into effect by the Supply & Materiel Division.

It has long been a Laboratory practice to sell scrap computer paper and cards to outside contractors for recycling. In the past, pickups were made all over the site by contractors who would deduct the cost of collection from payment for the scrap material.

Now, Supply & Materiel has assumed responsibility for collecting these items. Under the new procedure, announced by Nelson Tyler, pickups of scrap will be made at the same time as normally scheduled deliveries of paper and cards, thus making one trip doubly efficient. The scrap will be stored in a central location. As contractors need only pick up the paper from one place, the Laboratory will earn more money from the sale of the scrap material.

Don't Start Too Soon

One error many gardeners make is starting vegetables too early, says the Cooperative Extension Association of Suffolk County. Daylength and light intensity increase throughout the spring months and plants get off to a better start when grown with more light.

Under average house temperature conditions, it should take at least four to five weeks to grow a tomato plant to sufficient size and to harden it for several days before transplanting it to the garden. Peppers and eggplants may need six to seven weeks, cabbage four weeks, and vine crops such as melons, squash, pumpkins and cucumbers require only two weeks.

An important step is the hardening process. Plants that have been started inside under reduced light and warm temperatures are termed "tender" and will often succumb if placed directly into the garden. In the hardening process, they are gradually exposed to full sunlight, cooler temperatures and restricted water. Generally, four or five days is suffcient. If a cold frame is not available, use a protected location on the south side of a building. More protection will be necessary if temperatures are less than 40°F.

Did you know?

When mesons and strange particles were first discovered, they were known as the particle zoo. The discovery of the Omega minus particle gave an encouraging confirmation that the zoo had a comprehensible layout.

Did you know?

In 1931, the physicist Robert Millikan predicted that by our time, "the United States and Germany will probably be the world leaders in science." Only two years later, Hitler came to power,and the cream of Central European scientists began to make their way to American shores. Since then, the United States has been the location for more important theories, experiments and instruments than all the rest of the world put together. This dominance of a field of science by one country is without precedent in modern history.

—Spencer R. Weart, "The Last Fifty Years — a Revolution," Physics Today, 11/81

The Walls Have Ears –

An overheard conversation imperils the engagement of a young composer and a famous actress. Can their tender romance be saved? You'll find out when you see the BNL Theater Group's delightful production of Ferenc Molnar's classic comedy, "The Play's The Thing." Shown here in their rehearsal clothes are (from left) composer Peter Irving, playwrights Kurt Fuchel and Neil Baggett: (at right) actress Sandi Lane, and actor Bill Love. Come see them in their costume finery, March 19, 20, 26, and 27 at 8:30 p.m. in Berkner Hall. Tickets ($2 for students under 18 or senior citizens, $3 for others) are available from Theater Group members listed below, or at the door.

Ticket Sellers:

BERA Sales Office ..... Berkner Hall
Neil Baggett ..... 510F - Physics
Penny Baggett ..... 902B - ISABELLE
Kurt Fuchel ..... 515 - Appl. Math.
Georgia Irving ..... 460 - Director's Office
Bob Kinsey ..... 197D - DNE
Sandy Lane ..... 830 - DNE
Joe Skelly ..... 911B - Accelerator
Bonnie Wesolowski ..... 555 - Chemistry

WIS Meeting

Three films from "The Story of Radiation" series will be shown at the Women in Science luncheon meeting on Thursday, March 18, in Room B, Berkner Hall.

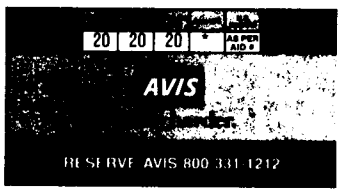
Mary Pat Takacs of the Safety and Environmental Protection Division will comment on the films, which deal with what radiation is made of, its effect on humans, and how to interpret doses. The program will start promptly at noon and is open to everyone. Bring your own lunch.

Drivers Note

If you rent cars for official or personal use and don't recognize this

BROOKHAVEN NATIONAL LABORATORY

A/A 298900



you are missing out. Check with the Travel Office for more information.

Softball

Softball leagues are now forming. If you were not able to attend last week's meeting and you have a team which you wish to enter in the league, please call Charlie Bohnenblusch, Ext. 4758, for roster forms and information. For scheduling purposes, all rosters must be in by Friday, April 2.

