BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

In Today's New World of Superpower Arms Negotiations, TSO Provides Fresh Approach to Treaty Verification

The changing landscape of U.S. and Soviet relations has created new arms-control issues — and thus a new project for the Technical Support Organization (TSO), a division of BNL's Department of Nuclear Energy.

The recent profusion of superpower arms-control agreements and negotiations increases the need for reliable techniques to verify each side's compliance with treaty provisions. Since the end of 1988, TSO has been working on a project funded by the U.S. Department of Energy's (DOE) Office of Arms Control to develop new verification tools and methods. One of the first products of this project, called Controlled Intrusiveness Verification Technology (CIVET), will be demonstrated later this summer.

"TSO was chosen for this project because of our 22 years of experience with safeguards verification," says Joseph Indusi, who heads the organization. Established at BNL in 1968, TSO provides technical assistance to several government agencies in the areas of nuclear safeguards, security and arms-control issues.

TSO received $600,000 in fiscal year (FY) 1989 and $1.2 million in FY90 for this project; Indusi says funding will continue for the next several years. Under group leader Jonathan Sanborn, various members of the TSO staff have been put on this project as their skills were needed; six members of TSO's multidisciplinary team are currently assigned to the project.

The development of new verification methods was made necessary, says Indusi, by a cluster of recent treaties covering chemical warfare agents, conventional forces, intermediate nuclear forces, and land-, sea- and air-based strategic nuclear weapons.

"The verification we did in the past was primarily oriented towards nuclear materials," he points out. "We're now faced with different problems — verifying nonnuclear materials and weapons systems." In addition, he says, the broad scope of current arms agreements means verification will involve many more facilities than before.

Indusi says three basic methods are used to verify that treaty provisions are being followed: on-site inspection of weapons factories or other facilities, technical means such as satellite imaging or aircraft surveillance, and intelligence gathering.

"Our program is primarily concerned with advanced concepts and methods for on-site inspection," Indusi says, "and these inspections have an element of intrusiveness we didn't traditionally deal with."

In the past, he explains, nuclear safeguards treaties between nations usually involved the inspection of commercial nuclear power facilities, employing widely known technology.

But on-site inspections of military facilities to verify current arms agreements could be very intrusive — that is, expose one party's sensitive weapons-design information. Limiting intrusiveness is a major concern of the both the U.S. and the Soviets, so "on-site inspection" may actually mean monitoring facilities from a pre-established distance.

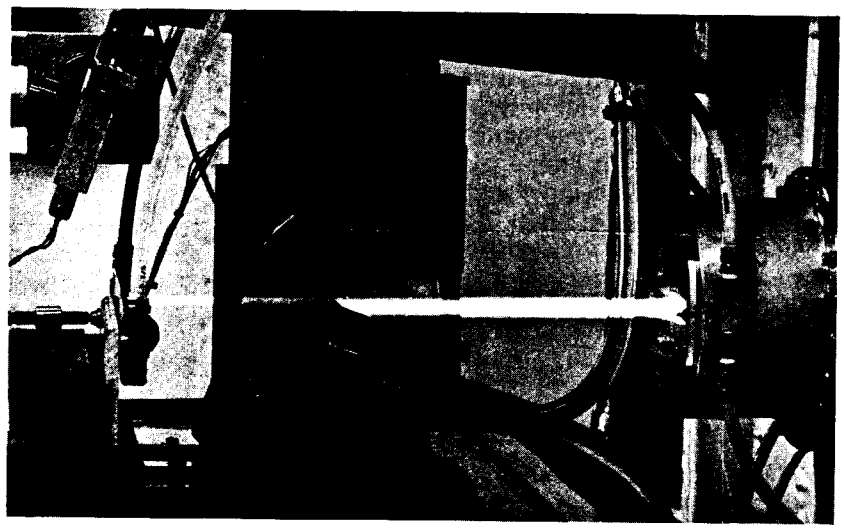
With this in mind, the TSO staff has developed a number of verification methods, including a test to detect certain chemicals by sampling water and air in the vicinity of chemical

(continued on page 2)

Roger Stoutenburgh

Members of the Department of Nuclear Energy's Technical Support Organization (TSO) examine the computer system, CIVET, that they developed for use in arms-control agreement verification work: (back, from left) David Dougherty, Jon Sanborn and C. Ruth Kempf; (front, from left) Alan Bieber, Peter Zuhoski and Joseph Indusi. Not shown are Michael Bonner and Cesar Sastre.

