BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

A Penchant for Particles

It is 8:30 a.m., and a new BNL workday is under way. At the trailer for a neutrino experiment, a physicist who has spent the night collecting data prepares to go home. In the Medical Department, a nurse logs in a patient who is participating in research involving activation analysis. A construction worker dons his hard hat before starting the day's work on the tunnel between the Alternating Gradient Synchrotron (AGS) and the Tandem Van de Graaff accelerator. At the National Synchrotron Light Source (NSLS) and the High Flux Beam Reactor (HFBR), scientists carry out structural analysis of biologically important molecules.

As diverse as these activities appear, they are united by a factor that links most of BNL's research: particles. Though most commonly associated with physics studies, particles are part and parcel of the whole Laboratory. When BNL researchers probe particles with other particles, they gain fundamental understanding of how our universe works. When scientists at Brookhaven use particles as probes, they gain insights into the chemical and physical forces of nature, the structure and behavior of molecules and the functioning of life processes.

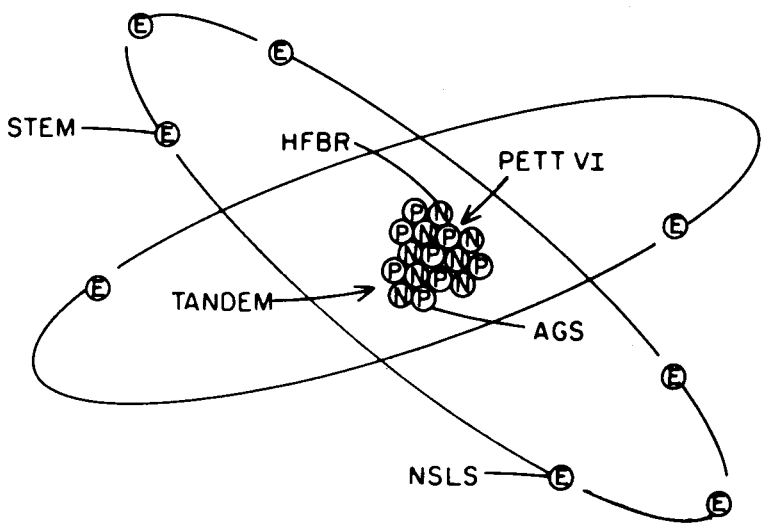
In the sense of Brookhaven's overall research program, a particle might be broadly defined as any very small part of matter. With this definition, one such particle is the atom. When atoms congregate, they form larger particles called molecules. And as molecules congregate, matter moves into our scale of dimensions, creating the world we know and see. At the opposite extreme, some particles, such as photons, have no mass at all but are still very important — as light, radio, TV, x rays and so on.

Atoms are themselves composed of even smaller particles in highly structured congregations: electrons orbiting around a nucleus composed of neutrons and protons. While electrons are believed to be basic, indivisible, building blocks of matter, or elementary particles, the nuclear particles — protons and neutrons — seem to be made of even smaller entities called quarks, which may also be elementary particles.

Nuclear particles led to the formation of BNL. As recounted in the report, "The Founding of the Brookhaven National Laboratory," made by Associated Universities, Inc. on January 15, 1948, "At the end of [World War II] it became apparent that the teamwork of government and scientific institutions, which had been so effective in wartime work, must somehow be perpetuated in order to insure the continued progress of nuclear science in peace time. The enormous expense of the tools needed to pursue the next steps in this research — nuclear reactors and high energy accelerators — and the shortage of scientifically trained personnel pointed towards the establishment of a cooperative laboratory."

Nuclear reactors and high energy accelerators produce beams of particles, and the staff at BNL immediately concentrated on the building of these tools, in order to create the nuclear particle probes needed to do nuclear science. The Brookhaven Graphite Research Reactor (BGRR), the world's first nuclear reactor for peace time research, was commissioned in August 1950, and, in June 1952, protons began circulating through the Lab's first accelerator, the Cosmotron.

The BGRR and the Cosmotron have since given way to more powerful machines. But they have left two continuing legacies at BNL: major research findings and a penchant for particles. The tapestry of particles that BNL has woven is stronger and brighter than ever, serving as a backdrop for a number of big machines and a wide variety of basic and applied research. A closer look at some BNL activities, such as those mentioned at the outset of this article, can help unravel the particle pattern.



Each part of the atom is used by a BNL machine. The electrons circulating around its nucleus are used by the NSLS to produce photons, and by STEM. The neutrons and protons that make up the nucleus are used by the HFBR and the AGS, respectively. The entire nucleus is used as a light or heavy ion in the Tandem Van de Graaff, and soon, in the AGS. A radiactive nucleus (i.e., carbon-11) is incorporated into a deoxy-glucose molecule, which, when given to a subject, emits positrons that are detected by PETT VI.

Particles on Target

The tunnel the construction worker is building will, by 1986, transport heavy ions from the Tandem to the AGS. A heavy ion is simply an atom stripped of its electrons; in other words, a highly charged nucleus. Since they may contain hundreds of neutrons and protons, heavy ions are the largest and heaviest particles used as a probe at BNL. They currently strike fixed targets at the Tandem, and will do the same at the AGS at much higher energies, when the Tandem becomes its injector. Then, the AGS, which replaced the Cosmotron in 1960, will be able to circulate three different types of beams: heavy ions, protons for high energy physics research, and polarized protons.

All AGS particles share the same fate. After accelerating to design energies, they are extracted from the ring and guided down beam lines, where they smash against fixed targets and create other particles. For neutrino experimentation, for example, protons strike targets, and among the products of those collisions are particles called pions, which quickly decay into other particles. In trailers at the end of the AGS' U beam line, physicists search around-the-clock during a run for events associated with one of the decay products, particles called neutrinos, to test current theories and to determine whether neutrinos have any mass.

Similarly, other AGS experiments create and track down kaons, mesons and a host of other particles. And essentially the same plot is acted out at BNL's other big machines, with different particles and targets, and for different reasons.