Volleyball

Standings as of 3/8/82

A Division	
Teddybares	11-1
Mixed Ups	8-1
Dinkers	7-2
High Society	5-7
Las Bolas	4-5
Nuts & Bolts	4-8
Leftovers	0-9
B Division	
Semi-Tough	8-1
TNT	6-3
Puff & Stuff	5-4
KMA	4-5
Big Boopers	2-7
Quirks	2-7

Poetry and Drama En Français

Danielle Netter

Next Friday, the BNL French Group will sponsor an evening of dramatic readings by Danielle Netter. Mme. Netter has worked with some of the most prominent directors of contemporary French theater. She has performed works by Sophocles, Corneille, Racine, Moliere, Shakespeare, Chekov, Brecht, and others. In 1974 she founded her own company, *Histoire et Theatre,* for the presentation of historical-literary productions dealing with the Trojan war, Joan of Arc, Louis XIV, and the French Revolution. Her productions have met with tremendous success in France and abroad.

Her presentation Friday night will be a montage of dramatic excerpts, prose, songs, selections from novels, tales and poetry by women, both famous and unknown, accompanied by a background of sound and music.

The French texts will be available to make it easier to follow. The program will take place next Friday, March 19, at 8 p.m. in Room B of Berkner Hall. A fee of $3.50 will be requested of non-members.

Micom Meeting

The next meeting of the MICOM Users' Group will be Wednesday, March 17 at 3 p.m. in the Conference Room of Bldg. 725B. The topic for this meeting will be the new Keystroke Memory program for repetitive editing now available for the MICOM 2000 and 2001. The meeting is open to anyone interested in Word Processing. For further details, please call Lavina Richter, Ext. 2905, or Jeannette Thiede, Ext. 4548.

Bowling

White League

The Portsiders are in first with the Pinsplitters moving into second. High games were bowled by N. Erickson 225, J. Griffin 218, M. Scheidet 208, B. Sells 204, R. Jackimowicz 202, R. Scheidet 200, G. Fales 203. M. Brenner converted the 6/7/10 split.

Red & Green League

J. Morris rolled games of 204/215 for a 614 scratch, 665 gross series, R. Barberich 213/209, R. Wiseman 222, J. Connelly 218, J. Ferrante 216, C. Bachsmith 203/204, M. Iarocci 208, J. Carroll 206, R. Helmig 204, N. Tyler 204, E. Meier 202.

Purple League

High games were bowled by E. Sperry 212, B. Jones 212, T. Romano 203, P. Bonti 202, F. Scesney 190.

L.I. Industrial Tournament

Representing BNL in the L.I. Industrial Bowling Tournament in Hempstead are D. Larsen, B. Jones, J. Morris who rolled a 225, K. Riker with games of 214/213, and M. Iarocci with a 198.

Scotch Doubles

The following are the winners of the Scotch Doubles Tournament held at Port Jeff:

- M. Leach — D. Miesell
- D. Murgatroyd — E. Murgatroyd
- H. Stemm — A. Stemm
- N. Tyler — C. Tyler

Cafeteria Menu

Week Ending March 19, 1982

Monday, March 15		
Cream of tomato soup	(cup)	.60
	(bowl)	.70
Ham & potato au gratin & 1 veg.		1.75
Stuffed cabbage & 1 veg.		1.70
Hot Deli — Pastrami	(bread)	1.75
	(roll)	1.85
Tuesday, March 16		
Lentil soup	(cup)	.55
	(bowl)	.65
Turkey & stuffing with giblet gravy		1.80
Sauerbraten & red cabbage		1.85
Hot Deli — BBQ pork sandwich	(bread)	1.75
	(roll)	1.85
Wednesday, March 17		
Split pea soup	(cup)	.55
	(bowl)	.65
St. Patrick's Day Special		
Corned beef sliced to order with cabbage and boiled potatoes (Irish soda bread)		1.95
Mulligan beef stew w/biscuit		1.80
Hot Deli — Baked ham	(bread)	1.75
	(roll)	1.85
Thursday, March 18		
Old fashioned bean soup	(cup)	.55
	(bowl)	.65
Beef hash & 1 veg.		1.75
Sauted chicken breast over rice		1.80
Hot Deli — French toasted grilled ham & cheese		1.70
Friday, March 19		
Fish chowder	(cup)	.60
	(bowl)	70
Eggplant parmesan & 1 veg.		1.75
Swedish meatballs over noodles		1.75
Hot Deli — Roast beef	(bread)	1.75
	(roll)	1.85

Arrivals & Departures

Arrivals

Himanshu Jain ..... Nuclear Energy

Departures

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

Yosuke Inagaki ..... Instrumentation

Correction

Window service at the Upton Post Office is from 8 a.m. to 5 p.m. Monday — Friday. Last week's article "New Boxes At P.O." had them starting work an hour later.

