

Physicists Focus on Quark Matter

Almost 300 nuclear physicists and high energy physicists, experimentalists and theorists representing more than a dozen nations, joined forces this week in Berkner Hall to discuss "Quark Matter '83" at the Third International Conference on Ultra-Relativistic Nucleus-Nucleus Collisions.



The conference, which began last Monday and ends today, was chaired by two BNL physicists, Tom Ludlam and Harvey Wegner. The pairing of high energy physicist Ludlam and nuclear physicist Wegner typifies the interest generated by the conference's subject matter. "This is basically a new field of physics that has grown up in the last five years," said Ludlam, "and it represents an interface between nuclear and high energy physics."

This interface, theorists predict, will occur in high energy collisions between heavy ions — essentially atoms that have been stripped of all electrons, leaving only nuclei. Nucleus-nucleus collisions at relatively low energies have long been the realm of nuclear physics. But, said Wegner, "Energy in this area is just too low now to learn anything new or fundamental about quark phenomena."

That's where high energy physics comes in. High energy theory predicts that in ultra-relativistic nucleus-nucleus collisions — producing nuclear matter at extremely high temperatures and densities — the quarks that compose the neutrons and protons in the nuclei will deconfine. As Ludlam explained it, "There will be a change of phase in which individual nucleons will lose their identity. Essentially you will have an ideal gas of quarks and gluons — what we call quark matter."

While creating quark matter would be new for physicists, this quark/gluon plasma is actually very old. "At some early stage, primordial matter may have existed in this form," Wegner said. "If we can recreate similar conditions, we'll have quarks interacting in new ways never before experienced in the laboratory, and exotic quark combinations might be formed. At any rate, I think this new

physics will turn out to be much more interesting than our present imagination."

To begin to prove these theories, most physicists agree, requires accelerators which can collide heavy ions with masses of 100 or above at energies much higher than presently available in man-made accelerators. Worldwide, only two accelerators are presently dedicated to heavy ions at relativistic energies: one is in Russia and the other is the Bevalac at Lawrence Berkeley Laboratory (LBL). And at approximately 2 GeV per nucleon, Bevalac's top energy falls far short of those needed to create quark matter.

Thus, the topic most in the minds of those who attended this week's conference was how to achieve the energies needed to test the theories about quark matter.

Laboratory Director Nicholas Samios welcomed the participants to the conference, which was essentially divided into two parts. The first half focused on individual presentations of theories and experimental results. New ideas were exchanged in the second half, in round table discussions as well as parallel sessions devoted to theory and experimentation. This morning, at the meeting's final session, the chairmen of the three parallel sessions will summarize their group's discussions.

A high point of the meeting was the conference banquet, held Thursday night, at which the guest speaker was Walter Sullivan, Science Editor of The New York Times. And of interest to all attendees was the Tuesday afternoon discussion on "Future Possibilities for High Energy Nuclear Beams," at which representatives of five laboratories presented their plans or proposals for colliding heavy ions.

Two European laboratories, GSI in Germany and CERN, have approved heavy ion experiments for the near future. Three American laboratories — BNL, LBL and Oak Ridge National Laboratory (ORNL) — are developing proposals for heavy ion colliders to submit to the Nuclear Science Advisory Committee (NSAC). Meeting last July to form a long range plan for nuclear science in the United States, NSAC strongly recommended the building of a high energy collider for heavy ions.

Heavy ion experimentation has been under consideration at BNL for about two years and is now the focus

(Continued on page 3)



Meeting during the "Quark Matter '83" conference were (seated from left) Hans Gutbrod, GSI and LBL; Maurice Jacob, CERN; Harvey Wegner, BNL, co-chairman of the conference; Gordon Baym, University of Illinois; (standing, from left) Tom Ludlam, BNL, conference co-chairman; and Peter Hausteim, BNL. The logo on Hausteim's shirt, designed for the conference by Ludlam, represents hot nuclear matter radiating from a plasma of quarks and gluons. It also incorporates a well-known optical illusion.

Mort Rosen

A Visitor's View Maurice Jacob

For most of the attending physicists, "Quark Matter '83" offered a chance to exchange ideas about an exciting new field. But for Maurice Jacob, it also provided a second opportunity — to pay a visit to the place where he first started doing research in theoretical physics.

Now head of the Theory Division at CERN, the European Laboratory for Particle Physics, Jacob explained that he came to Brookhaven in 1957, after graduating from Ecole Normale in Paris, because, "at that time, there were no graduate programs in France to get a Ph.D. I had to do independent research, then present a thesis to the University."

After two years in the United States — one at BNL and one at CalTech — Jacob was drafted into the French army. During his two years of service, part of it in Algeria, he also managed to complete his thesis and present it to the University of Paris. He received his doctorate degree in 1961, almost simultaneously with his discharge papers.

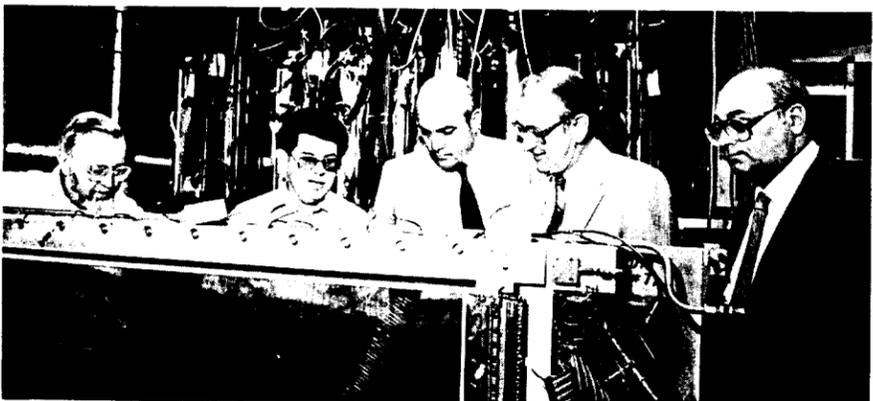
Since his start at BNL, Jacob noted that "I have worked in 24 countries." One of the most recent was China, where he spent one month during last March and April lecturing in theoretical physics at universities throughout the country.

