BROOKHAVEN BULLETIN
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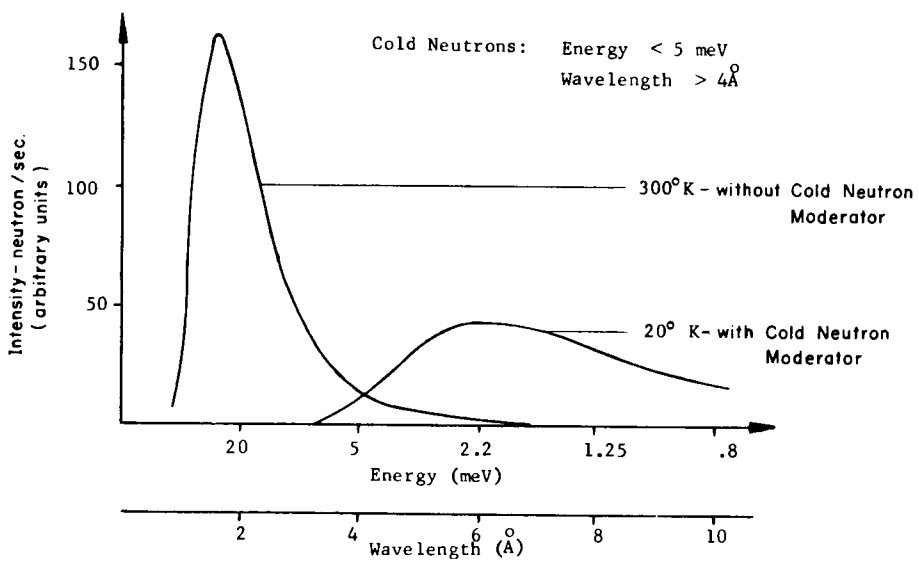
BROOKHAVEN NATIONAL LABORATORY

Experimenters Begin Studies With Cold Neutrons

When Brookhaven's High Flux Beam Reactor was being designed in the early 1960's, it was anticipated that one beam hole would eventually accommodate a cold neutron moderator in order to increase the flux of low energy neutrons needed for very specialized studies. The moderator is now installed at beam hole H-9, and the first experiments are under way.

The reactor ordinarily produces neutrons at room temperature (about 300° Kelvin), at an energy of about 20 milli-electron volts, with wavelengths of about one Angstrom (one milli-electron volt, meV, is only one one-thousandth of one electron volt, and one Angstrom, Å, is equal to a one hundred millionth of a centimeter). For certain studies of biology and physics, neutrons with less energy and longer wavelengths are needed.

The cold neutron moderator "cools" neutrons from the reactor down to about 14°K. At this temperature, they have energies of less than 5 meV and wavelengths longer than 4 Å. Cooling is done as the neutrons pass through a chamber filled with liquid hydrogen at about 14°K. Like colliding billiard balls, the more energetic neutrons are slowed down when they hit the less energetic hydrogen nuclei (protons), whose mass is almost equal to that of the neutrons. Leaving the moderator, the cold neutrons pass through three separate beam ports. Two are assigned to the Physics Department and one to the Biology Department.



This figure shows the spectral distribution of neutron energies (wavelengths) at different moderating temperatures in the High Flux Beam Reactor. 300°K is about the normal operating temperature of the HFBR, and 20°K is the temperature of the liquid hydrogen in the cold neutron moderator. At the lower moderator temperature, the number of neutrons at low energies (longer wavelengths) increases.

Physics

BNL physicists and guest researchers will be using the new moderator to look at the dynamics of condensed matter, materials in which the atoms are moving slowly. Low energy neutrons are better probes for these studies.

Steve Shapiro, a Physicist with the BNL Solid State Group, is doing the first scheduled experiment. Along with Gabriel Aeppli, a graduate student from MIT, Shapiro is studying an unusual class of magnetic materials called reentrant spin glasses. "They behave very strangely," he says. "It's almost like cooling a liquid until it freezes, then cooling it down even more and it becomes liquid again. What really happens is that these are materials in which the atomic magnetic moments freeze in random directions and form the magnetic equivalent of a frozen liquid or glass."

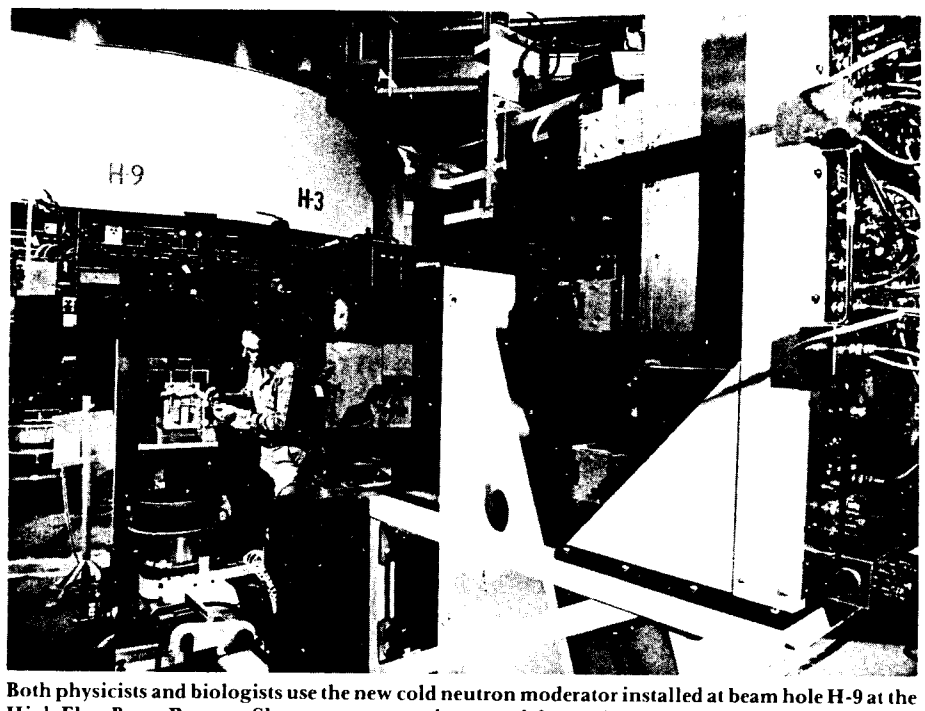
To learn more about the behavior of spin glasses, Shapiro and Aeppli are studying the precession of the spins of unpaired electrons, which can be compared to the precession of a top about its spin axis. As the temperature decreases, the precession frequency of the spins slows down much like a spinning top slowing down. This contrasts sharply with normal magnetic materials, where the spins become more rigidly aligned at low temperatures and the precession frequency increases. Using low energy neutrons, Shapiro and Aeppli can measure how low the precession frequency becomes.

