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Negative Ion Sources A-OK

Final acceptance tests of a negative ion magnetron source to be used for the charge change injection into the booster of the 400 GeV synchrotron at FermiLab were carried out last week at the AGS.

The source delivered the specified current of 100 milliamperes, culminating a three-year investigation by a group in the Accelerator Department who had pursued this different, but promising, method of injection into the AGS.

Instead of using protons all the way from the ion source through the linac and into the main AGS ring, negative hydrogen ions would be produced rather than protons in an ion source, accelerated in the linac and then injected into the main ring through a very thin foil. While passing through the foil most of negative ions lose both of their electrons and enter the ring as protons. Although the new method may look more complex than the one presently used, it offers two advantages, lower losses at injection and a more intense accelerated beam.

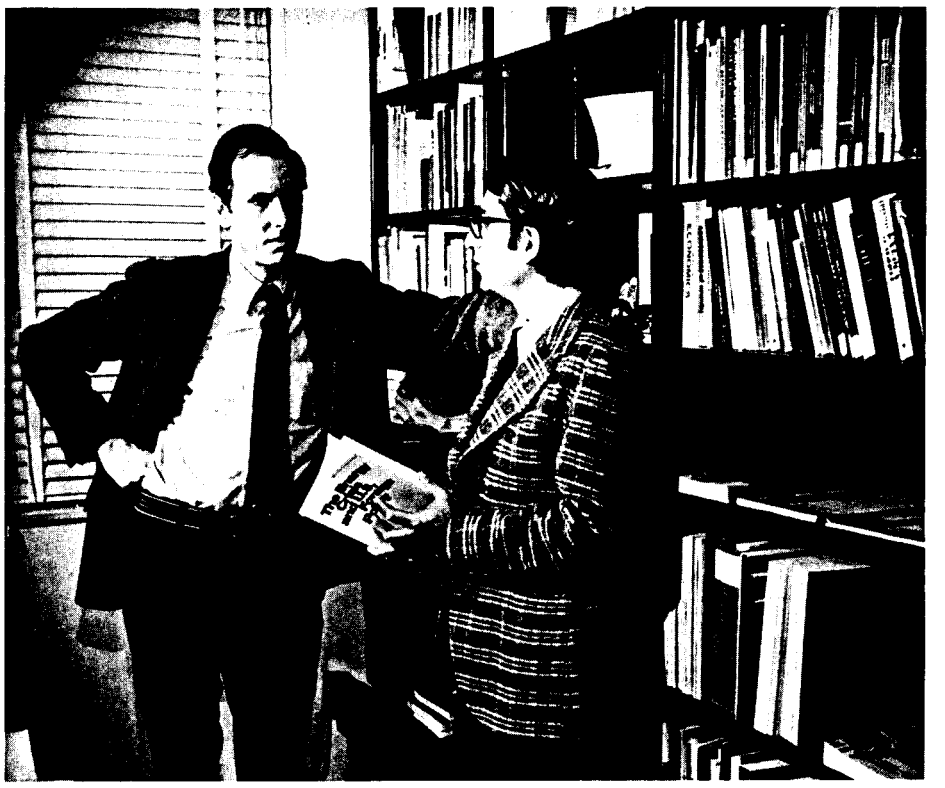
At first, two negative ion sources were designed and constructed - a hollow discharge duoplasmatron and a magnetron. Encouraged by the initial performance, Krsto Prelec and Theodorus Sluyters submitted a proposal to ERDA to develop a much larger source capable of yielding several amperes of negative deuterium ions to be used in megawatt neutral beam injectors for future fusion devices.

Funding was approved and the program was expanded. Now it includes the development of high energy neutral beam injectors and high speed cryopumps. Starting with only a few milliamperes of negative ions and very short pulses, beam currents close to one ampere have recently been achieved and pulse length extended to 20 milliamperes.

The development of lower intensity sources for accelerator applications, which was the original goal, proceeded at a slower pace, but was not overlooked. A visiting scientist from Japan, Masaaki Kobayashi, spent a year investigating the properties of the hollow discharge duoplasmatron and was able to improve its performance substantially. By injecting a mixture of cesium vapors and hydrogen into the source, he obtained negative ion beam currents of up to 60 milliamperes, which is three times higher than previously obtained at Brookhaven, and ten times higher than obtained elsewhere.

Participating in the tests of the negative ion magnetron source were Cyril Curtis and Charles Schmidt of FermiLab. Their experience with this source at the 400 GeV synchrotron will be of great interest to Laboratory researchers, and may speed up the application of charge change injection into the AGS.

Theo Sluyters (left) Accelerator Dept. and Cyril Curtis of FermiLab, with the negative ion source which will be used in the booster of the 400 GeV synchrotron at FNAL. —photo by Walton



Phil Palmedo (left), head of Policy Analysis Division of new Center for Analysis of Energy Systems, discusses developing countries project with staff member, Vinod Muyabi.

Search For Energy In Evolving Nations

For you, the energy crisis at present only means higher costs of gasoline for your car and oil for your furnace. For people in many other countries in the world, it may mean starvation.

In human terms, the effect of the oil crisis is most clearly seen in what is known as developing countries. They consume only a small percentage of the world's energy, but without it, their low standard of living becomes no standard of living. Statistically, 25.5% of the world's population uses only 1.8% of the world's energy, while at the other end of the scale, 18% uses 61%.

The problems associated with energy use in developing countries is the subject of a new program in the Policy Analysis Division of the new National Center for Analysis of Energy Systems. The program is supported by the Division of International Research and Development Programs in ERDA. Because these problems are so vast, Philip Palmedo, the Head of the Division and his colleagues are concentrating initially on the study of a few developing countries and a few uses of energy. Considering geographical and income factors, they have selected India and Kenya as representative of the up to $200 per capita income countries; South Korea and Ghana up to $375; and Greece and Chile in the over $375 bracket. Developing countries are doing just that, developing, and are in such varying stages that it would be impossible to study them as a whole.