Jacob frequently visits universities in CERN's member states. In particular, last year he was at Bielefeld, Germany, known not only as the place where the Roman legions stopped in their advance, but also as the site of the Second International Conference on Relativistic Nucleus-Nucleus Collisions. Jacob's efforts as one of the conference organizers reflected an interest in heavy ions that was born a few years ago when, he said, "I became aware of the possibility that at very high temperatures or densities, the quarks could deconfine. I thought this would be very interesting to study."

Heavy ion pioneers such as the Nobel laureate and theoretician T.D. Lee and CERN experimental physicist Bill Willis (also a BNL alumnus) had been saying that for several years. When Jacob joined their ranks, he was already editor of the review journal, Physics Reports, in which, he said, "I try to have topical reviews of things which are just being developed. So, as I got interested in heavy ions, my first reaction was to try to make a primer on heavy ions — some kind of a book which would be a reference so people could assess the field for themselves." The Physics Reports article "Quark Matter Formation and Heavy

(Continued on page 3)

New Manager Named to DOE Chicago Office



Doug Humphrey

At the AGS Multiparticle Spectrometer, (from left) Ken Foley, Physics Department, and Derek Lowenstein, deputy chairman of the Accelerator Department, explain the particle detector to Hilary Rauch (second from right), DOE, who was accompanied on his tour of the AGS by Associate Director Vincent O'Leary (third from right) and Brookhaven Area Office Manager David Schweller (right). Hilary Rauch, who succeeds Robert Bauer as manager of DOE's Chicago Operations Office, visited BNL September 15-16. He met with DOE area office personnel, AUI President Robert Hughes, and principal Laboratory staff. During his visit, he also toured the CBA site, the High Flux Beam Reactor, the National Synchrotron Light Source, the Power Transmission Line and the PETT Project.

Hilary J. Rauch, director of procurement and assistance management at the Department of Energy, has been named manager of the U.S. Department of Energy's Chicago Operations Office, effective October 2.

He succeeds Robert H. Bauer, who has been appointed associate director of storage and systems development, Nuclear Waste Policy Act Project Office.

The Chicago Operations Office administers the DOE contract with AUI for the operation of Brookhaven Lab. Among the other labs administered by the Chicago Office are Princeton Plasma Physics Laboratory, Argonne National Laboratory, Fermi National Accelerator Laboratory, Ames Laboratory and the Solar Energy Research Institute. General policy from DOE headquarters in Washington, D.C. comes through the Chicago Office to

the individual sites. Day-to-day matters are handled by on-site individual area offices, like the Brookhaven Area Office here.

Hilary Rauch has served as the principal adviser on DOE procurement contracts and business agreements since 1980, following three years as deputy director of procurement. All told, he has served 20 years with the federal government, in the U.S. Energy Research and Development Administration and the U.S. Atomic Energy Commission, both predecessors of DOE.

Robert Bauer has managed the Chicago Office since 1972. In his new position, he will be responsible for nuclear waste and spent fuel storage and systems activities, including implementation of specific DOE responsibilities under the Nuclear Waste Policy Act of 1982.



John Madey (left), Stanford University, and Claudio Pellegrini, NSLS, were co-chairmen of the recent workshop on free electron lasers.

Mort Rosen

Workshop Looks at New Laser

A four-day workshop was held at Berkner Hall September 19-22 to discuss the feasibility of using storage rings like Brookhaven's National Synchrotron Light Source (NSLS) to make free electron lasers.

The workshop was jointly organized by the NSLS Department and the Optical Society of America. The sixty-five attendees represented a mix of experts in free electron laser design, optics and accelerator technology.

Co-chairmen of the meeting were Claudio Pellegrini, physicist with the NSLS, and John Madey, professor of electrical engineering at Stanford University.

Professor Madey built the first free electron laser at Stanford in 1976. It makes use of the superconducting linear accelerator at Stanford's W.W. Hansen High Energy Physics Laboratory. Madey's laser operates in the infrared region.

Recently, researchers have become interested in developing free electron lasers that work in the short wavelength. The characteristics of short wavelength free electron lasers make them particularly suited for applications in spectroscopy, high resolution measurements, imaging (holography) and studies of time evolution in chemical reactions.

Unfortunately, most efforts to make free electron lasers in the short wavelength, using conventional techniques, have proven unsuccessful. So attention has turned to storage rings, which seem more promising because of their unique characteristics of wavelength, intensity and time dependence.

Already, work has begun at the NSLS to develop such a laser. Also, a storage ring accelerator is now being built at Stanford University.

Madey, Pellegrini and others believe that the combination of a good accelerator, a special magnet and very good optics will result in a useful free electron laser in the short wavelength.

BNL's Pedal-Powered Commuters

"I don't think it will ever catch on in a large way. If the average American gets more than 100 feet from his car, he gets the shakes." The speaker is Gerry Morgan, and his subject is bike commuting. Morgan (CBA) is one of BNL's bicycle commuters. He's among those who rise early, ignore the cars sitting in their driveways, hop on their bicycles and pedal to work. Then, after putting in a full day's work, they pedal homeward.

Why do they do it? Why do they brave the elements, the exhaust and the exhaustion? They offer a variety of reasons, but all share one underlying sentiment: "I love it."