Their work is adding to the fundamental knowledge of these particular magnetic materials that can go from solid to apparently liquid-like states. They already have some preliminary data which is superior to what they have obtained in the past. Before, they could measure the energy transferred between the neutrons and the sample only to within 65 micro-electron volts (one micro electron volt is equal to one millionth of an electron volt). Says Shapiro, "Now with the cold source, we have better energy resolution. We can measure an energy tranfer of about 30 micro-electron volts, with tolerable losses of scattered neutrons."

Among other experiments planned by physicists are studies of hydrogen diffusion in metal hydrides. These processes involve very tiny energy transfers, which can be better studied with slow neutrons because of the higher energy resolution.

Biology

Biologists are also eager to put cold neutrons to good use. The longer wavelength neutrons are desirable in neutron diffraction studies of the structure of large biological molecules (macromolecules). Biological applications of neutron diffraction techniques were pioneered at Brookhaven a decade ago by Benno Schoenborn of the Biology Department. Now with the addition of the cold neutron moderator, experiments are planned that were not previously feasible at a U.S. laboratory.



Doug Humphrey

Both physicists and biologists use the new cold neutron moderator installed at beam hole H-9 at the High Flux Beam Reactor. Slow neutrons coming out of the moderator pass through a collimator, being adjusted by Biology Technical Associate Edward Caruso. The neutrons then hit a sample, scatter, and are finally measured by the detector in the foreground. Biologists reconstruct information about molecular structure after determining the angular distribution of neutrons scattered by the sample.

Because these molecules and the complexes they form are large, the longer wavelength neutrons will give better structural data. The scattering range will be extended and higher resolution will be possible. Since structure is intimately connected to function, better information on structure will lead to greater insights on how these molecules behave.

For example, one study will look at the structure of lipoproteins, the vehicles of lipid transport within the blood. Lipids are basic components of fat. Certain diseases, like arteriosclerosis, are thought to be related to improper levels and transport of the lipids, and to alterations in the concentrations and structures of the lipoproteins. Knowing more about the differences between normal and abnormal lipoproteins may provide greater understanding about the nature of the disease.

Other studies will focus on the structures of such diverse materials as membranes, ribosomes, proteins and chromatin.

Doug Carlson, BNL Associate Biophysicist, will be doing the neutron scattering studies on chromatin, the basic genetic material of cells. Says Carlson, "Chromatin is made up of proteins and nucleic acid. DNA contains various genes, and proteins do such things as regulate gene expression and organize the folding of the DNA into a hierarchy of structures that culminates in the chromosome. These studies focus on the fundamental structural units within chromatin. In a sense, we are peeking at the building blocks of the chromosomes."

Scientists are queuing up to do experiments on the new cold neutron moderator, which is finally available, thanks to a number of people who were involved in designing, testing and installing it. Among them were engineers Andrew Kevey, Anthony Meade and Jack Jensen; designers Carl Cantera and John Plonski; and technicians Warner Hayes, Otto Jacobi, George Penny, Peter Pyne, Albert Roberts and Joseph Russo. David Rorer and Ralph Shutt were also involved in coordinating and administrating the project during recent years.

Astronaut Candidate To Speak at BNL

The world's attention once more focused on astronauts when the space shuttle Columbia made its triumphant reentry to earth last month. A woman who is now in training to qualify as a mission specialist on future space shuttle flight crews, will talk about NASA programs in a lecture at Berkner Hall on June 4, at 3:30 p.m.

She is astronaut candidate, Mary L. Cleave, who holds a doctorate in civil and environmental engineering. Ms. Cleave will discuss the NASA programs in general, and the space shuttle and training of astronauts, in particular. During her lecture she will accept questions from the floor. Her talk is sponsored by Women in Science.

NASA photo

Mary L. Cleave

Dr. Cleave is a native Long Islander and graduated from Great Neck North High School in 1965. She received a B.S. degree in biological sciences from Colorado State, and an M.S. in microbial ecology from Utah State University, where she also obtained her Ph.D. From 1971 until her selection as an astronaut candidate in May 1980, she held graduate research, research phycologist, and research engineer assignments in the Ecology Center and Utah Water Research Laboratory at Utah State University. She has authored or co-authored 15 scientific papers.

Service Awards

The following employees received service awards during the month of May.

Thirty Years

John P. Galvin ..... Chemistry

Twenty-Five Years

Hugh N. Brown ..... Accelerator

Twenty Years

Anthony Bono ..... Accelerator
Katherine S. Conkling ..... Medical
Jack E. Detweiler ..... Reactor
John M. Doorhy ..... Safety & Env. Prot.
Arnold J. Esper ..... Accelerator
John F. Iulo ..... Plant Engineering
Anna M. Kuczynski ..... Fiscal
Graham F. Ryan ..... Accelerator
James H. Sauls ..... Accelerator
Walter Saunders ..... Plant Engineering
Frederick A. Schneider ..... Accelerator
John D. Tilley ..... Accelerator
Philip H. Warner ..... Accelerator
Leo P. Zaloga ..... Accelerator

Product Display

Components & Controls, Inc., will show their products on Wednesday, May 27, from 9 a.m. - 5 p.m., in Room C, Berkner Hall. Featured will be various types of valves, brass and stainless steel fittings. Refreshments.

Summer Day Care

During the summer months, the Kids-R-Us Day Care Center for preschool children, located at the Middle Island Presbyterian Church, Longwood Road, Middle Island, will open its doors a bit wider to include children in grades K through 6.

The all day program for older children will run on a weekly basis. In addition to physical activities, specific topics will be highlighted each week as follows:

Week(s) of	Topic
July 1, Aug. 24	Photography
July 8, Aug. 3	Leathercraft
July 15, Aug. 10	Woodworking
July 22, Aug. 17	Solar Energy
July 29	Natural Weaving

Fees of $85 per week or $300 per month include full lunches and all materials needed for the weekly topics. Two and three-day weeks are available at rates of $45 and $50 respectively. A deposit of $30 is due by June 1.