The three groups comprise about 2½ billion people who have an energy *per capita* consumption of up to 17 million Btu. Comparing that figure with the 336 million Btu per capita consumption of Kuwait, one of the oil-rich countries and the largest per capita energy consumer in the world, the discrepancy is staggering. The U.S. is next in line with about 322 million Btu per capita consumption.

Awareness of the energy crisis in developing countries has not just suddenly surfaced. Palmedo and Robert Nathans, Dean of W. Averell Harriman College for Urban and Policy Sciences at SUNY, Stony Brook, initiated informal studies on it several years ago. In May 1974, they published a working paper on a proposal for an Energy Institute for Developing Countries, which would coordinate research activities around the world in this field, serve as a center for transfer of information on energy technologies, and for training people involved in energy programs in developing countries. The State Department has recently decided to pursue the formation of a similar institute, to which the Brookhaven group may become affiliated. In the meantime, the BNL effort has narrowed its field to evaluating new and alternative energy technologies for these countries.

Palmedo's team is small, at present, but international in character. Vinod Mubayi is a physicist from India, Angelika Papazoglou, an economist from Greece, and Tien Quang Le, a physicist from South Vietnam. They bring not only their technical expertise, but a first hand knowledge of the areas being studied.

This is valuable because not only technical questions of costs and technologies are involved, but structures of communities, population problems and political systems will all play a role in adapting an energy system to each country's needs.

"The fascinating thing about energy," says Palmedo, "is that it is so intertwined with everything else." The Laboratory's interdisciplinary approach to research has made available staff with diverse expertise. In Building 475 alone, where the group works, they can also draw on the knowledge of medical personnel, economists, en-

(Continued on page 2)

Policy Analysis Division staff members Angelika Papazoglou and Tien Quang Le pore over some of the many charts and maps they will consult in the assessment of energy supply and demand for six countries.

Suffolk Benefits

Although there was a hue and cry when detergents were banished from store shelves in Suffolk County in March 1971, the ban is now being reflected in a decrease of detergent concentrations in groundwater wells and streams, according to a report recently issued by the Suffolk County Department of Environmental Control.

Though most people have abided by the ban, the report states that "bootlegged" detergents from outside Suffolk is one of the factors involved in the continued presence of detergents in the water supply. Other factors cited are the use of automatic dishwashing detergent (which is legal) and residual ABS.

In 1965 in an effort to increase the biodegradeability of household wash products in the water supply, the soap and detergent industry converted the surface active agent ABS (branch-chain molecule) to the LAS (straight-chain molecule). However, later data showed that even the straight-chain surfactants did not degrade significantly.

The ban will remain in effect as certain areas still show significant quantities of detergents present. This, together with the increase in chlorides indicates that contamination from cesspools is still taking place. The report concludes that these factors "reinforce the need for sewers in the more highly developed portions of Suffolk County."

In any case, the environmental benefits of the ban far outweigh the inconvenience of "ring around the collar."

BNL Lecture

"Molecular Order, Anarchy and Revolution; Neutron Scattering Studies of Structural Instabilities in Solids," by John Axe, Physics Dept., February 25, at 8:00 p.m., Berkner Hall.

Australian Chemist To Give DAS Seminar

Dr. J.O'M. Bockris, Professor of Chemistry, Flinders University of South Australia, Adelaide, Australia, will give a DAS Seminar on "Electrocatalysis" in the Hamilton Seminar Room, Chemistry Building, on March 4, at 3:30 p.m.

Professor Bockris has an international reputation for his contribution in electrochemistry and has published several books and over 400 papers. He has been quite active in energy research, and is one of the proponents of the Hydrogen Economy. In recent years, he has taken a strong interest in solar energy utilization. In "Modern Electrochemistry" by J. O'M Bockris and A.K.N. Reddy, it is noted Prof. Bockris "views electrochemistry as a central future field of interest in the development of a viable post industrial society in which a clean environment must be associated with an electrically based industry, utilizing an electrically oriented chemical technology and an electrochemically powered transportation system."

John Garfield Dies

John F. Garfield, former head of Photography and Graphic Arts and one of the original members of the Laboratory, died Saturday, February 14, 1976, at age 68. He had been ill for a number of years and retired in 1972.

Garfield joined the Laboratory in February 1947 and organized the Technical Photography and Graphic Arts Division. During his tenure he also developed a laboratory for the processing of thick Nuclear Track Emulsions and contributed to the photographic recording of nuclear events in cloud chambers, and subsequently, in bubble and spark chambers. He later assisted in refining techniques so that larger chambers could be satisfactorily recorded on smaller film sizes.

Born in Cleveland, Ohio, he was educated at Andover Academy, Amherst College and the University of Vermont.

After three years as a photographer for the Federal Art Project, he opened a studio for advertising illustration in Boston. During World War II he joined the Radiation Laboratory of MIT where he worked on photographic techniques of recording radar images and was made manager of the photographic section. In 1943 he was sent to England where he worked with the British Telecommunications Research Establishment on early efforts in the high speed processing of motion picture film.

He was a member of the Society of Photographic Scientists and Engineers.

Garfield is survived by his wife, Elaine, three children and six grandchildren. The family asks that in lieu of flowers, donations be made to Skills Unlimited, Inc., 201 Howell Avenue, Riverhead, New York.

John F. Garfield

VLA Useful To All

The February 1976 issue of *Physics Today* reports on the construction of the Very Large Array Telescope being built in New Mexico by our sister lab , the National Radio Astronomy Observatory. In an editorial they emphasize the importance of the VLA to all physical scientists, not only the astronomers.