Once in a Blue Beam



Peter Horton

There's an ethereal blue glow coming from beam line X25 at the National Synchrotron Light Source (NSLS) — and the X25 insertion device team, headed by Associate Scientist Lonny Berman, is glowing about it.

The blue beam of visible light is produced when the intense x-ray beam coming from the X25 hybrid wiggler causes nitrogen in the air within the experimental hutch to fluoresce.

X25 is the beam line coming off a hybrid wiggler, which was inserted into a straight section of the NSLS x-ray ring in October 1988. As its name implies, a wiggler is a magnetic device that causes the electrons within the synchrotron ring to wiggle.

The number of times the electrons wiggle depends upon the number of the wiggler's magnetic poles. With each wiggle, the electrons emit photons, and, as these photons are superimposed upon each other, the photon beam becomes more intense.

The X25 wiggler is called a hybrid magnet because it is made of samarium-cobalt, a material with a naturally strong magnet field, and it has 30 vanadium-steel poles.

The blue-beam phenomenon can be seen coming from white-radiation bending-magnet beam lines around the x-ray ring — but the overhead lights must be turned off. Because the x-rays from the X25 wiggler are 30 times more intense, the blue beam can now be seen at X25 without darkening the experimental floor.

The intense x-rays also cause fluorescence in the boron nitride film that coats the beryllium window (right in photo). This window allows the light to exit from the wiggler in the ring into X25's experimental hutch.

The blue light and x-rays strike the surface of a water-cooled silicon crystal (center). When beam line X25 is commissioned, the crystal will be used as part of a monochromator to select specific wavelengths of x-rays for experiments.

But first, the crystal monochromator is being tested to understand how well its water-cooling system works in preventing thermal deformation in the crystal, caused by the heat of the powerful, 2-kilowatt x-ray beam.

Most of the beam misses the crystal's surface, so blue light and x-rays are halted by a backstop (left). A small fraction of the x-rays, which are invisible, are reflected up to an analyzer (top left). It determines whether or not the crystal has deformed by measuring how much of the beam was properly diffracted.

After the monochromator is in place before the end of the summer, the x-rays coming down beam line X25 will be used for high-resolution scattering experiments to probe the atomic structures of materials.

Designing the "Partial Snake"

Peter Horton

At the Workshop on a Partial Snake for the AGS held June 7-8, physicists from BNL and other facilities discussed the addition of a new device — a "Siberian snake" — to the Alternating Gradient Synchrotron (AGS).

Invented by Yaroslava S. Durbenev, USSR (back, fifth from left), a physicist from Novosibirsk, the Siberian snake is a device that can be inserted into an accelerator such as the AGS to preserve the polarization of the beam during acceleration.

Larry Ratner (back, fifth from right), an AGS physicist and coordinator of the workshop said the scientists worked on an optimum design for a less-powerful, partial or "baby" snake to be used in the AGS.

Workshop participants included AUI Distinguished Scientist emeritus Ernest Courant (back, seventh from left); AGS Department Chairman Derek Lowenstein (back, fourth from right); and Robert Pollack (back, second from left), from the Indiana University Cyclotron Facility, where the first experimental tests of the snake were performed.

Leaving the Lab — After 35 Years or More

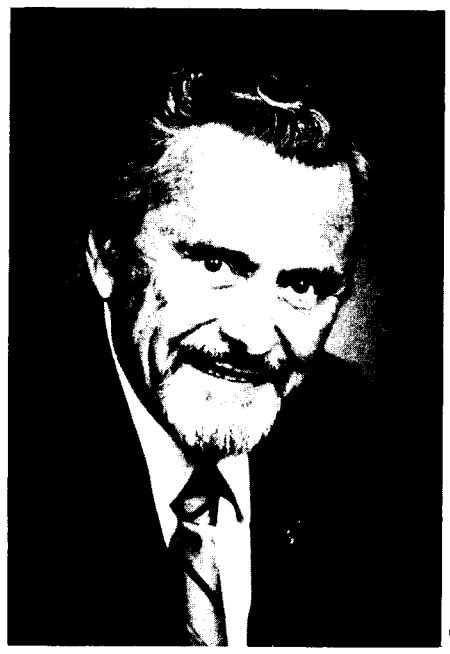
Retiring today after 37 years of BNL service, James Gilmartin will keep his life number 3521 — but give up his film badge number HF320.