At the 60 megawatt HFBR, which replaced the BGRR in 1965, neutron beams routinely strike biologists' molecular samples, yielding information about their structure. Neutrons from the HFBR also help physicists investigate nuclear stucture and study the magnetic properties of solids, while chemists may see how the neutrons interact with metal hydride samples to locate hydrogen atoms vital to energy storage devices.

Electrons circulating through the two rings of the NSLS generate photons. While the electrons stay in the NSLS' rings, photons are brought down beam lines to experimental areas. Among other things, photons, in the form of vacuum ultraviolet light and soft x rays, are helping BNL chemists study molecules in the gas phase, providing researchers from SUNY at Stony Brook with the first pictures of the internal structures of living cells in water, assisting Brookhaven biologists in studying the electronic structure of molecular components and exposing circuit patterns on photosensitive material for IBM scientists.

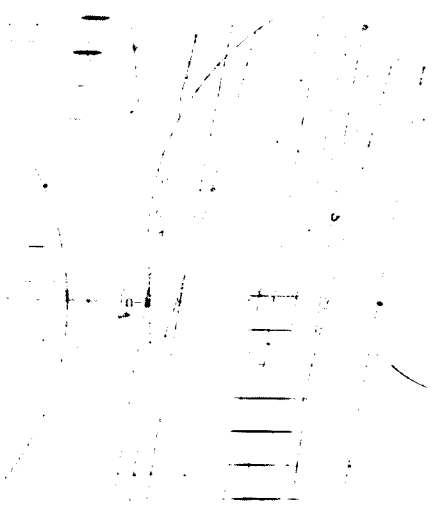
Some of the information gathered about low energy particles at BNL's research machines — particularly the HFBR and the Tandem — is found in the computers of the National Nuclear Data Center, a branch of the Depart-

(Continued on page 2)

Particle Pictures

Though the particles used by BNL researchers cannot be seen by the naked eye, scientists know they are there by their effects, some of which can be captured in images.

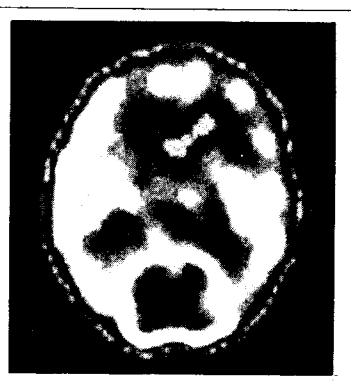
Using PETT VI, the brain scan of a schizophrenic subject, upper right, was created in a BNL/NYU study of the relationship between glucose metabolism and mental illness. To create such a scan, a subject is injected with a solution containing radioactive sugar molecules, which bind to different sites in the brain, depending on the rate of metabolism going on at each site. Then the subject's head is centered in the PETT, and its detectors signal when and where a positron is given off by the radioactive substance. Computers translate that data into a map of the subject's brain where the areas of increased metabolism are brightest. Here, these appear around the areas associated with vision, perhaps resulting from a visual hallucination.

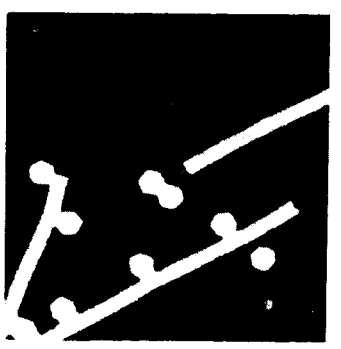


An NSLS/SUNY Stony Brook team at the NSLS uses a sensitive instrument, which is called an x-ray microscope because the photons it focuses are in the low energy x-ray range. For the image center right, a living diatom (a single-celled algae) was hit with x rays, which were absorbed in varying degrees by different internal structural elements. A detector behind the sample transmitted intensity information to a computer, which created this image. The white areas are the least dense and show the fluid surrounding the diatom.

The image of viruses, bottom right, was created by Biology's STEM. An electron beam with a tiny diameter of 2.6 angstroms probed the specimens, interacting with them, losing energy and changing course. After the redirected electrons were counted and analyzed by sensitive detectors, the signals were fed into a computer that reconstructed this image on a television screen. The viruses of interest are the southern bean mosaic virus specimens (hexagonal) provided by T. Baker and D. Caspar, Brandeis University. The rod-shaped specimens are tobacco mosaic viruses, which are used as the standard for mass calibration.

At the AGS, the predecessors of today's computerized particle detectors were bubble chambers: large vessels of liquid that served both as the target material and as the recording medium for high energy interactions. Cameras would photograph the tracks left in the liquid by particles that passed through. By analyzing those tracks, physicists could determine what kinds of new particles were created in collisions between the incoming particles and those comprising the liquid. The scan at left was taken in BNL's 80-inch bubble chamber and shows the formation of an Omega-minus (Ω^-) particle, discovered at BNL in 1964. — A.C.





Particles (Continued)

ment of Nuclear Energy (DNE). The Center is a repository for reference nuclear data that serve as a basis for nuclear research and the design safety, regulation and economic analysis of nuclear power programs. Such analyses are also DNE programs.

Patients and Particles

Electrons are the particles behind the Scanning Transmission Electron Microscope (STEM), used in the Biology Department to image specimens and measure the masses of proteins, nucleic acids and complexes of the two. The electron's antiparticle, the positron, makes possible a technique called positron emission transaxial tomography, embodied in the PETT VI machine used by the Chemistry and Medical Departments to study brain chemistry, in hopes of understanding how the brain functions and why it malfunctions.

For patients involved in Medical Department research, neutrons are used to irradiate the body and provide elemental analysis in a procedure called neutron activation analysis. The Medical and Chemistry Departments also take advantage of AGS-bound particles during preliminary acceleration in the Linac, steering them to targets where they create radioisotopes for industrial and medical use in Medical's Brookhaven Linac Isotope Producer (BLIP) and radionuclides for research in the Chemistry Linac Isotope Factory (CLIF).