Applications for the summer program are available from Gail Williams, Ext. 3338. Anyone with questions about the program should call Steve Held, Director, 744-6015.

Baroque Concert

The first concert in a festival of baroque music will be held on Thursday, May 28, at 8:30 p.m. in Berkner Hall. As noted in last week's *Bulletin*, Nina Barwell, flute, and Peter Wolf, harpsichord, will appear in all four concerts of the festival. For this first performance, however, they will be joined by flutist Samuel Baron.

Samuel Baron

Samuel Baron is one of the foremost American flutists now appearing before the public. He studied at the Juilliard School, where he held simultaneous fellowships in flute playing and conducting. He was a founding member of the New York Woodwind Quintet, and he is the flute soloist of the world-renowned Bach Aria Group. Mr. Baron has recorded a wide range of flute music, including contemporary compositions written for him by American composers. He currently teaches at the State University of New York at Stony Brook and at the Juilliard School.

The program for this concert will include solo, duo and trio works by Johann Sebastian Bach; his sons, Wilhelm Friedemann Bach and Johann Christian Bach; Carl Heinrich Graun; and Georg Philipp Telemann.

Series tickets for the four-concert festival are $15 for general admission and $12 for students and senior citizens. Series tickets will be on sale at the door on the night of the first concert. Single performance tickets will also be available at the door before each concert at $5 for general admission and $3 for students and senior citizens.

Hospitality Party Welcomes Spring

The activities of the 4H Club are discussed by these two visitors to that group's exhibit.

A representative of Brookhaven Town explains their ecology exhibit to one of the guests at the Tea & Sherry Party.

Doug Humphrey

Spring on Long Island is full of possibilities, many of which were on display last Tuesday at the Hospitality Committee's Spring Tea & Sherry Party.

Those interested in things to do could gather brochures about Suffolk County's recreational facilities, talk to representatives of the Fire Island National Seashore Parks Commission and the Audubon Society, or view a videotape about the Suffolk County Farm. For those who were concerned about things to grow, there were experts available on hydroponic gardening and herb gardening. Other "spring things" were represented through displays by the 4H Club and the Cooperative Extension Association of Suffolk County, as well as exhibits of watercolor paintings, plants, wood carvings, and sea shells.

CREF Values

April	$41.82	May	43.70
June	44.81	July	47.84
August	48.04	September	48.75
October	49.13	November	53.19
December	51.77	January	50.20
February	51.21	March	52.85

April $52.39

Patents Awarded

Richard M. Lambrecht and **Alfred P. Wolf,** Chemistry Department, were issued U.S. Patent #4,252,668 for developing a method for producing potassium-38. Potassium-38 has ideal physiological and physical characteristics for use as a radiopharmaceutical. Prior to this invention, there was no known method for its routine production in quantities and form suitable for use as a radiopharmaceutical.

U.S. Patent #4,252,778 was issued to **Ralph T. Yang** and **Ming-Shing Shen,** former BNL employees, for inventing a method for removing sulfurous gases such as H_2S and COS from a fuel gas, wherein limestone particulates containing iron sulfide provide catalytic absorption of the H_2S and COS by the limestone. The method is particularly effective at temperatures of 400°C to 700°C.

I.B.E.W. Meeting

Local 2230, I.B.E.W. will hold its regular monthly meeting on May 28, 1981, at 6 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, the President's report, and nomination of officers.

Memorial To W.W. I Vets

The Patchogue Barracks 2981 of the Veterans of World War I will dedicate a plaque at BNL in memory of soldiers who trained at Camp Upton and died in France during the first World War. The ceremonies will take place at the flag pole on Saturday, May 30, at 3 p.m. All those who are interested are invited to attend.

Want To Exercise?

One of the ongoing programs in Medical involves examining the effects of physical therapy on body composition in people 55 years of age and older. The hypothesis is that mild exercise can either prevent or slow down the rate of loss of bone and muscle mass that normally occurs with age. Neutron activation analysis is the technique used to measure changes in body composition.

An exercise program, under the supervision of Dr. Ashok Vaswani, will be organized and conducted by Sidney Jungreis, Physical Therapist in the Medical Department. Volunteers are required to complete the study. The experimental protocol requires four half-hour exercise periods per week for at least one year. A group of subjects who will undergo the same diagnostic studies, but who will not exercise, will serve as the control. If interested in participating, please call Jean Matkovich at 3672 for an appointment and physical examination.

Arrivals & Departures

Arrivals

None

Departures

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

Constance E. Barnard-Murray ... E.&Env.
George D. Cimino ..... Biology
Richard N. Heese ..... Accelerator
Charles H. Holbrow ..... Accelerator
John H. Lane, Jr. ..... Accelerator
Richard Weil ..... E.&Env.

PINY Courses

The Department of Nuclear Engineering at the Polytechnic Institute of New York will offer three graduate-level courses in nuclear engineering this summer at the Shoreham Nuclear Power Station. These courses, which are open to Brookhaven personnel, are as follows: NU601 Intro. Nuclear Eng. I, 6/1-7/10, Mon, Wed, 6-8 p.m.; NU602 Intro. Nuclear Eng. II, 7/21-8/21, TBA; and NU606 Radiation Protection, 7/21-8/21, TBA.

Registration for NU601 will be held at Shoreham on May 26, from 6-7 p.m. For further information call John Lamarsh at (212) 643-8184 or (914) 834-8576 or Glenn Price, Ext. 3336.

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Credit Union Status

The Boston regional office of the National Credit Union has requested additional information from Teachers Federal Credit Union supporting an amendment to add Brookhaven National Laboratory to their membership. With BNL assistance, Teachers Federal Credit Union is complying with this request.

As further word is received, we will keep you advised.

Diners Note

The Center Club will be closed Sunday, May 24, the day preceding Memorial Day. However, it will be open on Monday evening, May 25.

The Cafeteria will be open from 9 a.m. until 2 p.m. on Saturday, Sunday and Monday, May 23, 24 and 25.

The Vended Food Service in Building 912 is in operation continuously.