The love of biking is in Theo Sluyters' blood. "I'm a Dutchman," he says, "so I've cycled my whole life. I hate to use the car." Sluyters (AGS) may be the heartiest BNL biker, riding his lightweight, 10-speed, French-made bicycle the 15 miles to and from his East Patchogue home on all but the bitterest days in the dead of winter. His training ground was his homeland. "In Holland the weather is pretty lousy," he says. "It's always windy and three-quarters of the year it rains. Cycling here is so much better. The roads are better and straighter too, which cuts down on distances."

Most BNL bikers admit to a period when they never pushed a pedal. "I started biking to work around 1970, a bit before the energy crisis," says Morgan. "I started because I noticed that each year the stairs seemed to have an extra step on them." Morgan was soon commuting year round from Patchogue to the AGS, riding his Miyata most of the year, but an older Peugeot during the rough winters. Until his wife Cynthia started working at the Lab eight years ago, he rode both ways. But now, he says, "She

drives to work and we ride home together with my bike in the car."

John McNeil resumed biking in the fall of 1979. While in India participating in a monsoon experiment for Meteorology, McNeil saw a lot of people using bicycles as their primary mode of transportation. At home again, he began commuting sporadically on a secondhand 10-speed bike. "I didn't really think I could do it," he says, "but I found it was easy. Now I try to do 100 miles a week."

Today, McNeil rides the 15 miles round trip to Shirley on his 15-speed Miyata 610. And he says, "One of my goals is to ride back from our experiment in Pennsylvania this fall." He rides year round, wearing a woolen outfit through the winter, "but when there is snow on the ground, I stop." This diligence has paid off. McNeil has lost 35 pounds over the three years he's been commuting and increased his cardiovascular capability, which keeps him in shape to climb the meteorology towers when the need arises.

Commuting year round is a goal that Patricia Jencius (Supply & Materiel) has set for herself. She started riding to and from her Middle Island home in July. "I just wanted the exercise," she says, "and to build up my endurance for a long trip — to Shelter Island or Montauk Point." She saw results right away. "I lost about ten pounds the first two weeks," she says, "and now I find it's easy to maintain the weight I want by biking."

Gil DeGregory got bit by the commuting bug about five years ago, using his son's 3-speed to cycle from Shoreham to the Linac. Later, he bought a 12-speed Fuji. Most years he has ridden from February to December, but this year his work schedule prevented

him from starting until May. "I don't plan anything," he says. "I just take it as it comes. I just like to ride. I enjoy the fresh air and the exercise. It's peaceful."

The bikers sharing their views here, are representative of a larger group of BNL'ers who pedal to work regularly, a group that includes Mark Andrews (Chemistry), Ray Ceruti (CBA), Don Lazarus (AGS), Joe Mazzarella (Supply & Materiel), Bob Miltenberger (S&EP), Bob Monaghan, (AGS), Norman Rohrig (S&EP), and Pat Thompson (CBA). While some of these cyclists ride only in summer and others commute all year round, they all experience the same joys — and tribulations.

Dogs at their heels, glass from broken beer bottles, changing weather — the cyclist has to beware of all these hazards. But probably the biggest problem riders face is sharing the road with automobiles. Sluyters complains about their exhaust. "I don't think it is healthy," he says. "If you're inhaling all that carbon monoxide, it's negating the healthy aspects of riding." He solves his problem by leaving early and trying to avoid traffic.

But most riders are more wary of the drivers than the cars. As Morgan says, "Motorists usually swerve to avoid bikes, but some take the opposite tack. They don't like bike riders, so they try to see how close they can come, or blow their horn, yell at you. One time some punks even threw garbage at me."

How can cyclists protect themselves? "Wear a helmet," seems to top every rider's list, followed by, "Ride with the traffic." "That's where a lot of cyclists go wrong," McNeil says.

"There's no education. Parents just give kids bikes and say 'go ride.' If you blend in and ride with the traffic you should be safe. The problems come when motorists are uncertain of what you are going to do."

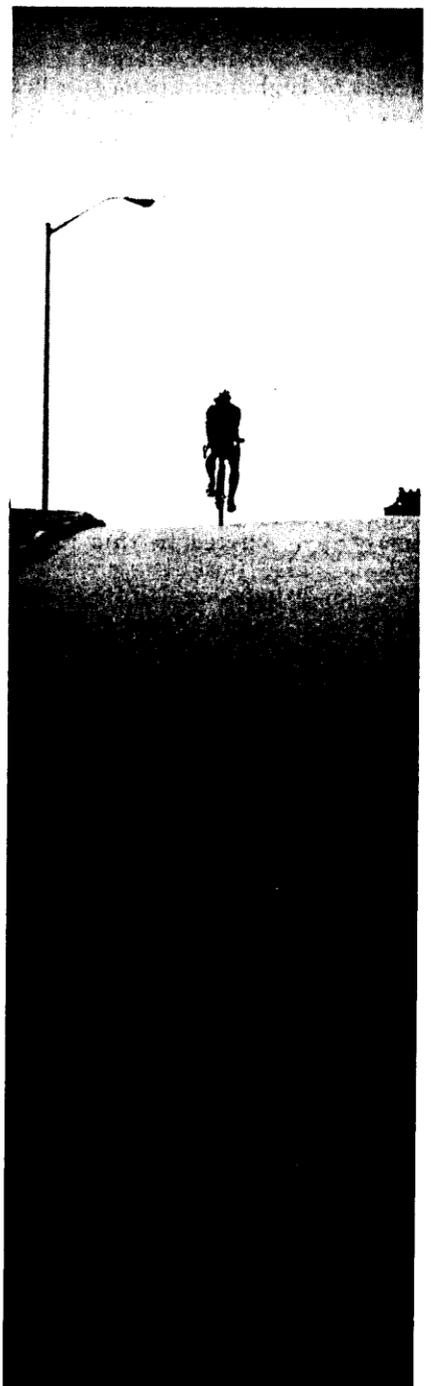
For McNeil, the pleasures outweigh the problems. "It's sort of a psychological high, where you get into a rhythm and you and the bike become one," he says. "You see and hear and smell more things than you do by automobile. And to those who think they'd like to experience these pleasures, McNeil advises, "Start off slowly and build up your endurance. Check out your route by car, then try it one morning — come one way. The thing is in the morning to say, 'Am I going to take the car or the bike?' You'll get to the point where you say, 'I really don't want to take the car.'"