That brings this survey back to the AGS, which figures largely in a proposal submitted to DOE in late 1984 for a relativistic heavy ion collider (RHIC). Another accelerator being worked on by the Accelerator Development Branch of High Energy Facilities, as part of a national effort, is the Superconducting Super Collider (SSC), in which two opposing beams, each with an energy almost 700 times that of the AGS, would collide. Brookhaven is involved in accelerator design and superconducting magnet research and development for RHIC and for the SSC. This draws the Department of Applied Science into the particle picture as scientists there study metals to determine their properties and find better superconducting materials.

In addition to this important role, other members of DAS are deeply involved in the use of particles at most of the Lab's major particle-producing facilities, including the NSLS, the AGS, the HFBR, the Tandem, the 3.5 MV research Van de Graaff and various positron sources.

Other BNL facilities used either as producers of particles or radiation, or as particle probes, include Chemistry's 60-inch and JSW 168 cyclotrons, Medical's research reactor, the Physics Department's double MP-type tandem accelerator facility and DAS's Dynamitron 3 MeV electron accelerator. The cable x-ray facility is also operated by DAS, for the Power Transmission Project.

Having gone full circle and then some, a definite particle pattern emerges. Not only do particles figure in the bulk of BNL's research activities, but they are also the threads that connect one area of research to another: Heavy ions from the Tandem are destined for the AGS. Protons from the AGS Linac make possible Medical's BLIP and Chemistry's CLIF. Medical and Chemistry team up to detect positrons with PETT VI. Chemistry, Biology, DAS and Physics share an interest in neutrons at the HFBR and photons at the NSLS. These particle programs are only a few of the interlocking threads that, when woven together, form a vibrant tapestry — the multiprogram laboratory that is Brookhaven.

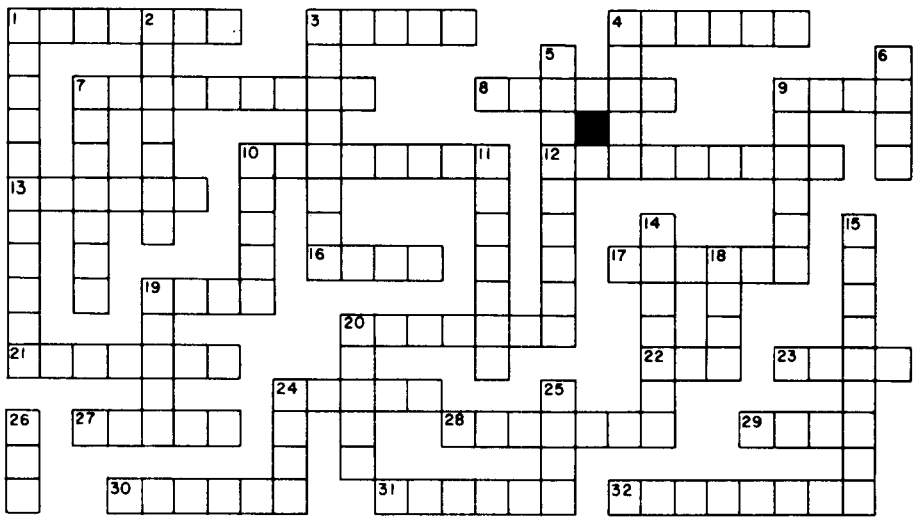
—Anita Cohen

Particle Puzzlement

Ever wonder why a list of particles contains so many words that end in *-on*? That's simply because the suffix *-on* indicates a subatomic particle unit or quantum. And as you can see by this puzzle, which can be done crossword fashion or as a fill-in, the list goes on and on. Also on the list are a few other words pertinent to particles.

Word List

aeon	boson	fermion	hyperon	meson	parton	preon	synchrotron
AGS	classon	gluon	instanton	muon	PETT	proton	tachyon
anomalon	cosmotron	graviton	ion	neutron	photon	rishon	tron
axion	Cyclotron	hadron	kaon	NSLS	pion(s)	soliton	Van de
baryons	electron	HFBR	lepton	nucleon	positrons	STEM	weakon



ACROSS
1. A pulselike, solitary wave with particle properties.
3. A hypothetical particle; almost an established rule.
4. This pointlike constituent of a proton can be identified with quarks or Dolly.
7. Machine invented by Ernest Lawrence.
8. How we see the light, or the particle-like manifestation of electromagnetic radiation.
9. This one is not a CAT.
10. A hypothetical particle related to the gravity of the situation.
12. A soliton in solitary confinement, for a certain moment in time.
13. One of the subquark's aliases.
16. It's a source of photons; see the light?
17. This fermion family does not feel a strong interaction.
19. This meson family is not dizzy; it has zero spin.
20. Three-quark clusters.
21. "9 down" or "11 down."
22. It's always charged up.
23. An unstable meson, O.K.?
24. Quark + antiquark = ?
27. It comes between the Tandem and the Graaff.
28. Three quarks, but heavy, so don't get hyper.
29. Makes good use of "11 down."
30. An alias for the intermediate vector boson, the carrier of the weak force.
31. Whether you call it baryon or meson, it's still one of these.
32. A stable member of the lepton family.

DOWN
1. The generic for "16 across" and "26 down."
2. A hypothetical particle faster than the speed of light.
3. An anomaly among particles, it's a fragment.
4. There might be several of these at a meson family reunion.
5. What electrons would see if they looked in the mirror.
6. The flower of the Biology Department.
7. This boson is massless, but not classless.
9. The lightest baryon.
10. Quarks stick like glue because of you.
11. It's at home in a nucleus.
14. Their spins bring electrons, protons and neutrons together under this heading.
15. BNL's first "tron."
18. Suffix meaning "an instrument."
19. Another alias for the subquark.
20. Pions, kaons and photons all fall under this heading.
24. A member of the lepton family.
25. Not a particle at all, but lots of time.
26. This accelerator stands alone because nothing can touch its accomplishments.

(Answers on page 4.)

In Memoriam

Walter J. Milian, died on February 18 at University Hospital, Stony Brook, at the age of 58 years. He was Assistant Manager of Architectural Operations and Maintenance, Plant Engineering Division, and had been with the Laboratory since March 24, 1947. Milian had served on the BERA Board, the Apprentice Evaluation Committee and was appointed to the first Equal Opportunity Advisory Committee in 1967.