Cafeteria Menu

Week Ending May 29, 1981

Monday, May 25
Snack Bar Service 9 a.m. - 2:30 p.m.

Tuesday, May 26
French onion soup (cup) .55
(bowl) .65
Corned beef & cabbage 1.60
Turkey Brazil & rice 1.55
Hot Deli - Pastrami (on bread) 1.65
(on roll) 1.75

Wednesday, May 27
Cream of cauliflower soup (cup) .55
(bowl) .65
Roast top round of beef & veg. 1.65
Swedish meatballs w/noodles 1.55
Hot Deli - Roasted fresh ham w/barbeque sauce (on bread) 1.65
(on roll) 1.75

Thursday, May 28
Chicken vegetable soup (cup).55
(bowl) .65
Spicy chili w/rice 1.55
Baked fillet of fish w/1 veg. 1.60
Hot Deli - Diced beef w/pepper & onions (on bread) 1.65
(on roll) 1.75

Friday, May 29
Seafood chowder (cup) .60
(bowl) .70
Yankee pot roast & 1 veg. 1.65
Macaroni & cheese w/1 veg. 1.55
Hot Deli - Roast beef (on bread) 1.65
(on roll) 1.75

Cooking Exchange

All-time favorite recipes will be demonstrated by the Cooking Exchange at its final meeting of the season on Wednesday, May 27, at 12:30 p.m. Titillate your taste buds by sampling such delights as chicken Tetrazzine, Waldorf salad, and chocolate mousse torte.

Demonstration meetings are held in the Recreation Building and are open to all employees and their immediate family members. The charge is $1.00 per person, and babysitting is provided at 50¢ per child.

Gym Closed

The gymnasium will be closed to all weekend activity during the summer, starting Saturday, June 6. The normal schedule will resume on Saturday, September 12.

Model Plane Display

The BNL Remote Control Airplane Club is having an indoor display and movie in Conference Rooms B and C of Berkner Hall, Friday, May 29, 11 a.m. to 2 p.m. We plan to exhibit gliders, bi-planes, trainers and models still under construction. Everyone is welcome to browse and ask questions.

Afro-American Club

All BNL employees are invited to attend the final organizational meeting of the Afro-American Culture Club on Wednesday, May 27 from noon to 12:30 p.m. in Room B, Berkner Hall.

You are encouraged to bring your lunch with you, but please bring a tray in order to minimize the clean up.

For more information please phone any of the following: Dwight Brown, Ext. 2879, Ed Taylor, Ext. 7589, Greg Mack, Ext. 3303, or Mac Thomas, Ext. 2959.

NYC Train Trip

The Hospitality Committee is planning a group railroad trip to the city on Wednesday, June 3. Departure will be at 7:55 a.m. from the Patchogue LIRR station. Round-trip fare for adults is $3.25, children under six years ride free.

Reserve a ticket by sending your fare through the U.S. mail to P.O. Box 322, Upton, New York 11973, no later than Thursday, May 28. Make checks payable to "Brookhaven National Laboratory." Your tickets will be given to you on the train. Refunds will be made only if cancellations are received by the Friday preceding the scheduled trip.

Mountain Club

An overnight hike up Slide Mountain in the Catskills this weekend is the first in a series of trips scheduled by the Mountain Club. For information about this hike, call trip leader Dave Crowther, Ext. 3403.

Other trips include a canoe trip on the Delaware River, June 6 & 7, contact Al Kuehner, Ext. 4226; a day hike on Breakneck Ridge, June 20, contact Harold Udseth, Ext. 4324; and overnight camping at Watch Hill, Fire Island, June 22-26, contact Don David, Ext. 4821.

The next Mountain Club meeting will be Tuesday, June 9 at 7:30 p.m. in the North Room of the Brookhaven Center.

Bowling

Purple & White

Ed Sperry's 242 game was high for the night (also Ed's high for the season). Pat Manzella converted the 6, 7, 9, 10 split and Vito Manzella converted the 4, 7, 10 split.

Other good games this week - Ken Riker 222, Vito Manzella 211, Ed Meier 208, Ben Belligan 200, Mike Milan 198, Sharon Smith 198/192, Gerrie Riker 193/180, Pat Manzella 186, Mary Grace Meier 180.

Photo by Mort Rosen

Bill Thomlinson (left), Mike Bergkamp and Ted Landry head for home. They are part of a group of runners who regularly run home after work.

The Rush Hour Runners

At 5 o'clock every day of the week, there is a mass exodus of cars from the Lab site. Occasionally, however, the grinding of gears is joined by the patter of feet. Once or twice a week, some BNL employees lace on their running shoes and head for home.

Mike Bergkamp, Jerry Hastings, Ted Landry, Hans Ludewig, Don MacKenzie, Bill Thomlinson and James Vaughn are active members of the Running Club who live within a few miles of each other on the south shore. They all agree that running home after work is a nice way to end the day. Of course, they are in excellent physical condition, and for them, the run home is a fun way to stay in shape.

Out of the group, Bill Thomlinson, who lives in East Patchogue, goes the greatest distance. He says they usually set a pace which is comfortable for conversation. "We talk, laugh and joke all the way," he says. Thomlinson has been running for twelve years, and particularly likes long distances. "My kids think it's normal to see me come running home in shorts, T-shirt and windbreaker," he says. "Even my neighbors are used to it now."

Although Wednesdays and Fridays are favorite days, the group doesn't have any kind of formal schedule for running home. Ted Landry says if someone feels like doing it, he can always count on picking up some company. Most of them are in car pools, so it's usually just a matter of catching a ride in to work and arranging to have clothes and briefcases dropped off at night.

Landry used to run competitively in high school and college, and still races every two or three weeks. It's 10.2 miles from his office door to his front door, and his fastest time for that distance is 56 minutes. He admits that at that pace, he's running under race conditions—no talking, only grunts and groans.

Like Landry, the more serious competitors in the group use the run home for long distance training. Jerry Hastings recently ran in the Boston Marathon. Running to his home in Brookhaven was part of the training, since it would take too long to do that distance during lunch. Hastings has run in four marathons, each a distance of 26.2 miles. Why that extra two-tenths of a mile? Says Hastings, "The story goes that in 1908, during the Olympics in London, Queen Victoria asked to have the marathon race start from the royal residence at Windsor castle and finish in front of the royal box in the London stadium. That added an additional 385 yards."