Classified Advertisements

Autos & Auto Supplies

CHEVY BLAZER - Pickup, compl. nose unit, excel. cond.,no rust. $500 or best offer. 286-1522 eves only.

74 DODGE - Colt, excel. running cond., 4 spd., good mpg. $400. Ext. 4547.

DYMO BARS - for 1980 Suzuki, 1000cc shaft drive. Protect your engine. $20. Dan, 277-1284.

71 TOYOTA - Sta. wag., good trans., 30 mpg. $600. Ext. 3894 or 744-9812.

80 SUZUKI - GS1000L, shaft drive, luggage rack, many extras, warranty. $3,000. Ext. 7745 or 981-9474.

67 FORD - Fairlane, auto. trans., 390 ci, low mi., mint cond., garaged. Must see, $4,000. 924-5477.

80 MAZDA - Pickup, 4 cyl., 5 spd., Sundowner Sport, am/fm, cassette, excel. cond. Asking $5,295. 588-2008.

71 BRONCO - 4 WD, 3 spd., 302, good mpg. $2,000. 475-9131 after 5:30 p.m.

68 COX POPTOP CAMPER - good cond. $375. 588-2008 after 6 p.m.

65-66 MUSTANG - rear bumper, no dents, $20; Blackwell cover for 65-67 convertible (new), $15. 929-8105.

RIMS - (2) 16" Chevy. $6 each. 732-6266 after 6 p.m.

80 CHEVY CITATION - 4 cyl., 4 spd., manual O.D. trans., 28 mpg. Many extras, $4,800. 589-3098 after 6 p.m.

TOYOTA ENGINE - 1600cc, 4 spd. trans., radiator, alternator, starter. All $100. Ext. 4098 or 281-8318.

77 HONDA - motorcycle, 400cc, Supersport, excel. cond., great mpg. Must sell, $1,000. 281-2257 after 5 p.m.

72 DODGE CHALLENGER - r/t, 340 eng., auto., stereo, mags, excel. cond. in and out. Must sell, $2,000. 281-2257 after 5 p.m.

70 TOYOTA - Rebuilt heads, runs well, good body; also second car, good for parts. Two for the price of one. Only $650 for both. Ken, Ext. 4581 or 286-1615.

77 INVADER - trailer, 25', sleeps 8, full rear, bath, dual batteries, many extras. $5,400. 732-2334.

78 HONDA - 400cc, well maint., 6000 orig. mi., some extras. Must see, $1,000. Ext. 2926.

68 VW BUG - recond. eng., new clutch, new paint, very clean, must be seen, $1,875. 281-2431.

80 CHEVY PICKUP - diesel, a/t 3 spd., w/overdrive, p/s, p/b, a/c, dual 20 gal. tanks, undercoat and rustproof, bed liner, cap, extras, excel. cond, $7,975. Ext. 4751 or 473-1967.

70 FORD - Maverick, 3 spd., 28 mpg., good eng., body needs work, $350. Anand, Ext. 2117 or 928-5529 eves.

TIRES - (4) E78.14, Sears radials, used, $5 ea.; (2) 14" AMC rims, $5 ea. Frank, 878-8258.

70 VW BUG - it's tired but it runs, best offer. Brian, Ext. 2059.

77 TRUCK CAMPER - 11-1/2' Aristocrat, loaded, mint cond. Mike, 878-1325.

76 DODGE VAN - B300, 3/4 ton, p/s, p/b, auto. trans., V8 trans. leaks, best offer over $1,500. Harry, Ext. 5018.

72 HARLEY DAVIDSON - FLH Police Special, 1200cc, all stock, $3,000. John, Ext. 4973 or 798-3766.

TIRE - brand new, Peerless steel belted radial, 7R78x15 w/w, worth $65, $30. Sue, Ext. 7235.