Milian was a resident of Brookhaven. He is survived by his wife, Maebelle; a son, Laurence, who is employed at the Lab in the Department of Nuclear Energy; two daughters, Linda, of Miami, Florida, and Laura Orofino of Zanesville, Ohio; a stepson, Richard Madden, Coxsackie, N.Y., and five grandchildren.

For Your Information

As reported by the Bulletin on February 1, the Laboratory notified Suffolk County on January 28 that a slightly elevated level of tritium had been detected in a monitoring well located just outside of the Lab's eastern boundary. At that time, water samples from the well contained a tritium concentration of 0.022 microcuries per liter. The EPA drinking water standard specifies that drinking water not contain more than 0.020 microcuries per liter averaged over the course of a year.

The tritium level in the monitoring well seems to have peaked, and the most recent sample shows that the level has dropped to 0.013 microcuries per liter, below the EPA drinking water standard.

As a precaution, Suffolk County Department of Health Services took water samples from houses in the vicinity of the monitoring well, and preliminary results indicate that the highest level of tritium in any of those private wells is 0.002 microcuries per liter, or one-tenth the EPA standard. According to health physicists in the Safety and Environmental Protection Division, the level of 0.002 microcuries per liter gives a negligible dose of radiation. For example, it is only one-tenth of what a person receives in a single day from natural potassium in the diet.

Tax Tip

Barclay's Bank on site still has a lot of unclaimed bank loan interest statements. You will need this information to prepare your income tax return, so drop by the bank and pick up your copy.

—Roger Stoutenburgh

It is not the latest in oxygen tents, but just Don David's whimsical response to the smoking policy recently instituted at the Lab. He, a non-smoker, set up this rig as a joke for his smoker friends. The isolation "booth" was in use just about long enough for this picture to be taken of Dan Padrazo. The group has now returned to more conventional means of restricting smoking.

Reports Available

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

NUREG/CR-3498
BNL-NUREG-51713
Two-Dimensional Modeling of Intra-Subassembly Heat Transfer and Buoyancy-Induced Flow Redistribution in LMFBRs. M. Khatib-Rahbar, E.G. Cazzoli

NUREG/CR-3519
BNL-NUREG-51717
Human Error Probability Estimation Using Licensee Event Reports. V.J. Voska, H.N. O'Brien

BNL-51768
Amorphous Silicon and Gallium Arsenide Thin-Film Technologies for Photovoltaic Cell Production: An Identification of Potential Health and Safety Hazards. V.M. Fthenakis, J.C. Lee, P.D. Moskowitz

BNL-51815
The Separation of Helium-Methane Mixtures by Single-Column Pressure Swing Adsorption. W.W. Merrill, P.S. Sackinger, H.A. Valeiras

BNL-51819
The Sequential Precipitation Chemistry Sampling Program at Brookhaven National Laboratory with an Analytical Summary of 1976-1982 Data. G.S. Raynor, J.V. Hayes

NUREG/CR-3993
BNL-NUREG-51820
Geochemical Investigations at Maxey Flats Radioactive Waste Disposal Site. Topical Report. R. Dayal, R.F. Pietrzak, J Clinton

NUREG/CR-4001
BNL-NUREG-51824
CONTEMPT4/MOD5: An Improvement to CONTEMPT4/MOD4 Multicompartment Containment System Analysis Program for Ice Containment Analysis. C.C. Lin

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BERNICE PETERSEN, Editor
MONA S. ROWE, Associate Editor
ANITA COHEN, Reporter
MARSHA BELFORD, Reporter

35 BROOKHAVEN AVE., UPTON, N.Y. 11973
Telephone (516)282-2345

WIS Meeting

The next meeting of the Brookhaven Women in Science will be on Wednesday, February 27 at noon in Room A, Berkner Hall. The guest speaker is Barbara Hoffman-Gable. She will speak on "Adult Education: A Challenge for Women in West Germany." Please plan to attend and invite all interested colleagues.

Reminder

Completed applications for the 1985 Summer Student Program will be available for review in the Office of Academic Relations, Bldg. 460, 2nd floor, from February 19 to March 1. Staff members are invited to review applications to select students to work under their supervision from June 3 to August 16.

BERA News

BERA Candidates

The BERA Nominating Committee met on February 14 to select a slate of candidates for the 1985 BERA Board election. Those selected were: Kurt Fuchel, AMD; Lois Marascia, DNE; Richard Scheidet, PE; and Bernard Silverstein, S&EP.

During election week, which is March 18 through 22, on-site employees will be invited to vote for two of the above four candidates to replace outgoing BERA Board members Sandra Lane and James Roesler.

Cooking Exchange

On Wednesday, February 27, members of the International Cooking Exchange will demonstrate recipes to help you stay slim and trim.

Cooking Exchange meetings are held in the Recreation Building on the second and fourth Wednesdays of each month from 12:30 to 2:30 p.m. Meetings are open to employees and their immediate family members. A one dollar donation entitles those present to a copy of the day's recipes, samples of the prepared dishes, and coffee or tea. Babysitting is provided at 50¢ per child.

Call Susan Sears, 744-7831, or Dee Polychronakos, 744-3576 for more information.

Dinizulu and his African Dancers, Drummers and Singers are coming to Berkner Hall tomorrow night at 8 p.m. The dances, mostly from Ghana and South Africa describe the communal life once lived by native tribes, as well as their myths and legends. A narrator tells the story of each dance. Dinizulu says "These dances are the classical dances of Africa and the roots of billions of people." The musicians have been characterized as "masters of rhythmic variation" and the drumming as "powerful and intoxicating." This troupe is famous, and the evening promises to be electric. The performance of Dinizulu and his company will conclude the series of events sponsored by the Afro-American Culture Club during Black History Month. General admission is $8 at the door. If bought in advance, tickets may be purchased for $7 each from Fran Ligon, Bldg. 460.