—Anita Cohen



John McNeil commutes to work on his bicycle.

—photos by Humphrey



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Quark Matter (Cont'd)

of a task force headed by Ludlam and Physics Department Chairman Arthur Schwarzschild. The task force's proposals, which Mark Barton presented at Tuesday's discussion, call for the construction of a tunnel through which heavy ions could be injected from the Tandem Van de Graaff to the Alternating Gradient Synchrotron (AGS). While heavy ion experimentation is conducted in the AGS, at about 15 GeV per nucleon, construction could begin on a booster ring or a cyclotron to facilitate injecting heavy ions from the AGS into the CBA tunnel, where two beams of heavy nuclei would collide at energies of about 60 GeV per nucleon — the energies which have been theorized as ideal for creating true quark matter.

While decisions on the proposals by BNL, LBL and ORNL will be made in the future by other groups, this conference provided the laboratories with an opportunity to present their ideas to the physics communities and to receive feedback on their proposals.

In organizing the conference, Ludlam and Wegner were assisted by a 16-member International Advisory Committee; a Local Program Committee which included Michael Creutz, Carl Dover, Ole Hansen, Peter Hausstein and Ed Platner; and Conference Secretary Rae Greenberg.

Jacob (Cont'd)

"Ion Collisions," published in 1982, was a first step in this direction, and an even more comprehensive book came out of the Bielefeld conference.

That conference, Jacob said, was largely inspired by the present "conjunction between experimental possibilities and theoretical interest," what Jacob described as "a convergence of interests between theoretical activities in the new state of matter and the possibility of doing experiments in the not too distant future."

Experimentation at still moderate energies (according to present views, though already high according to present works) has been approved and will likely begin at CERN by 1986. Though theorist Jacob will not be involved in the experiment, he said, "There is a whole spectrum of theorists, from those who are more mathematically oriented to those who talk rather frequently with experimenters. At present, I belong to the second category."

As the first speaker at the BNL conference this week, Jacob spoke to experimenters and theorists alike about "Expectations for New States of Matter." In his talk he reviewed the physics after the Bielefeld workshop, spoke of developments since then and considered future possibilities.

Though the present conference looks to the future, being at BNL makes Jacob reflect on his past here. "It was a great opportunity for me to be able to start in research in theoretical physics that way," he said. "I come with pleasure to Brookhaven because, as far as physics research is concerned, it is my alma mater."

— Anita Cohen



Meet (from right) Arlene and Paul Miller (Dale Kimball and Chris Liano), your average middle-class American couple...or are they? They're shown here with Mitchell Lovell (Scott Hofer), their friendly family dentist...or is he? The true natures of these characters will be revealed to those who buy tickets by October 5 for the Special Event in Berkner Hall, on either Friday, October 14 or Saturday, October 15. Following a Cash Bar from 6:30 to 7:30 p.m., and a five-course dinner from 7:30 to 9:00, everyone will go to the auditorium to watch these players from the Broadhollow Theatrical Production Corporation in "Murder at the Howard Johnson's." Drowning, shooting, hanging, faked suicide and much more are not

above the bumbling trio as they try to do away with each other in this two-act play, written by Ron Clark and Sam Bobrick, and directed by Marian Waller. After the show, the "We the People" Dance Band, led by BNL'er Frank Kito, will provide music until 1:30 a.m. Tickets to this BERA-sponsored entertainment extravaganza are only \$17 a person and will be sold through Wednesday, October 5, at the cafeteria from 11:30 a.m. to 1 p.m., and from the following ticket sellers: Blanche Laskee, Ext. 2873, Bldg. 185; Betty Pergan, Ext. 2937, Bldg. 179A; Rosalie Piccione, Ext. 3160, Bldg. 355; Marge Stoeckel, Ext. 2459, Bldg. 134A. Tickets will not be available at the door.

Arrivals & Departures

Arrivals

Gordon F. Corbin, III Reactor
Richard F. Harrison, Jr. Accel.
Thomas W. Mooney Accel.
Douglas F. Ports Reactor
Robert W. Siemon NSLS
George N. Westwater Physics

Departures

This list includes all employees who have terminated from the Laboratory, including retirees:
None

Hospitality News

The Hospitality Committee's next monthly morning get-together will be held Tuesday, October 4, from 9:30 to 11:30 a.m. at the Brookhaven Center. Ms. Gale Levy, a hairstylist, will be the guest speaker. The topic of her discussion and demonstration will be "Hairstyles Becoming to You."

We would like you to join us for this interesting presentation. All wives of Laboratory employees, guests, and visitors are welcome. Coffee, tea and danish will be served. Please come and bring the children. Babysitting will be provided free of charge.

Microcomputer Club

A demonstration of a microprocessor emulator system, which is used for diagnostic purposes, will be given Thursday, October 6, from 12-1 p.m. in the Biology Dept. library, Bldg. 463. This presentation of Applied Microsystems equipment will be given by Rical Associates, Ridgefield, N.J. Contact Jim Hainfeld, Ext. 3372, for more information.