Hastings says another BNL employee, Gary Struve, also competed in the Boston marathon. "He lives on the north shore, and bikes to and from work. Since he did very well, there may be something to bicycling."

Hans Ludewig has tried biking, but would rather run. He started about three years ago, more by accident than by design. "During my lunch break, I used to go to the gym to jump rope and work out a little," says Ludewig. "At some point, the gym was closed for painting, and since I was addicted to some kind of physical activity, I went out jogging. To my amazement, I ran to the south gate and back without any trouble. After that, I couldn't go back to jumping rope." Early on, Ludewig was talked into buying a good pair of running shoes. He thinks good shoes are a worthwhile investment for comfortable running, mile after mile. They give the necessary foot support with a heel built up of shock absorbing material, and the tops are made of nylon, which is light, durable and breathes.

Special shoes weren't available when Don MacKenzie started running. That was about 14 years ago, before jogging became the in thing to do. Out of the current group, MacKenzie has been running home longer than anyone else. He started doing it alone just a couple of times a year when the weather was nice in the spring and fall. "Long distance running wasn't very popular back then," he remembers. "The first official Lab run wasn't until 1972. It was a ten-mile course around the perimeter of the site and drew about a dozen runners. This gradually developed into more formal Lab races and the Runners Club was eventually formed."

Even today, not many in the club run home. As casual as the group is about it, running that distance requires a serious commitment. Landry says, "If you have to stop for any reason, it's a long way to walk."

So far, that's never happened to anyone in the group. Their runs are usually pleasant and uneventful. Ludewig says the only excitement is when they get chased by dogs. "But that's pretty easy to deal with," he says. "The trick is to stay on the opposite side of the road. Dogs are very territorial, and they will only come as far as some imaginary line drawn around their property. Of course, some are bolder than others. But that's the advantage of running in a group. You can always try to keep someone between you and the attacking dog!"

Classified Advertisements

No Summer Lottery

The Personnel Office advises that due to the reduction in force, there will be no general labor jobs available for students this summer.

Autos & Auto Supplies

74 CHEVY - Caprice, 350ci, p/b, p/s, a/c, rebuilt trans., no rust, runs good. Must Sell. $800. Ext. 3106.

73 HONDA CB350 - $600. or best offer. John, Ext. 3651.

WEBER 40 CARBS - (2) w/manifold and an air pump for 2000cc Datsun. Karl, Ext. 4068.

RACING SLICKS - on Chevy rims, $50; Crager s/s mags, 2 front, 2 slicks, $1000. or best offer. Diane, 878-1630.

SPEAKERS - 1 pr. Audiovox full range, high compliance surface mount, $9; 1 pr. Jensen flush mount, B-high compliance speakers. $15. Bob, Ext. 4551.

22' TRAVEL TAILER -sleeps 8, self contained, new tires, uphostery. 732-5445, $2,900. After 6 p.m.

8 YARD DUMP TRUCK - International R-190, 372-6 cyl. Red Diamond 5 spd, Hi & Low excel, good rubber. $2,500. 928-5031.

74 HARLEY DAVIDSON - Sportster, low mi., kick start, stock, $3,000; also 76 HARLEY DAVIDSON -Sportster, low mi., electric start, black, stock. $3,200. 732-3118 at 6 p.m.

79 CHEVY - Camaro, a/t, p/s, am/fm stereo, 26,000 mi, $4,500. Jerry, Ext. 7611 or 744-7622.

NEW TIRE - Michelin w/w on GM wheel, balanced, 225x15 (JR78-15) orig. $95. Now, $50. or best offer. Alyce, Ext. 5203.

72 VW SQUARE BACK - new tires, brakes, battery, needs engine work. Asking $950. 757-5248 eves.

72 VW SQUARE BACK - a/t, excel cond, many new parts, orig. owner. Ron, Ext. 4449 or 751-8403 eves.

73 PLYMOUTH - Satellite, needs some body work, fair running cond. $350. Barbara, 473-8060 after 6 p.m.

69 CHRYSLER - 4 dr, good running cond, orig. owner. 475-4394.

79 SUZUKI RM 125 - excel cond. $675. or best offer. 929-3346 after 5 p.m.

79 CHEVY - heavy duty pick-up, power angle plow, 4 WD, 1 ton capacity, 17,000 mi, excel. $8,000. Ext. 5294.

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

70 OPEL GT - 4 cyl, good cond, 32 MPG, new brakes, clutch, and exhaust system. Neil, 281-1795.

PARTS - to a '75 CHEVY VAN; radiator, a/t, power steering unit, 36 gallon gas tank. Low, Ext. 4087.

65 OLDS - F-85, 3 sp. fl., 4 dr, excel running, nearly new radials, snow tires. $300. Ext. 2608 or 751-7078.

74 YAMAHA 250cc - just tuned, mech. excel, very clean. $500. or best offer; Lambretta Manual for L.I. Series, TV series, J Series, Luna Line & Grand Prix. $2. Victor, Ext. 7154.

SNOW TIRES - Michelin 165Rx13, very ow mi., mounted on wheels (Mazda RX2) Ext. 2051 or 689-8685.

TIRES - (2) Michelin 230x15 on Olds rims. $100. Ext. 3392 or 475-8330.

66 BRONCO DRIVETRAIN - 1973 Vega drivetrain, both running & complete. 473-2318 or 744-3968 after 6 p.m.

76 RENAULT 5 LE CAR - very good cond, 43,000 mi, 30 MPG +, reg. gas, new radials, FM stereo tape. Ext. 2051 or 689-8685.

RIMS - (4) wide white spoke rims mounted on H78x15 tires. $110. 732-3350.

76 GRANADA - immaculate cond, std. trans, 24-28 MPG, economical. $2,650. Low, Ext. 4615.

74 CHEVY - Malibu, a/t, p/s, p/b, good running cond, am/fm stereo, reg. gas. $1,200. 654-5169 after 5 p.m.

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

73 AUDI FOX - 96,000 mi, Many new parts. $750. or best offer. Call Hersh, Ext. 2841.

Boats & Marine Supplies

16' ALUMINUM MIRRO - Craft 28 HP Evinrude, galvanized trailer w/controls. $900. Dennis, Ext. 2897 or 727-7278.