70 FORD - Mustang, V8, a/t, $300. Ext. 4088 or 286-0204.

60 STUDEBAKER LARK - 6 cyl., auto. 47,000 orig. miles, driven daily, $1,000. Kevin, 281-8031.

80 CHEVY - diesel pick-up, many extras, unlimited warranty until Nov. $8,000. 475-4623 after 5 p.m.

76 TOYOTA COROLLA - 2 dr., a/t., p/b., excel. cond., 56 kmiles, $2,000. Ext. 7547 or 282-3126.

SNOW TIRES - Goodyear, 8.00 x 16.5 good cond. $35/pr. Steve, Ext. 4636.

FORD SHOP MANUALS - 71 and 78, complete sets, best offer. Sam, Ext. 3453.

76 PONTIAC - Grand Prix, mech. special, probable bad connecting rod bearing (serious eng. prob.), best offer, Ext. 7577 or 473-7720.

74 VW SUPER BEETLE - excel. cond., must see, $2,200. Ext. 5181 or 698-4444.

73 PLYMOUTH - 4 dr. sd., 318 eng., auto., $350. 924-0960 any time.

75 DATSUN - pick-up, w/cab, mag wheels, selling parts or whole. Bill, 399-2531 after 5 p.m.

Boats & Marine Supplies

75 SEARS - 7 HP outboard with tank, excel. cond. $225. Billy, Ext. 3541 or 924-8689 eves.

13' BOAT - wood/fiberglass, needs work, 35 HP, good cond. $150 takes all. 473-9223 after 5 p.m.

79 BASS BOAT - Charger, incl. live Baitwell rod racks. 744-7577 or 473-1456.

23' ALLMAND - fiberglass, 150 HP, Mercury 1/0, cuddy cabin w/trailer. $3,800. 475-2679 eves.

79 SILVERLINE - 16', 55 Johnson, new canvas. $1,500. Kevin, 567-6651.

71 EVINRUDE - 60 HP, good cond., winterized. Pick-up Southold. Asking $400. Marsha, Ext. 2871 or 727-8750 eves.

8' PRAM - w/outboard, 2-1/2 HP Evinrude, excel. cond. Jim, Ext. 3436 or 727-7741 after 8 p.m.

80 HP EVINRUDE MOTOR - needs lower unit, repaired, $100. 589-9103 eves.

79 MERCURY - 50 HP outboard, manual start, perf. cond., 25 hrs. $1,000. Mickey, Ext. 3082 or 286-3984 eves.

12' BOAT - fiberglass, 10 HP motor, good trailer, $800. Brian, Ext. 2059.

22' BOAT - glass cuddy cabin, deep-V, trailer, plus extras, $3,500. Ext. 3935 or 325-0968.

Free

POOL - Above ground. You take out. 751-1687.

Yard Sales

TAG SALE - March 13 & 14, Oak La., Wading River, 10 a.m. - 4 p.m., some furn., household items, tools, unsplit wood. Eriksen, 929-8642.

Miscellaneous

BIKE - 26" girls, 10 spd., $25; 20" girls, 3 spd., $50. Like new. 473-9223 after 5 p.m.

LEATHER BOWLING BAG - 2 balls, $10; 8 track tapes, $1 ea.; assorted paperback novels, 10¢ ea. 732-3350.

USED BRICKS - clean, 15¢ ea.; 4 ft. galv. chain link fence, 7 per ft., 400 ft. avail. Tom, Ext. 4084 or 878-1060.

R/C PLANES - (2) plus all access., radio, 6 channel, 4 servos., 2 eng. Asking $300. Manny, Ext. 2022 or 369-1688.

TABLE SAW ATTACHMENT - Sears, bolts up to skill saw. Like new, $60. Ext. 3457.

GO CART - Sears, good cond., $150; Odyssey TV game, 5 cart., $200. Ext. 3894 or 744-9812.

NECKLACE - 27", 14K gold, three small diamonds. Must see, $150. Ext. 7187.

AMPLIFIER - Scott, integrated, $40. Diane, 929-6748.

UMBRELLA STROLLER - $10; full stroller collapsible, $15; industrial floor scrubber, $75; Navy top side curtains, $20. Carl, Ext. 4420.