Volleyball

All established and new team rosters are due by October 3. All Mixed League rosters should be forwarded to Bob Marascia, Bldg. 911B, Ext. 4672. All Open League rosters should be sent to Don Litcher, Bldg. 515, Ext. 7587. There will be a captain's meeting on October 7 at noon in the large conference room in AGS, Bldg. 911. Election of officers will take place at this time. Anyone needing a roster form, please call Lois Marascia, Ext. 4904.

Bowling

Red/Green League

High games were bowled by R. Jones 222, J. Ferrante 220, L. Jacobson 208, J. Petro 206, H. Arnesen 203, J. Morris 201.

Service Awards

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

Thirty-Five Years

R. Christian Anderson Dir. Offc.
Seymour Katcoff Chemistry
Edward D. Sperry Physics
Lyle W. Smith Accelerator

Thirty Years

James J. Egan Applied Science
Eugene C. Raka Accelerator
George H. Vineyard Physics

Twenty-Five Years

Walter G. Hansen Medical
James R. Miles Plant Eng.
Raymond F. Reilly Plant Eng.
Max A. Schmaeler Medical
John M. Sullivan Accelerator

Twenty Years

Edward Byrne Plant Eng.
Arjun D. Chanana Medical
Louis A. Harson Plant Eng.
Helen M. Kalbach S&EP
Mary A. Kelley Instrumentation
Said F. Mughabghab Nuclear Energy
Jeanne A. Penoyar Nuclear Energy
Erich H. Willen Accelerator
Madeline P. Windsor Tech. Info.

Ten Years

Peter D. Horton P&GA
Joseph P. Indusi Nuclear Energy
Robert Jeffries Plant Eng.
Samuel Krinsky Light Source
Francis J. Lepera Appl. Math
Derek I. Lowenstein Accelerator
Iuliu Stumer Physics
Roger L. Tanner Applied Science
William C. Thomlinson Light Source
Christopher N. Willms Appl. Math

Cafeteria Menu

Week Ending October 7, 1983

Monday, October 3

Corn chowder (cup) .65
(bowl) .75
Roast turkey w/stuffing & cranberry sauce 1.95
Open face meatloaf sandwich & 1 veg. 1.85
Hot Deli — Bratwurst & sauerkraut (bread) 1.85 (roll) 2.00

Tuesday, October 4

Beef barley w/vegetables (cup) .65 (bowl) .75
London broil w/mushroom gravy & 1 veg. 2.10
Turkey à la king on rice w/1 pc. cornbread 1.95
Hot Deli — Sausage Reuben 1.90

Wednesday, October 5

Split pea soup (cup) .65 (bowl) .75
Chinese pepper beef on rice 1.95
Corned beef and cabbage 1.90
Hot Deli — Italian burger (bread) 1.85 (roll) 2.00

Thursday, October 6

French onion soup (cup) .65 (bowl) .75
Beef liver w/onions & 1 veg. 1.85
Chicken fingers w/honey sauce & 1 veg. 1.95
Hot Deli — Baked ham (bread) 1.85 (roll) 2.00

Friday, October 7

Boston clam chowder (cup) .65 (bowl) .75
Fillet of fish w/Newberg sauce & 1 veg. 1.85
Swedish meatballs on egg noodles 1.85
Hot Deli — BBQ fresh ham (bread) 1.85 (roll) 2.00

Danscompany

Tuesday, October 4
Berkner Hall, 8:30 p.m.
Tickets available at the door.

Classified Advertisements

Placement Notices

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

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

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

For further information regarding a placement listing, contact the Personnel Placement Supervisor, Ext. 2882.

OPEN RECRUITMENT: Opportunities for present Laboratory employees and outside applicants.

1946. **TECHNICAL POSITION** - Requires AAS degree in electrical technology. Work will include high voltage, high power, rf, analog and digital circuits and controls. Will work at 200 MeV Linac. Accelerator Department. (Reposting of Job No. 1933).

1947. **TECHNICAL POSITION** - Requires AAS degree in mechanical technology or equivalent and demonstrated experience in the installation, maintenance and operation of vacuum systems. Proven ability to interact and communicate with all levels of personnel required. National Synchrotron Light Source Department.

Autos & Auto Supplies

70 CUTLASS - body poor, engine & trans. excel., needs muffler, \$300. Ext. 3763.

77 HONDA - XL75, new chain, sprockets and knobby tire, \$225. Bob, Ext. 4672 or 929-4753.

SNOW TIRES - (2), F70x14, fiberglass belted, w/w, \$10 ea. Ext. 4153 or 732-5829.

76 FORD LTD - p/s, p/b, a/c, great shape, \$1,500. 928-4487.

67 DODGE CORONET - sedan, \$450. Ext. 4821 or 727-1412.

CAP - for 1973-1975 K-5 Blazer, excel. cond., white, \$50; 6' Meyer's snow plow, \$300. 929-4032.

75 PLYMOUTH VALIANT - auto., a/c, p/s, p/b, new engine, extras. Ext. 4134.

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

77 MALIBU WAGON - auto., a/c, p/s, p/b, \$2,100. Harry, Ext. 3080 or 282-3096 eves.

80 BMW MOTORCYCLE - R65, 1,000 mi., new battery, \$2,750. John, Ext. 4973 or 781-3715.

73 HONDA MOTORCYCLE - CB350, new mufflers, tires, tune-up, 19,000 mi., \$400. Joe, Ext. 2897 or 281-7683.

70 BULTACO MOTORCYCLE - 250cc, needs piston/sleeve, \$150. John, Ext. 4028 or 744-0049.

70 MUSTANG - 6 cyl., 57,000 mi., good running cond. Joe, 744-3509 eves.

75 CHEVY MONZA - 2+2 manual, 28 mpg, \$1,000. 728-2104 eves.

78 KAWASAKI - 400cc, new tires, sprockets & chain, roll bars & luggage rack, saddle seat, 12 K, dealer maint., \$900. 281-0360.