18' FIBERGLASS - over Marine plywood, sleeps 2, excel. $1,000. 281-3455.

13' BOSTON WHALER - 35 HP Mercury w/trailer. $980. Jack, Ext. 4087.

SAILFISH - good cond. $125. George, Ext. 3664 or 722-3139.

10' SAILBOAT - Snark, protable, one sail, $60; also Sailboat 14' Flying Tern, 3 sails, trailer, extras. $900. 286-0259 after 5 p.m.

18' COOMBS GARVEY - self bailing glass over oak ribs, teleflex steering. $850; also 150 lb. mushroom mooring anchor, $50. 472-0499 after 6 p.m.

Yard Sales

YARD SALE - Sat. May 23rd, 10 a.m. to 5 p.m., (rain date Sunday), many quality items, furniture, glassware, clothing, etc. Several families. Settlers Path, Pt. Jeff.

YARD SALE - household items, cameras, 35 Center St., Lake Ronkonkoma, (rain date May 30 & 31st). 588-3779.

GARAGE SALE - 44 Evergreen Ln., South City Shores, E. Patchogue. Sat May 23rd, 10 a.m. to 4 p.m. hi-riser, canopy bed, chairs, elec. fix., bric-brac.

YARD SALE - Sat. & Sun., May 23rd & 24th. Household, toys, carpets, furniture, tools. 21 Albert St., Shoreham. 821-0761.

YARD SALE - May 23rd, M.I. Nursery School, Main St., Yaphank. Baby items, children's clothing.

MOVING SALE - must dispose of 3,000 LP albums (Jazz, Big Bands, popular vocalists, and much more. Will sell in bulk or separate. $1.00/album, multiple sets higher, all new cond. 289-2116 after 6 p.m.

Miscellaneous

T.V. - B&W, portable, $25; Westinghouse washing machine, very good cond. Chris, Ext. 2907.

HAMMOND ORGAN - Spinet, Model M111, mahogany, excel cond. $600. 473-2523 after 5:30 p.m.

WOODEN STORM WINDOWS - (2) 30"x37½", (1) 29½"x47½", (5) 30"x59½, $3 ea. 589-4363 after 6 p.m.

TV - RCA 19" color, $150; vacuum cleaner, $15; hair dryer, $5; steam/spray iron, $4; toaster, $4, more Ext./ 3106.

HOMEMADE CANDIES - mixed ass't. by the pound. Special novelty figures made for any occasion. Will deliver. Ext. 4976 or 878-8241.

POOL FILTER - D.E. ¾ hp s/s tank rebuilt, $45; Danish walnut chair w/cushions. $20. Bill, Ext. 7698 or 732-9102.

BUNDY FLUTE - good cond. Asking $100. 473-9275.

ELECTRIC RANGE - 30" Westinghouse, gold, excel cond. $100. 924-4323 after 6 p.m.

STAHL - 2-8' pick up truck tool boxes. $50. Don, Ext. 3284.

INDOOR/OUTDOOR - water fountain, stand, pump, flowers, stone. Perfect cond. $165 or best offer; (2) pine table tressle nook coffee tables, dark pine. $125 or best offer. Diane, 878-1630.

VIOLIN - ¾ hand made, 60 yrs. old, beautiful full tone w/bow, case, $300; gas grill, Sunbeam w/rotisserie, cutting board, like new. Cost $200. Will sell $100. 744-3744.

AM/FM CASSETTE - Sony portable cassette recorder w/am/fm radio. Two-way speaker system, 1 yr. old, excel cond. Cost $90. Asking $45. 732-5829.

HOSPITAL BED - good cond. Reasonable offer. 588-3779.

TV'S - (2) 19" Admiral color, $150; Admiral B&W, $50. Both solid state, excel. Jag, Ext 5080 or 924-7025.

ELECTRIC HOT WATER HEATER - 52 gal. Quick Recovery. Best offer over $25. Ext. 2878.

BLUE TAPES - over $200 worth of Waldbaums tapes. $2/100. 281-7844.

POOL - 16'x4' round, above ground, filter, ladder, deck & accessories. $395. Complete. Linda, Ext. 5241.

BOX SPRINGS - queen size extra firm, excel cond; Eveready battery charger, brand new. Dalal, Ext. 7790.

COMBO DESK FILE - and storage cabinet w/folding doors and shelf. $90. Ext. 4727.

POLICY SCANNER/RECEIVER - new 16 channel including antenna. $350. Firm. Sells for $400. Ext. 5141.

REFRIG/FREEZER - 17 cu. ft. Sears Kenmore, retails over $700, 3 yrs. old, excel cond. $400. Firm. Ext. 4552 or 929-3310.

YASHICA - 35mm GSN35, 50mm lens (1.7f), telephoto, wide angle, flash, & more, $160 or best offer; Polaroid one-step & 5 rolls. $28. Russ, Ext. 3059 or 744-7242.

APPLIANCES - dishwasher, $50; Maytag washer, $75; dryer, $50; turquoise electric range, $35; hotpoint refrig. $50; antique Singer sewing machine w/cabinet. $50. Dory, Ext. 3389.

U.S. DIVER'S - Spoiler swim fins. $20. Bob, Ext. 5286.

KITCHEN CHAIRS - (3) maple, $5 ea; maple platform rocker, $10; fixed window fan, 24"x28", $5. 281-7844.

PUPPIES - Siberian Husky, black/white w/blue eyes, AKC beautiful, healthy, shots, papers, parents on premises. 399-2677.

TV - Motorola color console, needs some work. $35. 475-4394.

TOMATOES - by July 4th! Sturdy one ft. plants in gallon containers, early & main season types. $2 ea. Tom, Ext. 7196 or 286-2505.

ANTIQUE GRINDSTONE - extra large for prof. knife sharpening. $50. Al Campbell, Ext. 3499.

WINDOWS - wooden double hung, 37"wx39"l, matching screen & molding. 475-5960.

HALF PRICE COUPON - Eastern JFK-San Francisco. $35 or best offer. Roger, Ext. 3578 or 878-4864.

DOOR - exterior, new 2'8"x6'8"x1¾" (3) windows R pre-hung fir. $110. 924-6582.