"We . . . urge that all physical scientists lend their encouragement and support to the VLA facility – not only because they appreciate the importance of the project to the progress of basic astronomy but also because information from the new telescope may well advance their own disciplines. We have already seen that solid-state physicists, for example, have been able to obtain information about new forms of matter from radiotelescope observations of neutron stars. In a similar vein, the new VLA is expected to provide information that will be useful to a number of disciplines other than astronomy. (One example would be contributions to basic knowledge in plasma physics from observations of plasma processes in extra-galactic sources). In this sense the VLA should be regarded as a national laboratory serving science more broadly."

IBEW Meeting

Local 2230, IBEW will hold its regular monthly meeting on February 26, at 8 p.m. in the Knights of Columbus Hall, Railroad Ave., 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.

Evolving Nations (Cont'd)

vironmental ecologists, systems analysts, mathematicians, and even a cultural anthropologist. They already have a framework for their energy planning – the Brookhaven Energy System Optimization Model developed by Kenneth Hoffman and Ellen Cherniavsky. In constructing reference energy systems for the six countries, the Policy Analysis Division will study various sectors of each country – agriculture, industry, transportation, and so on.

Economic development seems to be directly related to the amount of energy consumed. "Historically, the use of energy has gone up in direct proportion to the gross national product," says Palmedo, "or those countries with high GNP have high energy consumption." The group is attempting to uncover in more detail the underlying relationship between energy use of various kinds, and the development process.

A major proportion of the countries being studied have primarily agricultural economies and are largely dependent on oil for the production of fertilizers. As oil prices skyrocketed, they had no way of compensating for the additional funds they had to expend, as they had nothing to export. The agricultural sector is receiving particular attention because of its central role. Professor David Pimentel of Cornell is collaborating with the BNL group in those studies.

A serious problem arising from the lack of oil in agricultural countries is the increased use of wood and animal manure for fuel. People are foraging further afield for wood and cutting down younger trees, causing soil erosion. The use of cow dung for fuel instead of fertilizer, further increases erosion or the need for synthetic fertilizers. The depressing cycle continues, resulting in less and less food productivity. Deforestation is of great concern to many countries and they are seeking alternative fuel sources.

Because it seems to have the greatest short term benefit, the group will zero in on small-scale, decentralized power systems for use, for example, in lighting, providing power for rural health clinics and in driving pumps for irrigation. It is no longer enough to rely on animal draft power to lift water from underground sources. As most of the countries are equatorial, Palmedo thinks that "solar (including wind) energy looks more interesting and competitive in these countries than in the industrialized countries which have developed complex transmission systems."

Many countries apparently have indigenous energy sources which have not been sufficiently explored or developed. Africa is reportedly rich in coal. Looking for potential energy sources within each country is an important task, the group feels. One possibility is for an international lending institution to give loans to countries for exploratory purposes. If they find resources, the loan would be paid back; if they don't, the loan would not have to be repaid.

During their investigations, the staff of the Policy Analysis Division may also be going to individual countries to work with the energy planners there. Conversely, plans for sending teams from developing countries to Brookhaven for six weeks of intensive training in energy programs are now under discussion with the World Bank and other agencies.

The Palmedo team hopes to have an assessment of energy supply and demand for each of the six countries ready in about a year.

CREF Unit Values Jump

	1975		
January	$30.67	February	$32.80
March	33.77	April	36.12
May	38.07	June	39.88
July	36.81	August	35.86
September	34.31	October	35.89
November	36.61	December	36.34

1976	
January	$40.31

It is our hope that the U.S. Post Office has delivered your individual copy of ESTATE PLANNING to your home. A special effort has been made to assure that all employees, active and retired, might benefit from the booklet. Therefore, if you did not receive a copy, please contact Personnel, Ext. 2113.

February Retiree

George M. Stoll, an Electrical General Supervisor and a Laboratory employee since March 12, 1947, will retire on February 27, 1976. Best of Luck!

Selected Reading

New Yorker February 2, 1976
A reporter at large (energy-I). B. Commoner. 38-46+

New Yorker February 9, 1976
A reporter at large (energy-II). B. Commoner. 38-44+

Sci. Gov. Rep. 6, February 1, 1976
Research gets favored treatment in '77 budget. D.S. Greenberg. 1-3

Smithsonian 6, February 1976
A physicist finds that colonies in space may turn out to be nice places to live. R. Chernow. 62-9

Eng. Sci. 39, January-February 1976
Los Alamos from below – Reminiscences of 1943-1945. R.P. Feynman. 11-30

Science 191, January 30, 1976
Science in the public forum: Keeping it honest. A.M. Weinberg. 341
Ruckelshaus: What happened to Mr. Clean? C. Holden. 361-2

New Sci. 69, January 1, 1976
Towards environmental warfare. F. Barnaby. 6-9

Change Your Sights

Applications are now coming in to Personnel for the openings in the Craft Apprenticeship Training Program: two as refrigeration and air-conditining engineers and one as an electrician. As the application deadline is two weeks away, March 5, there is still time to get it all together.

There are more than 100 women presently employed in other areas who are eligible to apply and they are urged to consider entering this field.

Beginning on March 8, applicants will be called in for an interview before the Joint Apprenticeship Committee. This committee is composed of three representatives of Laboratory management and three IBEW members employed at the Laboratory. The applicants will be evaluated and scored. The three persons receiving the highest scores will be offered apprenticeships and will be so notified on March 19.

The program is under the general administration of Ric Villacara, Placement Supervisor, who also serves as liaison with the New York State Bureau of Apprenticeship Training. The applicants are selected in accordance with the Bureau's approved standards.

Arrivals & Departures

Arrivals

Susan Norton.....Photo & Graphic Arts
Richard S. Yeo.....Applied Science

Departures

None

New York City Trip

Last call for the Hospitality Committee group railroad trip to the City on Wednesday, March 3. Departure will be 8:59 a.m. from the LIRR station in Patchogue. The round trip fare for adults is $2.45; children under 6 years ride free. Send your money by February 25 to Ruth Dimmler, BNL Hospitality Committee, P.O. Box 322, Upton, N.Y.