Also known as a personal dosimeter, a film badge is what the Lab uses to gauge the amount of radiation exposure badge wearers receive while working around radioactive materials or external radiation sources. And Gilmartin has been a conscientious BNL film-badge wearer since coming to the Lab in 1953.

Since 1972, as a technical associate in the Safety & Environmental Protection Division's (S&EP) Personnel Monitoring & Dosimetry Services Group, he has been responsible for calibrating the sources that are used for quality assurance irradiations of sample film badges. Gilmartin also irradiates those sample film badges with those radiation sources.

Gilmartin began his BNL career on February 2, 1953, working as a technician in what was then a medical physics division of the Medical Department.

There, Gilmartin was involved in many projects, including the first studies of boron neutron capture therapy, an experimental radiation treatment for the deadly brain cancer called glioblastoma, which was pioneered by BNL and Massachusetts General Hospital.



Roger Stoutenburgh

James Gilmartin

In November 1960, Gilmartin transferred to what was then the Health Physics Department and is now S&EP. He worked first on the repair and calibration of radiation detection equipment, and then assisted with data collection and analysis for BNL's environmental monitoring program, before joining his present group.

Though his anonymity is guaranteed by BNL's Tune In! program, now that he is retiring, Gilmartin has chosen to reveal himself to be the author of many letters regarding access to BNL facilities by the handicapped.

"Over the years, I had a running dialogue going on through Tune In!, so it's good to see that Personnel, the bank, post office, Cafeteria and many other buildings are now accessible to the handicapped," says Gilmartin, whose late father was confined to a wheelchair for the last 20 years of his life. "Now, more qualified handicapped people can be recruited by the Lab."

A Montauk native raised in Yaphank, Gilmartin spent three years in the Air Force and three years at Fordham University majoring in physics before returning to the area. Having moved to Manorville after marrying his late wife Marie and starting their family of five children, "I was lucky enough to be hired by the Lab," he says. "I learned a lot on the job, so I'm still glad I came to work here."

Gilmartin plans to remain in Manorville, close to two of his daughters. But he also plans on traveling to visit his three other children in Colorado Springs and Denver, Colorado, and Buffalo, New York.

His parting words to BNL are reminders to its film-badge wearers:

"Wear the badge correctly — on your torso, not on your cap or back pocket; don't open the badge to see what's inside — the dose information is then lost forever and can only be estimated; don't wear your badge home or leave it in your car — put your badge back in its assigned spot on the film-badge board at night."

Concludes Gilmartin, "If you follow through, my former coworkers will thank you now, but you'll thank yourself in the end."

— Marsha Belford

Staff Services' Service Awards

Roger Stoutenburgh

A party was held in the Staff Services Division (SSD) recently in honor of five SSD employees who are observing BNL service anniversaries this year. Shown here with SSD Manager Ronald Manning (center) are (from left) Jean Bunsel Meyer, 10 years; Margaret Fennelly, 10 years; Joan Perullo, 20 years; and Frank Norton, 30 years. Unable to attend was Dorothy Metz, 35 years.

Inside Info

Walter Kato, Chairman of the Department of Nuclear Energy (DNE) has been elected to a three-year term on the board of directors of the American Nuclear Society (ANS).

The ANS is dedicated to the peaceful applications of nuclear science. Founded in 1954, the society now has a worldwide membership of over 16,000 engineers, scientists and educators in government, academia and private industry.

Kato has been continually active in ANS activities since its inception in 1956. He was elected a fellow of the society in 1973. Highlights of his contributions include chairing the local Long Island section, 1978-79; previous service on the Board of Directors, 1974-77; chairing the Nuclear Reactor Safety Division, 1983-84, and Reactor Physics Division, 1972-73; serving as general chair of the International Topical Meeting on Probabilistic Risk Assessment in 1981; sitting on the International Committee since 1984; and being a member of ANS delegations to the People's Republic of China in 1980 and to the U.S.S.R. in 1989.

On a more local level, **Peter Kroeger**, DNE; **Robert McNair**, Reactor Division; and **Norman Rohrig**, Safety & Environmental Protection Division, were all recently elected officers of the Long Island section of the ANS.