ELECTRO-TOUCH PLOW - Meyers, with lights, controls and all connections to chassis, \$750. Ext. 4976 or 929-3061.

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

62 CHEVROLET IMPALA - 4 dr., excel. cond., \$1,650. 732-3338.

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

74 DODGE VAN - 100K miles, good cond., make offer. Gerry or Dee, 878-1124.

81 HONDA MOTORCYCLE - GL500 Silver Wing, dressed, \$1,950. Dick, Ext. 3273.

72 FORD PINTO - \$400. Mike, Ext. 4293 or 567-9362.

68 DODGE DART - 6 cyl., auto., very high mileage, runs good, \$250. Ext. 5120 or 878-2687.

73 PLYMOUTH - 4 dr., runs well, some dents, no rot, \$600 firm. Ext. 2021 or 924-3469.

74 TOW TRUCK - w/79 Holmes back, runs excel., complete camper pkg., \$3,600. 821-9280.

82 DATSUN 210 - 5 spd., 21,100 mi., excel. cond., asking \$4,400. Paul, Ext. 2264 or 941-9055.

81 CHEVY MALIBU CLASSIC - 3 spd. on floor, am/fm/cass., a/c. Ext. 5294.

83 PLYMOUTH RELIANT - 4 cyl., auto., take over 5 yrs., 50,000 mi. warranty. JoAnn, Ext. 4120 or 588-8492.

77 PINTO SEDAN - sunroof, cassette, auto., p/s, p/b, new head, needs little work, clean, \$1,300. Ext. 2302.

65 MUSTANG - "as is", \$350; 1968 VW Bug, \$350. Ken, 281-5565.

76 FORD MAVERICK - 63,000 mi., 6 cyl., a/t, p/b, new tires, brakes, exhaust, asking \$2,995. Anna, 475-4149 eves.

73 AUSTIN MARINA - good for parts, all new radials (165SR-13), best offer. Linda, 924-7476.

72 DODGE CORONET WAGON - 318 c.i. engine, regular gas, \$450. 331-3841 after 6 p.m.

76 CHEVETTE - new tires & brakes, am/fm, 4 spd., 55,000 mi., good cond. 447-0047 days.

68 VOLVO - 1425, excel. running cond., 4 spd., rebuilt engine. Ext. 2781 or 286-0745.

78 PLYMOUTH HORIZON - 4 dr. hatchback, auto., power steering & brakes, 65,000 mi., \$1,995 + tax, firm. Richard, Ext. 3534 or 286-3178.

78 CHEVY CUSTOM VAN - auto., high mileage, am/fm/cb/cass. player, \$4,500. Tony, Ext. 3198 or 924-5248.

80 POP-UP CAMPER - 8e2s 6, sink, stove, ice box, heater, \$1,800. 399-0828.

72 OLDS DELTA 88 - reliable, runs well, a/c, p/s, p/b, \$600 firm. Mark, Ext. 5176.

81 PLYMOUTH HORIZON - excel. cond., 4 spd., 4 dr., 4 cyl., 40 mpg, must see. 698-7428.

CHEVY SHORT BLOCKS - (2) 350, need work, \$50/ea.; Crane cam, 516-539 lift, \$30. Bill S., Ext. 4434 or 399-6168.

75 FORD TORINO WAGON - excel. second car, auto., p/s, 87,000 mi., runs well, \$1,800. Jim, Ext. 3290.

AMC HORNET - a/t, p/s, p/b, a/c, am/fm stereo, \$1,500. Olav, Ext. 3927 or 3211 eves, or Jim, Ext. 3761.

71 FORD MUSTANG - reliable auto, orig. owner, needs work, best offer. Gene, Ext. 4261.

75 CELICA ST - excel. cond., a/c, new carburetor, brakes. Mike, Ext. 7280 or 929-8588.

71 TRIUMPH 650 - \$300. Ext. 2923.

TIRES - (4) for VW Beetle mounted w/hub caps, 2 snows, \$20 takes all. 744-9832.

73 MONTEGO WAGON - V-8, auto., p/b, p/s, am/fm stereo, elect. wind., new tires, excel. mech., interior, needs body work, \$600. Pete, Ext. 3045.

76 FORD TORINO - station wagon, a/t, p/b, p/s, a/c, good running cond., \$1,000. Ext. 7179 or 3032 eves.

71 VW BUG - rebuilt eng., new brakes, exhaust, tires, excel., asking \$900. Ext. 4028.

74 CHEVY IMPALA - runs well, \$700, returning to Europe. Tim Hering, Ext. 4581 or 3089 eves.

80 YAMAHA 850 - 4,000 mi., excel. cond., \$1,875; 76 HOND 550 - 13K mi., \$795. 878-0175.

63 FORD GALAXY 500 - new tires, exhaust system, 289, V-8, manual trans, very good cond. Mike, Ext. 4988.

74 NOVA - 6 cyl., auto., needs minor repairs, \$500 or best offer. Roger, Ext. 7793.

75 BUICK SUBURBAN STATION WAGON - good cond., \$950. Ext. 7110 or 3186.

66 CHEVY SUBURBAN CARRYALL - \$250. Ext. 2509 or 878-4882.

70 VW SQUAREBACK - minus eng., good body, usable extras, auto trans., \$150 neg. 473-9223.

Boats & Marine Supplies

MOORING - 100 lbs, with buoy & chain. 751-6418.

26' CABIN CRUISER - 105 HP FWC, fully equip., self contained weekender, sleeps 4, \$3,600. 286-1192.