Bartok Quartet

Bartok Quartet Concludes BERA Concert Series

One of our most successful concert seasons will be brought to a close on Tuesday, March 2, at 8:30 p.m., with an appearance by the Bartok Quartet, the outstanding Hungarian ensemble. The program will feature music by Haydn, Bartok and Beethoven.

The Bartok Quartet was founded in 1957 by composer Professor Leo Weiner, and until 1963 was known as the Komlos Quartet, Peter Komlos being their first violinist.

The ensemble actually began their international career when they were awarded second prize at the International Haydn Competition in Budapest in 1959, and second prize at the International Schumann Competition in Berlin, held in 1960.

In 1963, they scored first prize at the International Music Competition held in Budapest in memory of Leo Weiner, and it was at that time that the Ministry of Education and the members of the Bartok family jointly bestowed on this most deserving ensemble the name of one of Hungary's immortal composers, in recognition of their outstanding achievements and high musical accomplishments.

They have appeared in concert halls, radio broadcasts and over television networks in Italy, Scandinavia, Germany, France, Belgium, Finland, Poland, USSR, North and South America, Japan, Australia and New Zealand.

They have recorded many standard works of the classical repertory as well as a number of modern and contemporary works. On the French label ERATO, the Bartok Quartet has recorded the entire cycle of the six Bartok Quarters, which they have also performed in public on numerous occasions.

The quartet includes Peter Komlos (violin), who plays a *Guarneri del Gesu*, 1736; Sandor Devich (violin), a *G.B. Guadagnini*, 1774; Geza Nemeth (viola), a *Lorenzo Storioni*, 1787; and Karoly Botvav (cello), a *Giovanni Granciano*, 1702.

Admission will be $3.50 for adults; $1.75 for students with I.D.; $1.75 for persons over 65 and $1.00 for persons under 18.

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Slo-Break Basketball

Dr. K

The second half of the BNL basketball season opened with a double-header on February 5. In the first game the Spuds defeated the Condors 60 to 55.

Box Score

Spuds (60)		Condors (55)	
Player	**Pts.**	**Player**	**Pts.**
Nordstrom	18	Dagg	12
Doty	17	Vaughn	20
Sutter	4	Thomas	12
Henry	2	Dr. K	11
Rose	10	Ehrenkaufer	0
Kowalski	6		
Cassella	2		

In the second game of this double-header an intact Persuader team slaughtered the Moose-less Browns 69 to 44. Persuaders scoring was led by Dunmore with 24 points. Other Persuaders in double figures were L. James (19 points) and B. Johnson (16 points). Bob (The Shoe) Schumann had an excellent game and scored 11 points as Les (L-cubed) Lawrence led the Browns scoring with 16 points.

Box Score

Persuaders (69)		Browns (44)	
Player	**Pts.**	**Player**	**Pts.**
James	19	Lawrence	16
Garrison	0	Schumann	11
Dunmore	24	Heotis	9
Johnson	16	Stillman	4
Jesaitis	4	Smith	4
Lynch	2	Taylor	0
Lamb	4		

The double-header on February 12 featured the Condors defeating the Persuaders 57-45 in a surprisingly one-sided contest. The Condors had 3 people in double figures: Jim (The Mad Bomber) Vaughn, Mike Dagg and Dr. K. The Persuaders had only Wayne Smith who despite injuries scored 25 points.

Box Score

Condors (57)		Persuaders (45)	
Player	**Pts.**	**Player**	**Pts.**
Dagg	13	Johnson	8
Ehrenkaufer	0	Baltz	4
Brown	4	Smith	25
Vaughn	18	Lynch	0
Thomas	7	Jesaitis	8
Dr. K	15		

The second game of this double-header pitted the Browns and the Spuds in what looked like a very even contest. The Spuds were lacking their best point producer Jeff Gaffney and the Browns were bolstered by the return of the "Moose" and "L-cubed." The first half champs, the Spuds, rose to the occasion and the Browns played disorganized ball and were defeated 60-47. The Spuds had three players in double figures: Bob Doty (23 points), Dennis Nordstrom (13 points) and Joe Rose (10 points).

Box Score

Spuds (60)		Browns (47)	
Player	**Pts.**	**Player**	**Pts.**
Nordstrom	13	Moose	28
Kowalski	8	Smith	2
Doty	23	Pittman	4
Rose	10	Lawrence	4
Casselta	4	Heotis	9
Snead	0	Schumann	0
Henry	0		
Lopez	2		

Second Half Standings

	Won	Lost
Spuds	2	0
Condors	1	1
Persuaders	1	1
Browns	0	2

Signs of Spring — The Buoy Returns

A few weeks ago in the dead of winter, a group of men from the Laboratory journeyed to Woods Hole, Massachusetts to bring back the Oceanographic and Atmospheric buoy, sections of which are shown above. The buoy was hauled out of the water, disassembled and trucked to the Lab. This is the first time the buoy, 8½ tons when fully assembled, has traveled all the way by surface transportation. Formerly, it was towed by way of the water, a long tedious process. The men responsible for the safe conduct of the buoy were, from left, Roy Barone, Supervisor of roads and grounds, carpenters Peter Stolz and Joe Radich, riggers Mike Perrier, Bernard Belligan, Charles Elbert and Bill Rembt. Cy Fink and Don Huszagh, DAS, are now at work modifying the buoy for use in meteorological and oceanographic studies this spring. —photo by Cy Fink

On The Aisle

Charlie Brown and the gang arrived with a bang at BNL last week-end and they'll be here again today and tomorrow.

Under Ruth Galvin's imaginative yet tight direction, the cast was able to establish believable characters remarkably quickly. This is not easy when working in close contact with an audience seated on three sides of the stage.