FIREPLACE - free standing w/screens, brand new. Sacrifice $75. Ext. 4702 or 928-7769 after 5:30.

POKER TABLE - custom made, $100; freezer, 30 cu. ft., $250; couch, blue; kitchen set w/6 swivel chairs. 289-5704 after 5 p.m.

DOUBLE GAS BARBECUE - Charmglow; liv. rm. set; wheelchair; 12" b/w TV; walker. 981-1692.

POWER SUPPLY - 36VDC, 25 amp., battery charger, can be converted to 12V or 24V. Victor, Ext. 2395.

DRUM SET - 3 piece, plus 2 cymbals. 475-4270.

STEREO RECEIVER - and speakers, Emerson, excel. cond., still in box. Only $199.95. Ext. 4303 or 286-3149 eves.

TICKETS - Met opera, Fidelio, April 2, D.C. box seats 2 & 3, partial yet outstanding view, $30. 928-7826 after 6 p.m.

C.B. - 23 channel, Pace mobile unit, $25. 473-8749.

BOW & ARROWS - Compound, never used, can be made into 4 wheeler, $120; wood lathe w/cutting tools and all access., $60. Ext. 4823 after 5:30 p.m.

KITCHEN TABLE - white oval formica and two wood tressel benches in v.g. cond. Asking $50/set. 281-0360.

ELECTRIC WALL OVEN - Hardwick, 24", good cond., $85 or best offer. 929-8105.

BARBER CHAIR - porcelain, 1940's, great conversation piece, $150; electric barber pole light, $120. Mike, 669-9482.

JACKET - Mouton lamb, brown, fits sizes 12-16, good cond., $75. Ext. 4267.

ELECTRIC COMPACT DRYER - 10 lbs., 220, 21" wide, 3 cycles, perm. press, window vent, good cond., $75. 399-4243

BICYCLES - boys, 24" Schwinn, 10 spd.; girls, 26" Iverson, 3 spd., good cond., $40 ea. 581-7656.

HOME PROTECTION - and fire systems, wireless, Lab discount. Gene, 286-8330.

CAMERA - Kodak Pony 135 w/case & flash attachment; Wollensak 15-40 power telescope. $35 takes all or swap for light meter. 744-9832.

FRENCH VICTORIAN BED - lamps; Griffith Spinnet console piano; mink coat, sz. 14. HR2-0509.

CAMERA - Yashica Electro 35 GSN, used 2 mos., $80 firm. 924-6348.

GAS RANGE - 36" in good working order, $35. 231-8479 after 6 p.m.

SLEEPER COUCH - grey velour; twin box spring & mattress; 2 desks; dressers; chairs; baby items; toys & more. Moving. 331-3724.

POTS - 9 pc. set, Country Collection by Magnalite, hand-cast aluminum. Orig. $120, asking $50. Cheryll, Ext. 4207 or 654-2041.

FREEZER - $200; b/w TV, needs repair, $25; girls bike, $45. Paul, Ext. 4156.

COLOR TV - Sylvania, 25", good cond., $100. Ext. 3922.

REFRIGERATOR/FREEZER - Whirlpool, side-by-side, 21.2 cu. ft., 36" wide, good cond., $85. 475-2679 eves.

VACUUM - $25; luggage, 2 pcs., $10 ea.; contemp. desk; antique chair, $80; queen sz. bed/headboard, $125; single bed, $60; new crock pot, $15; new ice cream maker, $10; ironing board, $5; brass floor lamp, $50; stereo console, $25. 878-8933.

IMITATION FUR COAT - boot length, new, sz. 14, $70. 924-6051 after 6 p.m.

COLOR TV - Zenith, 25", needs work, best offer over $25. G. Kinne, Ext. 4061.

OIL BURNER GUN - good working cond., $25; Kodak Telektra camera w/electronic flash; Polaroid Model 320 camera w/flash attach., $25. Bob Doering, Ext. 4474.

C.B. TOWER - 40" tilt, Wilson "Y" quad antenna, rotor, cable & many other extras, $150; all wood credenza, beautiful for dining rm. or liv. rm.; black Japanese Silkie chickens. 751-5539.

CAR RACING SET - Aurora, AFX, GT (plus) cars, new pwr. transformer, extra tracks & cars, hardly used, like new. Mark, 744-8063 days.