ELECTRIC BOAT TRAILER WINCH - \$100. Ext. 4312.

SAILBOAT - 18 1/2' sloop, alum. spars, 6 HP, outboard, stainless rigging, fiberglass over wood, \$750. 929-8475 eves.

11' SUPER SNARK SAILBOAT - excel. cond., like new, w/sail, rudder, centerboard, \$275. Janice, Ext. 3332 or 589-4153.

14' APOLLO SAILBOAT - fiberglass, main & jib sails, moving steel centerboard, \$500. 878-4285 eves.

CATALINA 25 - with Honda 9.9 HP o/b, 4 sails, see it while still in water. 473-2473.

21' CRUISER STARCRAFT - 1973, alum. hull, full cabin, 115 HP Evinrude, \$3,700. Rolf, Ext. 4238 or 286-1974.

27' OWEN CABIN CRUISER - in water near BNL, \$1,200. Ext. 3698 or 496-4585.

14' HOMAR PHANTOM - 1982, used seven times. 477-2269 after 5 p.m.

17' O'DAY DAYSAILER - 1979, mariner outboard, galvanized trailer, excel. cond.; also 3 man inflatable boat. 286-0478.

JOHNSON OUTBOARD - 1973, 40 HP, manual start w/controls & tank, very good cond., \$450. Ext. 3499 or 981-7369.

24' STAMAS - 1974, cuddly cabin, OMC, 225 HP, I.O., VHF, DPT.FND, extras, excel., \$10,500. 928-6150 eves.

27' OWENS CABIN CRUISER - in water near BNL, \$1,200. Ext. 3698 or 496-4585.

21' FIBERGLASS T-CRAFT - 1972, 245 HP, I.O., cuddly cabin, VHF, d.f., sleeps 4, trailer, electric winch. 744-9802.

16' EVINRUDE - 115 HP, Johnson, 1982 Dilly galv. trailer, \$2,000; 1981 Evinrude, 6HP, \$500. Ext. 2705 or 298-9581.

Free

DOG - spayed female, Collie Shepherd mix, 2 yrs. old, loves children, needs room. 929-3455.

FIRE WOOD - for cutting. 689-9214 after 6 p.m.

Miscellaneous

TICKETS - The Temptations and Four Tops, Westbury Music Fair, Fri. Nov. 4, leave from Berkner Hall 9:30 p.m., \$25 includes all. Rosemary, Ext. 5036 before 10/5.

SOFA & CHAIR - colonial, dark pine with plaid cushions, \$100; elec. dryer, excel. cond., \$25. Ext. 4664 or 744-8779.

CLARINET - \$50; flute, \$50; colonial loveseat & chair, \$35; carriage, \$20; bassinet, \$10. Barbara, Ext. 2456.

LAWN MOWER ENGINE - Briggs & Statton, horizontal shaft, \$15. 924-8213.

ELECTRIC TYPEWRITER - & electric adding machine, oldie but goody, \$80 for pair. Ext. 3499 or 929-5883.

MINI BIKE - 5 HP, Tecumseh, \$100; 20" Schwinn dirt bike, BMX, \$100. Chris, 585-4038 after 6 p.m.

POT BELLY STOVES - (1) used, \$50; (1) new, \$100. Ken, Ext. 7959 or 581-1169 eves.

BOWLING BALL - 16 lbs., AMF with bag, \$20. 744-9832.

WALL MIRROR - 36x44, \$20; winter coat, woman's size 16, brown, wool, like new, \$40. John, 929-4540.

DISC CAMERA - Kodak 6000, new, used once, \$45. 281-6699.

JAPANESE BLACK PINE - various sizes, from 2' to 4-1/2', \$20 ea.; chest freezer, 48 cu. ft., white. 727-4515 eves.

SONY TV - 15", excel. cond., \$150; Fisher 3-way speakers, \$100 pair. Ext. 4242.

TV ANTENNA - new, \$50 from \$65; portable dishwasher, \$125; car roof rack, 37"x37", \$20. 744-9677.

METAL DESK - 2'x3', w/chair, very good cond., \$50 or best offer. Ext. 4585.

TRAINS - N-gauge, 3-tracks, 4'x8' layout, many cars, loco in prefinish stage, \$125. Ramona, 928-3088.

DINING ROOM CHANDELIER - Italian Provincial; 2 hanging occasional lamps, French Provincial, excel. cond. Ext. 4531 or 331-3785.

BASF BLANK CASSETTE TAPES - CR02, Proll, \$2.75 ea. Ext. 2521.

BEDROOM SET - colonial, 6 pieces, w/2 glass lamps, less than 1 yr. old, \$500. 399-5316.

TRUMPET - good cond., \$100. Ken, 281-5565.

BEDROOM SET - white canopy, 2 dressers, night table, mirror, \$200; assorted baby furniture. Dave, Ext. 7922 or 298-9581.

MET OPERA TICKETS - balcony, (4) Manon Lescaut, Mar. 23, \$20 ea. Dave, Ext. 2694 or 941-9022.

ADLER J5 TYPEWRITER - excel. cond., recommended by Consumer Reports, \$100. David, 286-2265.

COLEMAN STOVE - \$10; lantern, \$10; camping fly, 8x10, \$25; Sears pak-a-potti, \$25. Ext. 4846.

COLOR TV - 25" console, works fine, \$25. Roy, Ext. 4664 or 744-8779.

AIR CONDITIONER - Sears Coldspot, 8,500 BTU, model 106.63150, 1360W-12 amps, 115 volts, phase 60 cycles, \$75. Ext. 2265 or 289-0567.

DIESEL FUEL TANK - 275 gal., hand pump, gauge, hose, nozzle, used 1 yr., \$150. Karl, Ext. 4309.