Audiences will have the fun of picking a show stopper. This reviewer had a hard time choosing between Snoopy's "Red Baron," "Happiness," "Suppertime" and the entire cast in "The Baseball Game." My choice is "Suppertime." This captivating tune is sung and danced to by Snoopy and Lucy who obviously love every minute of it. Enjoyment is the key to the show. The whole cast enjoys what it's doing and the result is this feeling is contagious.

Bonnie McNair keeps the play running with a sustained vivacity and drive. Bruce Martin's agility and alertness combine to portray a lovable pup that would bring a smile to even a dog catcher's face. Bob Kinsey provides his usual solid performance enhanced this time by the use of his fine singing voice. Jane and Bill Love along with Carl Goodzeit and Sharon Smith join in the fun and are particularly good at keeping this show on the move. Nancy Bernius' nimble fingers on the piano and percussionist Billy Trigg's innovations not only provided a pleasing musical background but also kept the tempo lively.

On a winter's evening "You're a Good Man Charlie Brown" is like a touch of spring. It's light, it's fresh, it's fun. Everything's comin' up daffodils and tulips!

—John Binnington

Adult Swimming Lessons

Any employee or adult employee family member interested in taking swimming lessons is asked to call the Recreation Office, Ext. 2873, or sign up at the Pool during open hours.

Lessons will be given only if enough interest is shown before the deadline date of March 2.

Official & Special Events

Monday, February 23
Workshop on Alternate Energy Systems - Berkner Hall - Rooms B&C (Feb. 23-28)
Tuesday, February 24
Brookhaven Town Project Advisory Committee
Wednesday, February 25
BNL Lecture - Berkner Hall - 8:00 p.m.
ERDA Nuclear Science Program Review
Friday, February 27
Low Level Radiation Effects Meeting - Berkner Hall - Room A

Tuesday, March 2
Bartok Quartet Concert - Berkner Hall 8:30 p.m.

Come and Get 'em

Hundreds of applications to the Brookhaven Summer Student Program have been flowing in to the Office of Academic Relations, Bldg. 460, and will be available for inspection by staff members starting Monday, February 23.

Each department has appointed a coordinator to keep track of the student selections. Requests for students from staff members must be channeled through the department coordinator to the Office of Scientific Personnel by March 12.

Cafeteria Menu

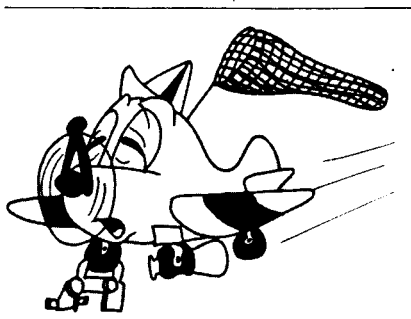
Week Ending February 27, 1976

Monday, February 23
Tomato Vegetable Soup
Keilbasy w/Sauerkraut 1.05
Grilled Ham Steak & 1 veg. 1.15
Tuesday, February 24
Cream of Potato Soup
Southern Fried Chicken & 1 veg. 1.10
Macaroni & Cheese & 1 veg. 1.00
Wednesday, February 25
Beef Barley Soup
Tuna Noodle Casserole 1.10
New England Boiled Dinner Special
Cup of Soup
Corned Beef & Cabbage
Boiled Potato or Mashed Turnip
Plain Jello or Ice Cream
Small Beverage $1.87 plus tax
Thursday, February 26
Chicken Noodle Soup
Chili Dogs w/Rice 1.00
Salisbury Steak & 1 veg. 1.05
Friday, February 27
New England Clam Chowder
Broiled Filet of Cod & 1 veg. 1.10
Roast Sirloin of Beef & 1 veg. 1.25

Stony Brook Events

Lecture: Eric Von Daniken, author of the "Chariot of the Gods" and other well-known books on UFO's and mysterious happenings, will speak at 8 p.m., February 22, in the Stony Brook Gymnasium.

Guidance Service: Mothers and teenagers who are getting along poorly may take advantage of a problem assessment and referral service which will be offered free during the next two months by the Psychology Department. For further information and to make preliminary appointments, call Dr. Ronald Kent or Ronald Prinz at 751-5766.



Classified Advertisements

Placement Notices

Each week the Personnel Office lists personnel placement requisitions, currently being processed. The purpose of these listings is, first, to give notice of all non-scientific staff positions being filled and, second, to give employees an opportunity to request consideration for themselves through the Personnel Office. In filling vacancies, the Laboratory's objective is to give first consideration to present employees, as follows: employees within the immediate group having the vacancy, employees within the department or division, employees within the Laboratory as a whole.

For further information regarding a placement notice, or to request consideration for an available position, contact Supervisor, Personnel Placement & Development, extension 2874 or 2882.

34. RESEARCH SERVICES ASSISTANT - Temporary position. Applied Mathematics Department.

35. DEVELOPMENT ENGINEER - BS degree or equivalent with DEC PDP10 experience to join Computer Controls Group. Job requires experience in digital design and machine language programming. Work will include computer interfacing and controls design aimed at expanding and improving an existing computer controls system. Job requires backing up a computer maintenance group during unusual periods of overload. Accelerator Department.

36. TECHNICAL SPECIALIST - Biology Department.

37. SCIENCE ASSOCIATE - BS degree or equivalent in Nuclear Engineering or Mathematics to carry out and assist in the development of a large scale computer code. The computer code is being designed to simulate off-normal thermofluid behavior of liquid metal fast breeder reactors. Position requires in-depth familiarity with FORTRAN language and usage of large data processing machines. Department of Applied Science.

38. LAUNDRY OPERATOR - Plant Engineering Division. Application deadline: March 2, 1976.

39. STORES CLERKS (3) - Supply & Materiel Division. Application deadline: March 2, 1976.

Autos & Auto Supplies

65 INTERNATIONAL - Panel, 4 wheel drive, snow plow, low original mileage, 17,000. $850. 878-0432.

ROOF VENTS - For vans or campers, assorted colors. $12 each. Bill, Ext. 4434.