BOY'S 3-PIECE SUIT - w/white shirt, sz. 10, navy blue, polyester, like new. $15. Ext. 2926.

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

SLO-COOKER - plus, non-stick interior. Harvest pot lifts from base for oven or rangetop, Pyrex cover to bake and serve; sewing machine; iron; hair dryer; high chair; quartz heater; roll top desk. 924-4991.

ATARI TV GAME - $100 complete. 24 cartridges, $10, $14, none higher than $22. Ron, Ext. 3238.

275 GAL. TANK - $50. Ext. 3848 or 472-0553.

B&W TV - 21" console, beautiful maple cabinet, perf. cond., $50. Joe, Ext. 4255 or 289-1831.

PROPANE STOVE - Bernzomatic, 2 burner, portable, very good, $20; Coleman icebox, holds 75 lbs. ice, very good, $18; 3 bar stools, swivel action, hgt. adjust., ring type foot rest, vinyl padded, $15 ea. 588-5228.

FIREWOOD - split, seasoned oak, 4'x16'x18", $110 delivered, 924-4284 or 924-3919.

TYPEWRITER - Adler Meteor 12, elec. portable, w/case, excel. cond., $150. 589-2884.

WEDDING GOWN - sz. 9, $150; veil and under slip $50. 878-9213 after 4:30 p.m.

DINING ROOM SET - antique, circa early 40's, nine pieces, table w/leaf, pads, 4 side chairs & 1 captain's chair, buffet, breakfront and sideboard, mahogany solids & veneers, gd. cond. Asking $300. Ext. 2384 or 878-0074.

DINING ROOM SET - bedroom set, desk & chair. 924-3546.

TRANSITE PEGBOARD PANELS - 4'x8'x1/4", cost $48. ea., asking $18. ea. 286-1522 eves. only.

RADIO SHACK COMPUTER - TRS-80, w/cassette drive, basic and game tapes, $350. McFadden, Ext. 4188 or 363-5170.

MEDICAL THERMOMETERS - new, $10. Charlie, Ext. 3935.

TAMBERG RECEIVER - AIWA tape deck, AR turntable, w/Ortonfon cartridge AR92 speakers, sacrifice, asking $700. Ext. 2034 or 475-2598.

CAMPING GEAR - Coleman stove and lantern for only $30 total. 473-2473.

SCANNER - 10 chan., high/low bands charger, ant., case $160. Paul, Ext. 4665 or 727-4859.

BASF TAPE CASSETTES - FeO, FeCr, CrOe and metal, reasonable. Ext. 2521 or 928-8379 eves.

BIKE - 12 spd., Fugi Grand Tourer, like new, extras, must see to appreciate, $165. Ron, 878-1731.

MINIBIKE - Trailcat, 5 HP, Tecumseh, front and rear shocks, very fast, $175. Greg, 286-0065.

FURNITURE - contem., good cond., l/r couch, 2 chairs. Franz, Ext. 7103 or 744-3235 eves.

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

MASTIC BEACH - 4 bdrm. cape, low taxes, 160x100, gas h/w & cooking, walk to stores & bay, 8% Farmer's mortgage, eik, d/r, l/r w/Franklin, $28,000. 281-0360.

MILLER PLACE - Contemp. ranch w/$ saving heat, 4 bdrms., eik, l/r, d/r, den, fenced yard, mint cond. Rustic acres, $72,500, financing avail. 331-3724.

MIDDLE ISLAND - ranch, 3 b/r, 2 f/baths, l/r, eik, den, basement, covered patio, excellent, many extras. 924-6354.

For Rent

LAKE PANAMOKA - studio apt., priv. ent., priv. garage. $300/mo. w/util. Don Shuette, Ext. 3084.

PORT JEFF STATION - 1 mi. from shopping center, 3 bdrm. house w/gas heat, no pets, avail. April 1, $425/mo plus util. Ext. 2744 or 928-2469 eves.

BERKSHIRES CHALET - 3 hrs. from NYC, 3 bdrms., 2 baths, fully equipped kitchen, electric heat, deck w/spectacular view, near lake, hiking trails, near ski areas. Avail. weekly or weekends. 929-6946 after 6 p.m.

CENTER MORICHES - unfurn, 3 b/r, ranch, 15 min. from Lab. Avail. 5/1, $375/mo. + util. Security and references req'd. 878-1280 after 6 p.m.