CARPETS - fits approx. 8x10 rooms, good cond., make offer. 473-7667.

MET OPERA TICKETS - (4), Boheme, Nov. 5, Orchestra, \$45 ea., row R. Dave, Ext. 2694 or 941-9022.

TICKETS - (2) Oak Ridge Boys, 10/22/83, 5:00 p.m. show, \$15 ea. Ext. 4589.

GAS HEATER - 75,000 BTU, thermostat controlled, excel. cond. Hugh, Ext. 4669 or 924-3522 after 5 p.m.

ORCHIDS - various house plants; Timex watch, \$20. Irene, 589-5126.

CANARIES - varigated, red factor, yellow, etc., \$60 pr. Whitey, Ext. 2913 or Ramona, 928-3088.

WROUGHT IRON RAILINGS - (2), fancy twisted Balustrade, 3 step, 4' stoop, 744-3792.

RIBBONS - 12 correctable film for IBM, \$2.50 ea.; Garrard Record Changer, needs arm and cartridge. 281-2002.

STORAGE SHELVES - (3) steel, sturdy, 3 for \$25; good blue cast iron bathtub, \$50 firm. 878-6637.

FIREPLACE INSERT - Dare IV, coal & wood burning plus 3 ton bin & 2 tons coal, excel. 654-5888.

UNICYCLE - 24", \$25; 28" fireplace grate, \$2; cat box, \$1. R. Dietz, Ext. 3059 or 744-7242.

HANDMADE WOOD STOVE - \$75; child's metal desk & chair, \$7; child's spring horse, \$5. Judy, 698-4882 after 5 p.m.

WALNUT DRESSER - antique, 4 drawer, good mirror. Walt, Ext. 7154 or 754-1392 eves.

COMPUTER - TRS-80, Model III, 64K, 1 disk drive, RS232, joystick & software, \$1,000. Tom, Ext. 7115.

QUEEN SIZE MATTRESS - w/box spring & frame, Simmons Beautyrest, super firm, \$90. Ext. 3947 or 475-3431.

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

FORCED AIR HEATER - \$22. Ext. 3688.

WASHER - Sears, heavy load, good cond., \$95. Ext. 3589.

MAN'S SKI PANTS - 34R, dark blue, wool & polyester, stretch, \$75; ski boots, 8 1/2c, Salomon, SX-90, \$135. Ext. 4727.

AIR CONDITIONER - 14,000 BTU, working cond., \$60, must sell. Ext. 3641 or 698-8623 eves.

BABY CRIB - \$25; Kenmore portable dryer, \$125. Malini, 473-2721.

FREEZER - Amana, 9 cu. ft., energy efficient, space saving chest, \$150. Ext. 7535.

ROUND TABLE - 42" dia., 4 chairs, very good cond., for dining or patio, \$75. Ext. 7582 or 744-2499 after 6 p.m.

BALLET TICKETS - American Ballet Co.-2 at SUNY Stony Brook, Oct. 8, Sat, (4) \$10. 473-2473.

SHINGLED GARDEN WISHING WELL - \$70. Jerry, Ext. 4337 or 286-2680.

RECLINER - \$75; dresser w/mirror, \$75, full mattress boxspring, \$75; full-foam mattress boxspring, \$20. Ext. 4618 or 928-5737.

JACK LALANE SPA MEMBERSHIP - \$29/yr. renewal, \$400. Ext. 4098 or 736-4886.

SNOW PLOW - 7' manual, \$100. 363-6845.

Yard Sales

BROOKHAVEN - miscellaneous household articles, furniture, antiques, rugs, Oct. 2, 10 a.m., 334 S. Country Rd. 286-1192.

SAYVILLE - Sat., Oct. 1, 10-4 p.m., treasures galore, The Grange, Broadway Ave. & Montauk Hwy.

MANORVILLE - 3-family, 96A Wright Rd., north off Moriches-Yaphank Rd., 9:30-5:00, Sept. 30, Oct. 1 & 2.

SHOREHAM - 10/1/83, 10-4 p.m., dinghy, go-kart, bicycle, Regis Place off Randall Rd, rain date 10/2/83.

PATCHOGUE - 10/1 & 10/2, merging 2 homes, plenty of everything, 57 Lakeland Ave. off Main St., corner Park/Lakeland. Roseann, Ext. 3199 or 475-6622.

EAST PATCHOGUE - 10/1 & 10/2, 9-4 p.m., 52 Hewlett Ave., depression glass, antiques, miscellaneous items.

SHIRLEY - Sat. & Sun., 10/1 & 10/2, 12 Lama Dr., 10-4 p.m., W/S of Floyd Pkwy.

SHIRLEY - Sat. & Sun., 10/1 & 10/2, 16 Saint George Dr., 1/2 mi. from Smith Pt. Bridge, off Wm. Floyd Pkwy., raindate 10/8.

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

RIVERHEAD - mobile home, 12'x60' with 10'x15' extension, w/w, a/c, major appl., shed, \$18,000. 727-5475.

COOPERSTOWN VICINITY - 180 acres, good farm land plus bldgs., \$375 per acre. 363-7032.

RIVERHEAD - 4 bdrm. house, 2 bath, lrg. yd., lrg. eik, lrg. l/r, family rm., w/w carpet, utility rm., garage, assumable mortgage 9%. Ext. 2334 or 727-1887.

For Rent

N. SHIRLEY - 1 bdrm. apt., in private residence, lg. rooms, private entrance, \$350 per mo. + elec. 281-2625 eves.

ROCKY POINT - 2 bdrm. house, 7 mi. to Lab, lg. property, quiet neighborhood, no pets, \$550 + util + sec. 473-4948 eves.

STONY BROOK -