Camera Club

The club will meet on Thursday, February 28, at 5:30 p.m. in the Recreation Building. The spring photo show and photo classes will be discussed. Interested non-members are also encouraged to attend.

Bowling News

Red/Green League

High games were bowled by T. Prach 233, D. Jesaitis 229, G. Meinken 228, E. Meier 246/201/624 scratch, J.Morris 216, H. Arnesen 211/203, K. Riker 202.

Pink League

M-G Meier rolled a 201, M. Reynolds 186/181, E. Kristiansen 188.

Purple League

Bob Jones bowled games of 255/200/654 series, Dick Adams 243/204/632 series, Tony Natoli 202, Annmarie Spira 179, Marge Stoeckel 176.

White League

Ten strikes in a row gave Jim Griffin a 289/615 series. John Hanlon bowled 255, Al Pinelli 225/601, Sandy Asselta 222/222/610, Ben Belligan 214, Jim Vogel 210, Joyce Pinelli 201.

Basketball

All Star Game

The BNL All Stars will play the Bay Shore Hurricane Athletic Club on February 28, at 6 p.m. in the BNL gym. Everyone is welcome and admission is free. The All Star team was chosen by vote of League members. On the BNL team are: Bob Doty, Jim Garrison, Stan Gilbert, Leroy James, Pete Johnson, Greg Mack, Ed Meier Jr., and Mal Tardd. Ed Taylor is coach.

Boxscores 2/14/85

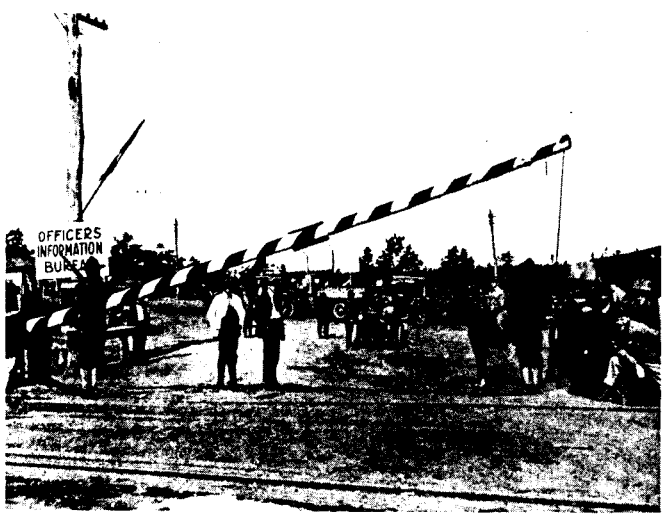
Game 1

Longshots - 64		Runaways - 63	
J. Gaeta	14	S. Gilbert	2
J. Garrison	12	T. James	20
L. James	19	P. Johnson	18
L. Walcott	18	G. Shepherd	6
E. Taylor	1	G. Smith	2
		M. Tardd	14
		S. Woodson	1

Game 2

Hollywood - 63		Coasters - 51	
R. Domenech	6	R. Doty	21
G. Gngg	16	M. Fulkerson	4 6
R. Kowalski	6	F. Malone	10
G. Mack	12	L. Snead	2
E. Meier	23	M. Williams	7
		K. D'amico	7

Black History Notes



The black soldiers guarding the gate of Camp Upton were members of the all black Fifth Maryland Regiment, which had been called up early in the summer of 1917 from Virginia to guard the Camp during its construction. Since the civilian construction crew had been caught stealing, gambling and drinking, the black military police inspected the workmen before they left for the day, and the workers resented this. At the same time, the black MP's resented being excluded from the local entertainment places. Four days after the first group of drafted soldiers arrived on September 12, 1917, a day-long riot broke out between the black guards and white workmen.

During World War I, black soldiers were organized into the segregated 92nd Division of the National Army. The men in this division were not trained in one camp, but sent to the sixteen National Army cantonments, including Camp Upton. The black troops in this picture had been selected from men called up in New York City; greater New York supplied most of the black soldiers inducted at Camp Upton. Though those pictured had not yet been issued uniforms, they were off on a hike around the camp. The first black draftees arrived at Camp Upton on November 1, 1917. The black troop strength peaked in August 1918 with 7,721 men. A unit of black soldiers, composed of several companies, was organized and known as the "Buffaloes."

Since they were not permitted inside the white soldiers' entertainment halls, members of the black 367th Infantry built the Buffalo Auditorium at a cost of $40,000, where they showed movies and held dances. The black troups of the 92nd Division were segregated into their own YMCA building, and the wives of black soldiers who came to visit their men were housed in a separate YMCA Hostess House.

Segregation continued at Camp Upton during World War II. The Army's segregation policy did not come into question until July 26, 1946, when President Harry Truman issued Executive Order 9981. In it, Truman established a special committee to examine all existing regulations and practices with a view toward instituting a new national policy of "equality of treatment and opportunity for all persons in the armed services without regard to race, color, religion or national origin." The committee formally reported to Truman in 1950, and their report was used as the basis for racial integration in the Army, Navy, Air Force and Marine Corps. The last all black unit of the Army was disbanded in 1954.

Cafeteria Menu

Week Ending March 1

Monday, February 25		
Cream of potato & bacon	(cup)	.65
	(bowl)	.85
Turkey à la king on rice		2.10
Cheese omelet & 1 veg.		2.10
Hot Deli: Knockwurst & kraut	(bread)	2.00
	(roll)	2.20
Tuesday, February 26		
Turkey noodle soup	(cup)	.65
	(bowl)	.85
Chicken cacciatore & 1 veg.		2.25
or w/spaghetti		2.45
Top round of beef & 1 veg.		2.15
Hot Deli: Italian style sausage hero		2.20
Wednesday, February 27		
Split pea soup	(cup)	.65
	(bowl)	.85
Turbot Florentine & 1 veg.		2.10
Taco platter special		2.15
Hot Deli: corned beef	(bread)	2.00
	(roll)	2.20
Thursday, February 28		
Navy bean soup	(cup)	.65
	(bowl)	.85
Breaded pork chop w/1 veg. & applesauce		2.15
Beef Burgundy over egg noodles		2.20
Hot Deli: Turkey breast	(bread)	2.10
	(roll)	2.30
Friday, March 1		
New England clam chowder	(cup)	.65
	(bowl)	.85
Fettucini carbonara & 1 veg.		2.15
Fish 'n chips		2.10
Hot Deli: Top round of beef	(bread)	2.10
	(roll)	2.30