VAN SEAT - High back, tan w/pedestal & adj track, new. $105. Bill, Ext. 4434.

67 OLDS - Ac/ps/pb, power antenna, seat, rear defroster, am/fm radio, tilted steering wheel, cruise-control, trailer hitch. Ext. 2011.

65 GMC PICK UP - ¾ ton, V6, 4 spd, radio. $500. 567-6261 after 6.

64 MERCEDES 220 - Ps/ac, good motor & tires, no transmission, sell complete or parts. Don, 929-6646.

TIRES - (2) H78-15, w/w tires, good cond. $20 for pair. Bill, Ext. 2022.

72 FORD PICK UP - ½ ton, standard V8, snows, rails, Tonneau cover, stereo tape, 6½', excel cond. $2250. Ext. 4068, 298-5092.

68 PLYMOUTH FURY III - Very good cond, ac/ps/pb, am/fm radio. $600. Peggy, Ext. 3148.

2 SNOW TIRES - E78-14. $15 for pair. Frank, Ext. 4581.

CHROME - Set of side exterior pipes, 6' long, like new, fits all cars & trucks. $50. Steve, Ext. 4308.

TIRE - 645-14 polyester cord, black wall. $5. Bill DeCaro, Ext. 3354.

73 CAPRI - 2000, auto, vinyl roof, am/fm, 44,000 mi, very good cond. $2000. 878-4368.

ONE OF US GOT TO GO - 1974 Honda, 360cc, electric start, in excel cond, only 2000 mi. 928-5199.

HONDA - Late '75, CR 125, dirt bike, good racing bike, never raced, extras. $695. Whitey, Ext. 2913, 928-3088.

67 PONTIAC TEMPEST SW - 6 cyl, at/ps, radio, new muffler, voltage reg, alternator, good tires, good cond. $475. 286-8119.

70 PLYMOUTH - Surburban wagon, 382 cu in engine, ac/ps/pb, roof rack, r&h, power rear window. $1250. Ext. 4532.

67 SUNBEAM - Minx, 4 dr, 4 cyl, at, r&h, 25 mpg. $450. Ext. 4532.

68 VALIANT - 2 dr, good cond std shift, 22 mpg, 6 cyl, motor recently overhauled. $750. Ext. 2550.

66 CHECKER MARATHON - New tires, recently tuned. Asking $500. Ext. 3688.

72 BUICK - Estate wagon, 9 pass, ac, am/fm, low mi, excel cond. Matt, Ext. 3935, 543-9128, 864-5596 after work.

71 DODGE VAN - B200, excel cond. Matt, Ext. 3935, 543-9128, 864-5596 after work.

Boats & Marine Supplies

23' PEMBROKE - Sportfisherman, flying bridge, d/f, canvas, 6 cyl, extras, good cond. $1650. Laird, Ext. 4068, 298-5092.

20' CRESTLINER - Fiberglass, cuddy cabin, 100 hp Johnson, elec start, extras, good cond. Asking $1500. 727-5168 after 6.

DOUBLE ENDER - New 18'x6', white oak frame, Everdur, fastened, designed for ocean crossing, sell for cost of material. 298-8601.

CHRIS CRAFT - 56 40' double cabin, fly bridge, fully equipped loaded w/extras. John, Ext. 4311.

Classified Advertisements

Miscellaneous

LUDWIG DRUM SET - All new skins, new Zildjian cymbals, new hardware. $350 or best offer. 363-7032.

72 FORD ECONOLINE 300 - Motor home, 17', auto, ps/pb, 350, 2 barrel, completely self-contained, 6000 orig mi. $7500. Bob, Ext. 4547, 473-3987.

HARRIS TWEED JACKET - Size 38 short, worn twice, asking $25. Peter, Ext. 4094.

TAPE RECORDER - Roberts 770x, reel to reel, excel cond. 744-8632 after 6.

GREAT BOOKS - Of the Western World, Syntopicon, good cond. 744-8632 after 6.

KEROSENE HEATER - Will heat work shop, $30; Garrard record player, $30; antique dining rm set, high back chairs. Ext. 3688.

ROPE LADDER - 2-story, $12; 5' baseboard heater, sealed unit, $50. Ext. 3688.

30" RANGE HOOD - White, 2 spd, exhaust fan w/ light, like new cond. $100. 363-6597.

KNITTING MACHINE - W/ribber on stand, Italian make, very good cond. $35. Ann, Ext. 3143, 732-9384 after 6.

B&W 18" TV - Motorola, portable, completely overhauled, excel cond. $45. Ann, Ext. 3143, 732-9384 after 6.

CHINESE WOK - Complete, cover, utensils, cook book, used once, cost $28, sell $17. Ext. 3143.

CHINESE SAUCES - Spices, dried mushrooms, etc, never used, cost $15.50, sell $7. Ext. 3143.

OSCILLOSCOPE - EICO 460, all new in cartons. $135. D. Vail, Ext. 2046.

TENT - Attaches to van or free stands, $100; dining canopy, 10x10, $10; dryer, electric, $40; children's skis, sizes 1, 3 & 5, never used, $35 w/boots, $20 w/ out boots. 473-9180 after 1.

HO TRAINS - 7 locos, 35 cars, 11 switches, triple power pack, 5x9 layout, many extras. $250, no reasonable offer refused. 744-3312.

MOVIE CAMERA - Revere 8mm. 589-3269 after 6.

BOY'S COAT - Size 14, Van Heusen, black pile, windbreaker, warm, excel cond. $5. Rowley, 286-0975.

TAP SHOES - Black pat leather, size 5, hardly used, $4; brown suede hiking boots, size 7, good cond. $4. Rowley, 286-0975.

DINING ROOM TABLE - Teak, 35"x57", extends to 95", excel quality, design & cond. $100. Rowely, 286-0975.