Kroeger was chosen as vice president and president-elect. He will automatically assume the presidency in July 1991. McNair was selected for the position of secretary, while Rohrig begins a three-year term on the executive committee, which has seven other members, including continuing members John Lehner, DNE; George Maise, DNE; and Dave Rorer, Reactor.

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Yreana-Renée Flack, a senior educational programs representative in the Office of Educational Programs, was honored by the Helping Hand Club of Gordon Heights at their Third Annual Scholarship Luncheon on June 16. A highlight of the occasion was the presentation of a proclamation signed by Brookhaven Town Supervisor Henrietta Acampora, proclaiming June 16, 1990 Yreana-Renée Flack Day in the Town of Brookhaven.

Flack was recognized for her dedication and hard work in coordinating educational programs within the Lab, and for outside individuals and groups; for her interest in helping young people obtain an education; and for being active in many community groups.

Service Awards

The following employees celebrated their BNL service anniversaries during the month of June 1990:

Thirty-Five Years

James Costanzo.....Reactor
Gertrude H. Neuhoff.....App. Science

Thirty Years

Kurt Fuchel.....Comp. & Comm.
Michael A. Guacci.....Sup. & Mat'l.
Theodore G. Robinson.....Physics
Thomas A. Wild.....Accel. Dev.

Twenty-Five Years

John W. Baum.....Nuc. Energy
Richard E. Watson.....Physics

Twenty Years

Frank M. Dusek.....AGS
Howard A. Gordon.....Physics
Pearl M. Hicks.....Tech. Info.
Thomas M. Mogavero.....Physics
Alvin J. Vestal.....Cent. Shops

Ten Years

Karen E. Adelwerth.....Pers.
Richard E. Backofen..Photo. & G. Arts
Millicent J. Baggett..Comp. & Comm.
Neil V. Baggett.....Dir. Off.
Joseph C. Curley.....AGS
Peter H. Daum.....App. Science
Peter P. DeLeo.....NSLS
Louis A. Evers Jr......Reactor
Andrew J. Feldman.....Con. & Proc.
Margaret M. Fennelly.....Staff Serv.
Edward G. Gallagher.....MIS
Ole Hansen.....Physics
Ronald S. Hauser.....Cent. Shops
Lynn C. Kelly.....NSLS
Payton T. King.....Medical
David K. Kirby.....Physics
Francis E. Loeb.....Physics
Denise M. Miesell.....Nuc. Energy
Bruce E. Penn.....Nuc. Energy
Richard J. Reeve.....Staff Serv.
David J. Schlyer.....Chemistry
Dieter K. Schneider.....Biology
Daniel M. Sheppard.....Cent. Shops
Joseph E. Tuozzolo.....AGS

Coming Up

Edward C. Stone, the project scientist for NASA's Voyager mission since 1972, will deliver an AUI Distinguished Lecture on Monday, July 9. Entitled "The Voyager Exploration of the Solar System," his talk will begin at 5 p.m. in Berkner Hall. The lecture is free and open to the public.

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Lee E. Farr, first Chairman of BNL's Medical Department, from 1949 to 1962, will return to Brookhaven on Wednesday, July 11, to deliver a lecture entitled "Neutron Capture Therapy — Years of Experimentation, Years of Reflection." His talk will begin at 2 p.m. in the large seminar room of the Medical Department, Bldg. 490.

Intro to REXX

Programmer Analyst Alison Tilp will be the lecturer for a beginner's course in REXX, the Restructured Extended Executor Language, to be offered by the Computing & Communications Division on Tuesdays and Thursdays, for three weeks starting July 10.

As the command-procedure language for the IBM 3090, REXX is suitable for writing EXECs (command procedures) and user-defined XEDIT subcommands, and for prototyping and personal computing.

Each class will be held in the CCD Seminar Room, Bldg. 515, from 10 a.m. to noon. Enrollment is limited. To register, contact Donna-Ree Fernandez, Ext. 4103.

Catch a glimpse of
GLANCE
playing in Berkner Hall
weekdays, 11:30 a.m. to 1:30 p.m.
Show changes every Tuesday.

TSO Approach (cont'd)

weapons plants, and technology to detect tanks and other equipment by electromagnetic signals.

TSO staff have also designed CIVET, a computer-based system that can assist in providing a high degree of verification while minimizing intrusiveness. Indusi says this system can process large quantities of information but has no long-term memory; it can thus be used to analyze inspection data and verify compliance, but prevents the inspecting party from retaining sensitive information. The prototype hardware and software for the system will be demonstrated sometime this July.