CREF Values

February	64.21	March	65.37
April	65.34	May	60.81
June	61.71	July	60.35
August	66.91	September	66.75
October	66.70	November	65.69
December	$67.04		

January $72.01

I.B.E.W. Meeting

Local 2230, I.B.E.W. will hold its regular monthly meeting on Monday, February 25, at 6 p.m. in the Knights of Columbus Hall, Railroad Avenue, Patchogue. There will also be an afternoon meeting at 2 p.m. for shift workers in the Union office at 31 Oak Street, Patchogue. On the agenda will be regular business, committee reports and the president's report.

Arrivals & Departures

Arrivals

Matthew J. D'Azzo ..... AGS
David P. Osterman ..... Physics
Barnett Serchuk ..... Tech. Info.
Masami Torikoshi ..... Physics
Vincent S. Wong ..... AGS

Departures

None

Classified Advertisements

Placement Notices

The Laboratory's placement policy is to select the best-qualified candidate for an available position, with consideration given to candidates in the following order of priority: (1) present employees within the department, with preference to those within the immediate work group; (2) present employees within the Laboratory as a whole; and (3) outside applicants. In keeping with the Affirmative Action plan, selection decisions are made without regard to age, race, color, religion, national origin, sex, handicap or veteran status.

Each week, the Personnel Office lists new personnel placement requisitions. The purpose of these listings is, first, to provide open placement information on all non-scientific staff positions; second, to give employees an opportunity to request consideration for themselves through Personnel; and, finally, for general recruiting purposes. Because of the priority preference policy stated above, each listing does not necessarily represent an opportunity for all candidates. As a guide to readers, the listings are grouped according to the anticipated area of recruitment.

Except when operational needs require otherwise, positions will remain open for one week following publication date.

For further information regarding a placement listing, contact the Employment Manager, Ext. 2882.

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

ACCELERATOR SCIENTIST - National Synchrotron Light Source. Seek candidates experienced in experimental or theoretical particle beam physics to work on the development of high intensity electron storage rings for synchrotron radiation production, and of other methods of coherent radiation production from relativistic electron beams. Contact: C. Pellegrini

POSTDOCTORAL RESEARCH ASSOCIATE - Department of Applied Science. Recent Ph.D. in biophysics, physics, or electronic engineering, with experience in design and construction of electronic equipment, optics, and working knowledge of computer architecture, to design and develop a pulsed xenon flash fluorometer for use in oceanographic research. Contact: G.T. Rowe

LABORATORY RECRUITMENT: Opportunities for Laboratory employees.

2186. SECRETARIAL POSITION - Requires good secretarial and communication skills and knowledge of office and Laboratory procedures. Under supervision of Department secretary, will prepare correspondence and reports, mailing lists, travel vouchers, etc. Knowledge of word processing required and experience on MICOM very desirable. National Synchrotron Light Source Department.

Autos & Auto Supplies

66 MUSTANG - 2+2 fastback Pony, int. newly carpeted, 4 bbl, 4 spd., p/s, d/b, a/c, styled wheels, $2,500. 543-3701.

CARTER CARBURETOR - 750, CFM, AFB, competition series, like new, $80. Annamarie, Ext. 2352 or 473-9016.

77 CHEVY VAN - low mi., am/fm, radials, a/t. Ext. 7225 or 929-6748.

77 BUICK REGAL - Landau, 2 dr., V6, a/t, p/b, a/c, tilt, needs engine work, $800. 821-1915.

SNOW TIRES - (2) 13", 185/75, radial, excel. cond., $20 ea. 735-2299.

SNOW TIRES - (5) H-78×15 BW, almost new, 4-6 hole Jeep wheel, all $100. Ken, 289-8212.

VW PARTS - generators, starters, clutches, flywheel, assorted eng. parts, all Bug parts. Fred, Ext. 4407.

THEFT SENTRY PAGING SYSTEM - Auto Page AP/4500, new, boxed, cost over $280, sell for $210. Ext. 2981.

84 MONTE CARLO - full power, cruise, tilt, Landau roof, many extras, must see. Paul, 475-7243 days or early eves.

72 JAGUAR XJ-6 - orig. owner, very good mech. cond., all options, green saddle int., $4,000. 728-0939 or 727-3115 weekends.

79 FIAT 128 SPORT - 4 spd., am/fm, very good cond., $650. 821-1915.

TIRES - (2) 9.00-15", Atlas Plycron, very good cond. Ext. 3075.

72 FORD UTILITY TRUCK - F-250, new tires, exhaust, clutch, ladder rack, $1,400. 821-1915.

78 HONDA HAWK T2 - 400 cc, plexifairing, luggage rack, engine guards, nylon bike cover, $550. Sam, Ext. 4749.

76 DODGE ASPEN WAGON - slant-6, standard shift, high mi., $950 neg. Ext. 2666 or 283-5376 after 6 p.m.

71 SUPER BEETLE - rebuilt eng., good commuting car, needs some work, $500. Pat, Ext. 4255.

KAWASAKI 250 XL - good running cond., shield, console, radio. Charlie, Ext. 7749 or 325-0968 after 3 p.m.

74 VW BEETLE - good cond., $1,100. Ext. 3096.

73 FORD PICKUP - A-1 cond., cap, many extras, $1,300 firm. 331-5118, 5-9 p.m.

79 FORD BRONCO - two tone, 4 spd., 53k mi., am/fm cassette, good cond., $6,000. 744-3089.

73 FORD TORINO WAGON - high mi., good transp., $400. 286-3791 eves.

76 CHEVY MALIBU - station wagon, excel eng., good body, new brakes, tires & more, 128k mi., runs very well, $1,200. Ext. 2830 or 543-0487.