DINETTE SET - Octagon shaped table, opens to 60" w/one leaf, four contour chairs, green & gold color, 281-2162 before 4.

72" SLIDING GLASS ALUM DOORS - Safety glass, $100; shower sliding glass doors, $50; 281-9853 after 5.

KITCHEN STOVE - Combo ½ gas & 1/w kerosene space heater. $15. G. Irving, Ext. 2318.

FIGURE SKATES - Black, size 3, new, used once. $8. Georgia Irving, Ext. 2318.

CB RADIO - Realistic Havaho. $100. John, Ext. 3354.

DINING RM TABLE - Pedestal type w/4 chairs, pads, leaf, table cloths all incl, dark mahogany, traditional styling, very good cond. $150. 581-7656.

ELEC GUITAR - W/case, very good cond. Asking $45. 727-1931 after 6.

TENNIS RACKET - Men's professional, large grip, Maxima, wooden. Daniel, Ext. 2008, 878-1029.

HOCKEY SKATES - Good cond, men's size 10, for sale or trade for men's size 9-9½, figure skates. Daniel, Ext. 2008, 878-1029.

TOURING SKIS & POLES - Nordic, for ages 5-8, spring lock bindings, used once. $10. Al, Ext. 3354.

ELEC GUITAR - Rhythm & amp, w/15" speaker, orig $270, asking $85. 289-0753.

SHOT GUN - 12 ga Stevens, pump, like new. $75. John, Ext. 3354.

DOUBLE HUNG WINDOWS - Used (4) doubles, 67" long, assorted lengths, (1) single, 26"x41", all w/ wood frame s/s. John, Ext. 4076.

RECEIVER - Hammarlund HQ 100A, all hf bands, very good cond, matching speaker. Only $80. L. Honikel, 265-4974 after 6:00.

PENTAX CAMERA - SLR 35 mm, excel cond, w/55mm & 135mm telescopic lens. $150 firm. L. Honikel, 265-4974 after 6.

FIRST AID TEXTS - 4th ed ca. 190 new, published Doubleday. $100 all. 981-1195 after 6.

APPLIANCES - Refrigerator, washing machine, Norge 18 lbs, riding lawn mower, electric heater, 8', furniture. 289-0243.

SKI RACK - Fits station wagon rack, non-locking, 6 pair skis, good cond. $15. 286-8256 after 5.

TRAVERSE RODS - 2 pair, 54" span, very good cond. $6. 286-8256 after 5.

ARTLEY FLUTE - Sterling silver mouthpiece, very good cond. $150. 286-8256 after 5.

SKI BOOTS - Lace, size 6, very good cond, $3; buckle type, size 5, good cond, $5. 286-8256 after 5.

ALL WEATHER COAT - Misty Harbor, women's size 10, poppy color, full length raincoat w/zipout lining, worn once. Orig. $75. Linda, 698-9121.

APPALOSA MARE - 9 yrs, good mover, English/ western, experienced rider, good jumper. Sue, 589-6715.

GERMAN SHORT HAIR POINTER - 8 months, AKC registered; English pointer, 2 yrs, good hunters. $50 each. 878-1895 eves.

BICYCLE - Men's 27" Raleigh Grand Prix, excel cond, 9 mo old. Anthony, 286-1292.

DIAMOND RING - 4 point, unique white gold, 14K setting, size 7, Jo Anne, 727-7796.

COAT - Spring, redknit, double breasted, like new, size 12. $8. Jo Anne, 727-7796.

SPANISH GUITAR - Almost new, very good sound, case, too. $100. Ext. 3219.

PIANO - Contemporary, walnut w/bench, small w/ full length strings. 928-2954 after 5.

74 ENDURO - 125cc Zundapp, excel cond, Koni shocks, 6" rwt, new tire chain & sprocket. $500. 878-4513 after 6.

MAJORETTE BOOTS - White, size 6. $5. Gordon, Ext. 4613.

WHITE UNIFORM DRESS - Size 9/10, new. $5. Gordon, Ext. 4613.

HEATING UNIT - Fireplace, increases heat output 600%, inserts into fireplace w/blower motor, new. $89. Marilyn, 924-6582 after 6.

OAK FLOORING - 3 bundles, approx 10 sq ft, well seasoned. 286-8945.

DRAPERIES - 4 pair, Shantung, fully lined, 80" long x 69" wide, pleated avacado, used 3 months. $135. 286-8945.

COUCH - Converts to bed to sleep 2, 77"x28"x33", danish modern. $100. Ext. 4532.

WASHER - Hotpoint, good cond, $65; GE dryer 110/ 220V, old but runs well. $45. Dan, Ext. 4581, 928-7168 after 6.

ROCKING CHAIR - Maple w/cushions, $8; Regina elec broom, needs work, $2; floor fan, $8. Dan, Ext. 4581, 928-7168 after 6.

SOFA - W/orange/tan slipcover, good cond. $20. Bob Larson, Ext. 4597.

MODERN BEDRM SET - Chest, dresser, mirror, 2 night tables, headboard, like new. $250. 289-0504.

COLONIAL LIVING RM SET - Clayton Marcus, couch, love seat, 2 dark pine end tables, brand new. $700. 475-5903.

FLAT SNAKE - Plumbers 100', box of assorted sweat fittings, ¾", 1", 1½, 3". $20 for all. Fred, Ext. 4597, 475-4935.

MOVING - To Calif., must sell, black persian lamb coat w/mink collar. Asking $100. 744-2493.

WINDOW FAN - Hunter 20" reversible. $25. 744-2493.

KITCHEN TABLE - & 4 chairs. $25. 744-2493.

LAWN EDGER & TRIMMER - Craftsman electric. $15. 744-2493.

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

DELICATESSEN - Commack area, excel lunch trade. Bill Wanek, 266-3078 after 6.