ROLLING BAR - 6' long dark wood w/white vinyl w/4 matching stools. $90. Richie, Ext. 4254 or 734-7342.

GARDEN ROLLER - $20. 744-5867.

JEWELRY - costume and fine pieces. Babette, Ext. 3419 or 878-9273 eves.

BOY SCOUT - "Cruiser" pack frame & pack. $15. Fred, Ext. 4988.

FREE - adorable puppies, golden retriever mix, very lovable. 234-7079 after 6 p.m.

HEARTHMATE - fireplace insert wood burning stove, 2 seasons, excel cond. $250. Negotiable. 722-3841 after 5 p.m.

MAPLE SYRUP - from Vermont farm. $20 gal, $12 half. P. Wanderer, Ext. 7687 or 744-1112.

REGIST. QUARTER HORSE - Bay, 3 yrs old, 14.2 Hands, Green Broke. $1,200. 751-0182 eves.

FIR & SPRUCE TREES - 20" to 40", U-dig, 2 for $7; lily or the valley plants, 50 for $2.50; Ford cultivator, $150. 727-1617.

AIR COND - 9,600 BTU, works excel. Ext. 3516.

DOLL HOUSES - custom made. JU8-5617.

BANJO - Framus 5 string banjo, excel. $100. 751-7692 or Ext. 7667.

COAT - ¾ length dark brown, leather coat, 2 yrs. old, excel cond. Asking $200. Ext. 5226.

TV - 23" color Zenith, portable w/cart, needs work, $75; good for Atari games; turntable, Dual Model #1019 w/new Shure Cartridge. 78, 45, 33 rpm, $50. Alyce, Ext. 5203.

ELECTRIC KNIFE - Hamilton Beach, new, never used. $10. Joe, Ext. 4212.

ORGAN - antique Ithaca Reed organ, completely restored inside and out. Very reasonable. 751-4985.

PAINT - (2) 4.3 gal. cans, Pittsburg paint, interior, latex, colonial blue & colonial green. $20 ea. Ext. 4758 or 744-6967.

GAS GRILL - Arkala w/tank, regulator, and cart. $50. Firm. 744-1081 after 3 p.m.

BOOTS - women's suede hiking or backpacking boots, made in Italy, size 8 medium width, still new in box. $40. Frank, Ext. 3898.

AIR CONDITIONERS - (3) good working cond. $50 and $35. Ext. 4444 or 473-2588.

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

BELLPORT VILLAGE - 4 bdrm Hi-ranch, l/r, f/r, eik, appliances, large deck, 1½ bath, short walk to schools, tennis, golf. Will hold first mortg. $43,000. 286-8166 after 5 of Ext. 3502.

SHOREHAM - north of 25A, 25 yr. old Cape in established neighborhood, 3 bdrms, study, fin bsmt, garage, on 1/3 acre, priv. beach rights. Owner financing available. $52,500. 744-5801.

EAST MORICHES - custom built 5 bdrms, 2½ baths, kit, d/r, eating area, l/r with fp, den w/fp, 2 porches, full bsmt, w/fp, garage, fully landscaped, 1 acre land, beach & marina rights, 1 mile to beach. 7½% interest. Job transfer. Sacrifice. $85,000. 878-1630.

WEST ISLIP - Relocation sale. 4 bdrm Cape, 2 baths, modern kit, mud/util. rm, fin. bsmt, attached garage, partially furnished, walk stores. $49,500. by owner. 669-2774.

MASTIC BEACH - sprawling ranch on ½ acre, treed & fenced lot, l/r, d/r, eik, 3 bdrms, 2 baths, large den w/fp, 2 car garage, 2 zone heat and fully insulated. Assumable 7½% mortg., many extras. $42,990. 281-1773.

ROCKY POINT - assume $23K mortg. at 8½%, 3 bdrms, large kit, large l/r with cathedral ceiling, fin. bsmt, detached 1 car garage, OHW heat, storms/screens, etc. 744-0843.

BLUE POINT - 5 bdrms, 2 baths, handyman special, must sell to settle Bumstead estate. $35,000. Ext. 3482.

LAKE RONKONKOMA - 2 bdrm ranch, 1 bath, lg. eik, d/r, Florida rm, att. garage, full bsmt, alum. siding, carpet, ½ acre plot, 4 blocks from LIE. 588-1464 after 3 p.m.

RIVERHEAD AREA - mobile home, 10x50, 1 bdrm, stove/refrig/washer/dryer, tool shed, covered patio. $8,000. Ext. 3485.

For Rent

MIDDLE ISLAND - 1 bdrm apt. 5 appliances, central a/c, pool. $350/mo. incl. heat. 924-8262 or 928-6228.

MEDFORD - furnished apt. 2 rooms & bath, priv. entr, all util. paid, working gentleman, 1 month security. 289-3612.

POCONOS - plan summer vacation now. Chalet, sleeps 5, swim, tennis, golf, riding nearby. 200/wk. 289-2159 after 6 p.m.

SHOREHAM - Delightful secluded house in wooded setting on North Shore, available for summer, 5 minute walk to priv. beach. Terms flexible depending on rooms needed. 744-6804.

QUEENS - furnished studio to sublet from June 1 to Aug. 31. Pushito, Ext. 4360.

LAKE GROVE - 3 room bsmt apt., kit, l/r, 1 bdrm, near Smithaven. $250/mo. + util. W. Lundgren, Ext. 3800.

MT. SINAI - sublet 2 bdrm. furnished house. $475/mo. + util. (unsuitable for children - water on three sides). Available August 1 for nine months. Ext. 2118 or 928-8579.

LAKE GROVE - 6 rm. apt., 3 bdrm, l/r, d/r, eik, carpeting, patio, raised deck, walk to Smithaven. $425/mo. + util. Ext. 3800.

VERMONT CHALET - beautifully furn., stone fp, wkly rentals, woodland trails, pond & lake, swimming, boating, fishing; nearby Alpine slide, etc. tennis & golf. 757-5599 after 4 p.m.

BERKSHIRES CHALET - 3 hrs. from NYC; 3 bdrms, 2 baths, fully equipped kit, elect. heat, deck w/spectacular view, near lake, hiking trails, near ski areas, ½ hr. from Tanglewood Theater. 929-6946 after 6 p.m.