WHEEL COVERS - (4) good looking, $60. Ext. 3909 or 3111.

SNOW TIRES - (2) H78-15 w/rims, studs, fits GM cars. Ext. 4309.

75 VW BEETLE - am/fm, snows, rebuilt engine, new muffler, excel. cond., $1,250. Bill, Ext. 2906 or 929-6189.

78 NOMAD TRAVEL TRAILER - 22', sleeps 6, fully self-contained, used very little, excel. cond., $4,500. Ext. 4459 or 751-2095.

78 MAZDA GLC - 5 spd., $1,500. Ext. 4525 or 643-5579.

71 CHEVY IMPALA - V-8, a/c, p/s, p/b, a/t, 82k mi., good cond., $800. Ext. 2673 or 744-8632 after 6 p.m.

CAR MATS - rubber, blue, front and rear, for compact, used 1 week, clean, $7/set. 929-3566.

78 PINTO - p/b, am/fm, 4 spd., very good cond., $1,895. Bill, Ext. 2047 or 472-4684 after 6 p.m.

70 KAISER CHEROKEE - radials, spoked rims, am/fm cassette, 4 WD, new brakes, exhaust, cooling sys., very good cond., $1,600. 589-8290 eves.

75 CHEVY LUV - good cond., 91k mi., some rust, $1,000. 363-9527.

73 PLYMOUTH SATELLITE - 6 cyl., 4 dr., high mi., new tires, brakes, radio, $400. Dave, 475-7891 after 5 p.m.

80 FORD FAIRMONT - runs well, body excel., 6 cyl, 4 dr., p/s, p/b. Pat, Ext. 3565.

74 VW BEETLE - rebuilt engine, radio, 2 extra snow tires, new battery, 100k mi., good cond., $1,200. Edith, Ext. 4379 or 3002 after 8 p.m.

80 HONDA ACCORD LX - 5 spd., a/c, p/s, p/b, 63k mi., rustproofed, excel. cond., $4,000. Rose, Ext. 3483.

TIRES - (4) F-250, mounted & balanced, 8 lug, 163 orig. miles, excel. cond., cost $372 ea., $375 firm takes all four. Leon, Ext. 2973.

75 CHRYSLER WAGON - p/b, p/s, new battery & exhaust, am/fm, runs well, asking $750. Armin, Ext. 3104 or 4570.

Boats & Marine Supplies

20' FRIENDSHIP SLOOP - new deck, new jib, new stay sail, sleeps 2. Ext. 7225 or 929-6748.

MUSHROOM MOORING - 100 lb., w/chain & pickup buoy, $100. Joe, Ext. 5233 or 369-0432.

16' HOBIE - 1983, 6:1 Harken, double trap, white, $3,300. Ext. 2799 or 261-8466 after 6 p.m.

20' O'DAY - 6 HP, galvanized trailer, k/cb, sleeps 4, head, galley, extras, ready to sail, excel., $6,700. Ext. 2906 or 929-6189.

Miscellaneous

HOCKEY SKATES - man's size 9, $7; air hockey game on legs, $10; Reader's Digest magazines, 25¢; books, $3 ea. Russ, Ext. 3059 or 744-7242.

SWEATER - man's pullover, new, med., $8; new bath towel set, $5, Corelle cups. Susan, Ext. 4267.

CCTV CAMARAS - new, Panasonic Model #WV200, some access., $110. Tom, Ext. 7578.

CABBAGE PATCH PREEMIE - w/pacifier, $55. 722-4821.

BED - queen size Spindel, dark pine, heavy, very good cond., no bedding, asking $50; twin size canopy bed w/metal frame, no bedding, very good cond., asking $40. 929-8105.

IBM PRODUCT - mono., disp., parall. port., $175; PC power supply, $90, all new, never used. Ext. 2528.

TV - B&W, needs some work, $15; portable phonograph, like new, $15. 751-3551 eves.

SKI BOOTS - Nordica, never used, size 13, $40. Klein, Ext. 4018.

HOCKEY SKATES - size 5, never worn, $15; electric space heater, brand new, $25; child's snow boots, size 3, $3; boy's jacket, size 10, $10. S. Spark, Ext. 4111.

ELECTRIC MOTOR - 1/3 HP; grindstone, $15 ea. or $25 both. Winsche, 286-0517.

HANG GLIDER - Quick Silver B, flown once, $475. 286-1829.

SKI PACKAGE - Head GK03/185cm skis, Solomon bindings, Trappeur boots, $75 for all. Bill, Ext. 2171.

LAMP TABLES - (2), $10. Ollie, Ext. 3082.

CALORIC GAS STOVE - high-low oven, rotisserie, avacado, $175. Ellie, Ext. 3395 or 325-1537 after 6 p.m.

STAINLESS STEEL SINK - new, 5 ft., top one large basin, backsplash and faucets, $80. Peter, 475-0831.

REFRIGERATOR/FREEZER - 19 cu. ft., 31"w × 29"d × 60"h, good running cond., $100. Ext. 7505 or 689-8605.

BLACK & DECKER SAW - 1 hp, 4,900 rpm, 7" blade, $25. Walt, 289-8601.

COLOR TV - 19", G.E., excel. cond., $130. Ext. 3096.

REFRIGERATOR - 15.6 cu. ft., side-by-side, frost free, excel., gold, $150; elec. stove, gold, good working cond., $60. 289-3667 after 7 p.m.

HUMIDIFIER - Northern Electric, 7 gal., very good cond., $30. Hans, Ext. 4581 or 281-5563.

EARTH STOVE - wood, coal, A-1 cond., w/stack kit, must sell, $375. 588-4703 after 5 p.m.

PLATFORM ROCKER - green Naugahyde, very good, $20; child's G.E. phono speakers, $10. 281-7844.

KREIDLER MOPED - West Germany, low mi., beautiful cond., many extras, no ins. req., $300. Walter, Ext. 4605.