SHOREHAM VILLAGE - Large custom built ranch, 3 bedrms, 3 baths, den w/fireplace, dinette, many extras, must bee seen. $92,000. 744-2493.

MATTITUCK - 4 yr, 3 bedrm, 7 room ranch, basement, ½ acre, taxes $734, beach rights. $42,500 negotiable. 298-4093.

BELLPORT - 3 bedrm, 1½ baths, large ranch, full cellar, expansion attic, landscaped dwarf fruit trees. 286-1292.

PORT JEFFERSON VILLAGE - Harbor Hills, 4 bedrms, library, formal dining, private beach rights, might also consider renting. 928-3891.

CUTCHOGUE - 1 acre bldg lot, water view, beach rights, near schools & shopping. Asking $15,000. G. Laird Stubbings, Ext. 4068, 298-5092.

PORT JEFFERSON AREA - Hi ranch, 15 min to Lab, beautiful home, landscaped, shrubs, 4 bedrm, living rm, dining, den, 2-car garage, work shop, ac, pool. $37,500. 473-7833.

CALVERTON - 3 bedrm, 1½ bath townhouse, w/w carpet, 5 appl, central ac. Asking $27,000. Ext. 2978, 269-2526 eves.

For Rent

CALVERTON/RIVERHEAD - Townhouse, 3 bedrms, 1½ baths, ac, all appl. $289/month + util. 488-2497, Ext. 2445.

NORTH SHORE - 3 bedrm, 1½ baths, partially finished cellar, knotty pine interior, fireplace, 20'x30' garage w/pit, 23,000 btu ac, appl, 20 min to Lab. $246 taxes. $30,000. 744-3312.

LAKE RONKONKOMA - 3 rm apt, in 2 family house, ac, balcony, util incl. $220/month. 588-4131, 585-4038.

WADING RIVER - Large 1 bedrm basement apt furnished, util incl, private beach, 15 min to Lab. $250/ month. 929-8443.

WADING RIVER - 2 rms, bath, util incl. private beach. 929-6293.

SETAUKET - 4 bedrm, 3 bath, furnished house w/ yard, walk to SUNY. From Aug 15, 1976 for 1 yr. Family preferred. 751-3375.

PATCHOGUE VILLAGE - Furn rm, off street parking, suitable mature woman, private. 475-2627 after 6.

Wanted

PHONO RECORDS - D. Vail, Ext. 2046.

2 15" FORD RIMS - Fred Usack, Ext. 4597, 475-4935.

MEMBERS - Vibrant enlightened group of women seeking members for local Hadassah. 744-3238, 473-5450.

LAWN ROLLER - Water weighted. Bill Fleischer, Ext. 2502.

BABY PLAYPEN - Mesh type, used, also baby gate, mesh. Alyce, Ext. 2902.

US STAMPS - Scotts cat #C13, C14, C15, C18. 878-0717.

2 WHEELS - 14", 5-hole for 71 Ford. Hank, Ext. 3935.

WOMEN TO INTERVIEW - Women 40-55 to supply psychological, sexual, social, emotional histories in taped interviews for book on understanding successes & failures of passage thru middle age. Annonymity guaranteed. 751-1401.

WINDOW SHUTTERS - Old fashioned. John, Ext. 2502.

POTTERY WHEEL - Small outboard, less than 4 hp, am/fm tape car radio. Steve, Ext. 4008.

CAMPBELL'S SOUP LABELS - Soup & bean, needed. F. Chandler, Bldg. T87.

HIGH RISER BED - Good cond, will pay reasonable price. 878-2486.

BOOK DONATIONS - For Montessori School. Sanchez, Ext. 3354.

4 MAN TENT - In good cond. Charles Flaum, Ext. 4571, 758-9040.

Carpools

BELLPORT - Need driver 1-2 days, join 2 others, 8:45-5:15, flexible. Ext. 3766/3857.

Lost & Found

LOST - Gold initial pinky ring, lost near Center. Barbara, 473-8671.

Services

TAXES - Prepared by professional tax consultant, your home or mine, very reasonable rates. John, 732-2472.

PAINTING - Inside, outside, paneling, stucco & beam work. Steve & Ron, 732-8273.

SEATS CANED - Pressed type only. 363-6597.

INTERIOR & EXTERIOR PAINTING - 751-6431.

AUTO REPAIRS - Tune-ups, brakes, all repairs at good rates. Ray, 878-2486.

CROCHET - Shawls, vests, hats, scarves, afgan, shrink top. Rachel, 878-2486.

BANJO LESSONS - Southern traditional, 5 string, tablature instructions. Michael, 878-1029.

WELL REPAIRS - Reliable & reasonable. 744-0548.

BABYSITTER - Experienced, looking for a job, lives in Mastic, will babysit in Shirley & Mastic areas. Noreen, 281-7873.

FREE KITTEN - Light tan, adorable 9 week old male, house trained, shots given. Joan, 732-1610.

SILVERSMITHING & JEWELRY CLASSES. 286-9253.

DOG SITTING - In my home, refs avail. 286-8512.

DRUM LESSONS - & Guitar, classic, electric. 363-7032.

Classified Ad Policy

Deadline is 12 noon Monday for publication Friday of the same 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. Firearms offered for sale or trade may not be brought on site.
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.
7. Ads should be restricted to 20 words or less and typed or printed on the form provided, and must bear the employees signature.

☐ For Sale: Auto & Auto Supplies
☐ For Sale: Boats & Marine Supplies
☐ For Sale: Miscellaneous
☐ Wanted
☐ Carpools
☐ Lost & Found
☐ Services

Check [x] the heading applying to your ad.
Print or type your ad in 20 words or less.

Ads concerning 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, Room 111, 40 Brookhaven Avenue.

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(Name & Phone No. To Call)

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

Send to: Brookhaven Bulletin, Building 460, 40 Brookhaven Avenue (Ext. 2345).