MIDDLE ISLAND - 5 mi. from Lab, 3 bdrm Condo, 5 appl., central air, swim, tennis and etc. Ext. 4410 or 929-8680 after 6 p.m.

Wanted

A LOVING HOME - for abandoned, very affectionate male cat, orange & white. Anita, Ext. 2346.

BABYSITTER - my home, two children, 8 and 10, for school and summer vacation. Ext. 5230 or 281-0268.

HOUSE TO RENT - 3-4 bdrms, 1 yr., beginning Sept. Visiting scientist and family. Ext. 3786.

SERVICE MANUAL - for '75 Dodge 4x4 truck, to buy or borrow. Joe, Ext. 2022.

SMALL UTILITY TRAILER - to tow in back of small car, reasonable. Ken, Ext. 4987 or 475-1469.

PLAY GROUP - playmate for 4 yr. old boy or babysit for 4 yr. old. Mastic Beach area. 281-1773.

TWO BEDROOM APT. - from June 1 to Aug. 31 around BNL. Pushito, Ext. 4360.

'72-'76 TOYOTA - Corona or Corolla, running or in need of repair. Al Campbell, Ext. 3499.

PARTS - looking for performance small block Mopar parts 318-360 engine. Dennis, 722-4679 eves.

INTERESTED PARTIES - for whale watching expedition, off Montauk. Pat, Ext. 3636 or 369-2151 after 6 p.m.

SIAMESE KITTEN - seal or chocolate point. T. Morris, 744-5096.

INTERESTED LEADERS - Boy/Girl Scouts to swap information, resources. Contact John, Ext. 4243, lunchtime.

1969 CAMARO PARTS - wanted whole car or just parts, junk or jewels. Buy/sell/trade. 475-1469.

SMALL COOLER - for camping trips, 12 volts, 1-2 cu. ft., reasonable. 744-5867.

HUMIDIFIER - old hot steam model for sick room. Helga Pirozzi, Ext. 2384.

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

BUSINESS ASSOCIATES - excel. 2nd income, no investment req'd. For info 698-5861 after 7:30 p.m.

BICYCLE - 10 spd 23" men's model, reasonable. Babette, Ext. 3419.

HOUSE TO RENT - for French family, one month in July or August. Ext. 3765 or 744-5079.

GOOD HOME - for 6 wk. old kitten, all black. Lois, Ext. 2959 or 473-6033.

VENDORS NEEDED - for church flea market, June 13 (rain date June 20) $4 a space. Good location. 727-1617.

TIRES - (2) in good cond, size A78-13. Bob, 475-3981.

GOOD HOME - for 6 mo. old Peruvian Guinea pig. Call before 3 p.m. Ext. 3305/2966.

Car Pools

E. PATCHOGUE/BELLPORT - 1 person needed for 4 person car pool. Jim, Ext. 3851 or 286-2557.

BABYLON/W. ISLIP - driver needed for on-time car pool. 8:30 - 5:00. M. Tesla, Ext. 3284.

PATCHOGUE - to Lab via So. Country Rd., on-time, room for paying rider, 9 yrs. reliable service. Alyce, Ext. 5203.

STONY BROOK/E. SETAUKET - near 25A or North of 25A, need a 4th and 5th. Ext. 7790.

STONY BROOK/STRATHMORE - existing car pool needs rider/driver. Morris, Ext. 4188.

BELLPORT - need additional member to complete 5 man car pool. 8:30 - 5:00. George, Ext. 7654.

PATCHOGUE - 2 vacancies (driver/rider) in 5 person on-time car pool. John, Ext. 4615 or 475-6981.

RONKONKOMA - 1 driver to join existing car pool, near LIE exits 59, 60, 61. Victor, Ext. 7154.

RIVERHEAD - drivers wanted 1 or 2 to complete existing 3 member car pool. Pat, Ext. 2452.

W. BABYLON/MUNCIE AVE. - existing car pool needs drivers. Tom, Ext. 3320.

COMMACK/E. NORTHPORT - wish to join existing car pool. Dom, Ext. 3954.

Lost

LOST - gold ring, initials "M.J.P." Lost on 5/19. Mitzi, Ext. 2956.

Services

Services are listed as a courtesy to BNL employees. They are neither screened nor recommended by the *Bulletin*.

SEMINAR - how to increase your earnings and/or reduce your income taxes. For info, 732-6647.

BABYSITTING - teenager looking for babysitting/mother's helper job for wkdays during the summer. Coram, Selden, Centereach areas. 732-5829.

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

GARDENING - landscaping, rototilling, lawn maintenance, year clean up. Tony, 281-0350 after 6 p.m.

AUTO REFINISHING - all areas of body work performed. Reasonable rates. Bob, 744-4047.

HIGH SCHOOL GIRL - desires babysitting or house cleaning, good references. 286-9485.

LEARN TO SAIL - on Great South Bay on Classic 22' sloop. 286-1068 between 8 - 9 a.m.

TUTORING - high school math & science. Reasonable rates. 271-1720 eves.

PROFESSIONAL TYPING - Debbie, 727-5475.

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

SIGHT SEEING FLIGHTS - aerial photogr., Long Island, Conn., New York, modern all weather aircraft. 929-6148 day or eves.

DISCOUNT CUSTOM ACCESSORIES - performance parts for auto, truck, van. Guaranteed lowest prices. Hans, 281-5563.

HOUSE PAINTING - interior/exterior, professional, quality materials, insured. Bob, 289-7657 after 6 p.m.

DIRECT SECURITY - installed, fire, burglar alarms, intercom, vacuum systems, free estimates. For info call Deb, Ext. 2896.

BABYSITTING - will sit in my own home in Middle Island. 924-6139.

PLOWING - light grading. 727-0082.

TUTOR - all sciences. Prepare for regents exam now. Babette, Ext. 3419.

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

BABYSITTER - wkdays at my home located in Shirley, lots of love & care. Mary, 399-6128.

HOUSE SITTING - free, any period May 25th to Sept. 15th. J. Allentuck, Ext. 2412.

HAND CANE - and fiber rush. Reasonable rates. Jim, Ext. 5025 or 821-1704 after 5 p.m.

TELEVISION BUSINESS - can be run from your home. For info, call 732-6647.

Classified Ad Policy Deadline is 4:30 p.m. Friday for publication Friday of the next week.