Car Pools

RONKONKOMA - driver to join existing pool near Exits 58, 59, 60. Victor, Ext. 2395.

PLAINVIEW - drivers for car pool from LIE Exit 45. Reg. hrs. Monty, Ext. 2431.

PATCHOGUE VIA E. PATCHOGUE - on time, opening for paying rider. Alyce, Ext. 2902.

BELLPORT - 8:30-5, on-time carpool, looking for fifth member. George, Ext. 7654.

Wanted

RIM - (1) 15 x 8 for CJ5, preferably white spoke. Toni, Ext. 2907.

OUTBOARD MOTOR - 2 HP. If it's just lying around, turn it into cash. 473-2473.

OIL TANK - 275. Dinos, Ext. 4666.

POOL WALL - 4 ft. high, min. 15 ft. dia. I'll take down. Ext. 3457.

HIGH SCHOOL YEARBOOKS - any year, Westhampton, Eastport, Hampton Bays, Southampton. Reasonable. Jack Phillips, Ext. 4060 or 653-4924.

BICYCLE - boys, 20". Henry, Ext. 7913 or 724-6497 after 6 p.m.

BOAT TRAILER - 19', 3,000 lbs. or better. Fred, 588-3540.

PERSON - looking for multiple income development. 732-6647 for info.

AMBITIOUS PERSON - $200-$300/mo., 6-8 hrs./wk. 698-5861 after 7:30 p.m.

CAMPBELLS SOUP LABELS - for St. Mary's School, E. Islip. Send to F. Chandler, Bldg. T-89.

HOUSE-SITTER - April 9-30, 1982, rural Center Moriches, 15 min from Lab. Ext. 3578 or 878-4864.

OUTBOARD ENGINE - 7.5-9.5 HP, long shaft for sailboat, Evinrude, Johnson, Honda, preferred. 589-5490 after 6 p.m.

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

HOUSEMATE - 2 b/r condo., Holtsville, 5 appl., $225 incl. all util. Female please, Ext. 3199 or 475-6622 eves.

TWO CAR GARAGE - will move. 878-4304 after 5 p.m.

VENDORS - flea market, Newfield H.S., Selden, April 18th. If interested call 732-7591 or 698-2349.

CARBURETOR - 2 Bbl.; to fit 390 Ford eng., preferably Mod. #2100-D. Chuck, 589-1069.

UNFURNISHED APT - or home to rent for couple, $400 or less/mo. 282-3112.

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

ROLL TOP DESK - Barbie doll collection; girls 20" bike. 924-4991.

Lost & Found

FOUND - Bicycle. Ron, Ext. 3887.

Services

INCOME TAXES - exper. preparer, very reasonable rates. Bill, 821-9081.

BABYSITTING - Mastic/Shirley area, exper. 13 yr. old, good w/children. Tracy, 281-2396.

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

TYPING SERVICES - 744-4047.

HOME IMPROVEMENTS - carpentry, roofing, masonry, painting, compl. ext./int. Free estimates. 281-0360.

HOUSE CLEANING - and/or babysitting. Hours flexible, experienced, can provide refs. Cathy, 281-0360.

HOUSEPAINTING - int./ext., professional, quality materials, insured. Bob, 289-7657 after 6 p.m.

PLUMBING - and heating, Lab discount. John 654-8189.

SHEET ROCKING - and spackling. Free estimates. Kevin, 567-6651.

TAXES - prepared by tax consultant, your home or mine. Reasonable. John, 732-2472.

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

HOUSE SITTING - reliable, experienced, caring. Plan your vacation now. Jack Allentuck, Ext. 2412.

TILE SETTERS - ceramic quarry tiles. No job too small. Free estimates. E. Harris, 475-6460.

CARVING KNIVES - sharpened on a flat stone, $10; pen knife, a razor edge. Dave, Ext. 4755.

CARPETS INSTALLED - repaired, quick, dependable service. Free estim. Jim, 821-0187 after 5 p.m.

PROFESSIONAL INCOME TAX SERVICE - by exper. preparer, IRS enrolled, on-site preparation. Jack, Ext. 7942 or 864-2236.

MOTORCYCLE ACCESSORIES - for street and dirt. Ext. 2311.

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 ☐ Free

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).