COAL STOVE - Surdiac 713, 60k + btu, mint cond., paid $1,200, sell for $450. Ext. 7971 or 286-1358.

BEDROOM SET - mahogany, traditional, twin headboards, dresser, chest, vanity bench, 2 mirrors, $325. 289-0687.

HOT AIR SPACE HEATER - for one room, $22. 363-7032.

VICTORIAN BATHTUB - 150" × 75", white, best offer. Linda, 924-4872.

KEROSENE HEATER - Crestline, 16,000 btu, excel., best offer; Toyota Tercel repair book, 60% off, $10. Ext. 2676.

WOMAN'S WOOL CAMEL COAT - size 12, $35; light beige raincoat, size 12, $15; 12" b&w television, $30. 475-4394.

PVC DARKROOM SINK - corrugated bottom, 18", splashboard, 72"×24", like new, $250. 324-7643.

TV - 12", b&w, six months, excel. cond., $60. Luigi, Ext. 3090 after Feb. 26.

PIANO & BENCH - 84 Wurlitzer upright, walnut finish, only 2 months old, $1,450. Ext. 2823 or 282-3187.

STEREO RADIO - GM Delco, am/fm, excel. cond., $40. Suresh, Ext. 4459 or 751-2095.

DOUBLE BED - mattress & box spring, excel. cond., $120; youth bed and dresser, $80. Inan, Ext. 3370.

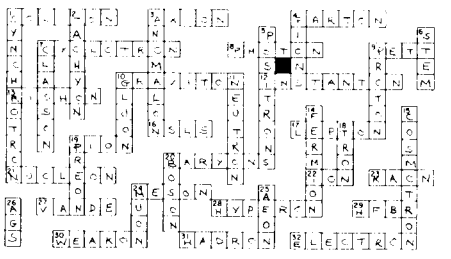
CASSETTE DUPLICATOR - Telex 1:1. Brenda, 643-2941 eves.

WOOD STOVE - Olympic Crest, slow burning, w/thermostat, plus 12' triple wall pipe, $225. 878-9534.

POOL TABLE - 4' × 8', slate, $200. 281-7039.

ANTIQUE ENGAGEMENT RING - 70 pts., white diamond, 18 kt., 2 sapphires, 4 (2 pt.) diamonds, $950. 444-3131.

Answers to Particle Puzzlement



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 Rent

PORT JEFFERSON - Harbor Hills, furnished ranch, avail. April 6 - July 6, deposit & refs. required, $800/mo. plus util., principals only. Ext. 3791 or 928-7154.

SHOREHAM - 4 bdrm. Colonial, l/r, d/r, den, f/p, carpeting, country kitchen, dishwasher, washer/dryer, garage, excel. location, April occup., $1,250 pays all. 744-8659.

SAYVILLE - 1 bdrm., lg. l/r, bath, lg. closets, no children, no pets, $475. 563-2847.

SHIRLEY - 2 rm. apt., w/full bath, ground level, partially furn., $400/mo. incl. util. Joann, 744-2821.

WADING RIVER - quiet, one bdrm., furn. apt., walk to private and public beaches, single working person only, $450/mo. incl. all util. & cable TV, avail. 3/15/85. Chris, 929-6543 after 6 p.m.

YAPHANK - 4 bdrm. house, 1-½ baths, l/r, d/r, large kitchen, completely renovated, 10 min. from Lab., avail. after Mar. 15, $800/mo. & util. 924-4872.

SOUND BEACH - 3 rm. apt., 1 bdrm., kitchen, dinette, $400 inc. util. & cable. 821-1059.

For Sale

MILLER PLACE - 4 bdrm. Colonial, formal l/r & d/r, country kitchen, 4 baths, fam. rm. w/brickwall fireplace. 331-1718.

BELLPORT VILLAGE - 1 acre plus building lot, one block from bay, $108 k. George, Ext. 4406.

LADY LAKE, FLORIDA - CB home on 1 acre, 2 bdrms., 2 bath, l/r, TV rm., screened porch, a/c, heat, $62,500. (904)753-3494.

RIDGE - 3/4 bdrm., eik, l/r w/coal stove, ¾+ acre lot, alum. siding, fenced, patio, bsmt., excel. cond. $83,000. Ext. 7509 or 924-8594.

N. CORAM - townhouse, w/w carpeting, fenced yard, washer, dryer, oil hot water, 2 zone heating, tennis courts, saunas, club, A-1 cond., $77,000 firm. 331-5118, between 5-9 p.m.

CORAM - Birchwood at Bretton Woods, 3 bdrm. condo., Dalton model, den, l/r, formal d/r, 1-½ baths, patio, gas heat, central a/c, like new, many extras, ½ block to Clubhouse. Ext. 7338 or 324-7643.

MASTIC - 4 bdrms., 2 full baths, split level, fam. rm., basement, 2 car garage, patio, shed, fenced, nicely landscaped, many extras, move-in cond., $88,000. 281-3635.

Lost & Found

FOUND - costume jewelry earring, near Berkner, 2/11 or 2/12. Ext. 7229.

Wanted

TIRES - Michelin or Pirrelli, size CR78 or equiv. Ext. 4393 or 589-3272.

DRIVER'S SEAT - 77 Datsun B210 or compatible. Ext. 3909 or 3111.

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

APARTMENT - mother/daughter, 2 bdrm., Patchogue Village only, $539 to $550 w/util. March or April. 289-5172 after 3:30 p.m.

MEMBERS FOR BNL RUGBY CLUB - all ages, all sizes, no exp. necessary. Pierrick, Ext. 3464.

FURNISHED ROOM - to rent from Feb. 25 to June 15, female, West Hampton area. 437-4298.

CRIB - sturdy, good to excel. cond., maple brown, well known brand. Tom, 929-3566.

MEN'S SKATES - size 9 or 10. Liz, Ext. 2318.

MOTHER - loving, responsible, non-smoker, to care for 2-½ yr. old, 6 hrs. a day, mid March to Sept., Setauket, Stony Brook area. 878-0717.

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
☐ 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).