Other project work falls under what Indusi calls "systems studies." Verification inspectors must be able to state the confidence level provided by their findings — that is, the extent to which the data from inspections assure that the provisions of the treaty are being followed. The verification group's goal is to determine how the results of various inspection activities can be synthesized to produce the most accurate assessment of confidence levels possible.

In another important systems study, the verification group is analyzing processes in factories that make pesticides, fertilizers and other commercial chemicals to identify ways that a treaty party could illegally divert those chemicals into chemical weapons production. The first report on this study is due out this September, Indusi says.

— Lisa O'Rourke

Summer Schedule At Swimming Pool

The summer schedule at the pool begins on Monday, July 2. The pool will be closed all day Wednesday, July 4, and summer hours will resume Thursday, July 5. The hours will be as follows:

Monday through Friday

11 a.m. - 1:30 p.m.	employees only
1:30 p.m. - 2 p.m.	reserved for speed swimming & training
2 p.m. - 3:15 p.m.	children's lessons
3:30 p.m. - 9 p.m.	employees, families, guests*

Saturday & Sunday

1 p.m. - 5:30 p.m.	employees, families, guests*

Daily Admissions

employee or family member	$2.00
guest	$3.00

Season Tickets (fees not prorated)

Individual membership	$30.00
Family membership	$40.00

**One guest per employee is permitted. Advance arrangements for additional guests, up to a maximum of five at any one time, must be made at the Recreation Office, Personnel Division, Bldg. 185.*

Tennis Trip Off; Pick Up Refunds

The Tennis Committee was unable to secure tickets for the planned August 30 trip to the U.S. Open. Those who ordered tickets should pick up their checks at the BERA Sales Office. The U.S. Open advises that a very limited number of tickets may be available through the box office or through Ticketron, mostly for the evening sessions.

The trip for September 4 is still scheduled.

Hospitality News

The next Hospitality Committee get-together will be in August. Details will be published in the August 2 edition of the Bulletin.

Software Demo

Representatives of P-CAD will present the UNIX version of P-CAD software on the SUN SPARCstation, on Tuesday, July 17. The demonstration will begin at 1:30 p.m., in the seminar room of Bldg. 515, Computing & Communications Division. All are invited to attend. For more information, call Pam Mansfield, Ext. 7286.

Early Deadlines For Next Issue

As the Lab will be closed for the Independence Day holiday on Wednesday, July 4, all Bulletin deadlines for the issue of July 6 have been moved up by one day.

Therefore, as announced in last week's Bulletin, the deadline for classified ads was yesterday at 4:30 p.m. All other submissions for next week's issue should be delivered to the Bulletin office in Bldg. 134 by noon on Monday, July 2.

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Aerobic Dance Summer Program

The Aerobic Dance Club will hold two eight-week summer programs: Monday stretch, and Tuesday and Thursday aerobic dance classes.

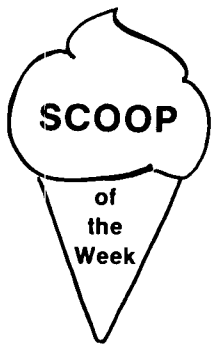
Both sets of classes will run from 5:15 to 6:15 p.m. A mat is suggested for floor exercises in both kinds of classes.

The fee for each eight-week session is $24, payable at registration, which will precede the first class, to be held in the Recreation Building as follows:

- Stretch - Monday, July 9
- Aerobic Dance - Tuesday, July 10

For more information, call Bill Leonhardt, Ext. 2378, or Janet Sillas, Ext. 2345.

Scoop of the Week



Week two of the Scoop of the Week contest yields three scoops: the first to Sarah Ebron, Plant Engineering Division, for giving the Bulletin the "Inside Info" on Yreana-Renée Flack Day in Brookhaven Town; the second to Nicholas Gmur, National Synchrotron Light Source Department, for suggesting "Once in a Blue Beam"; and the third to Joyce Wund, Personnel Division, for informing the Bulletin of James Gilmartin's "Leaving the Lab — After 35 Years or More."

During the summer, if you have a hot tip that you wish to trade for a scoop of frozen yogurt, rush your news and feature ideas to the Brookhaven Bulletin, Bldg. 134, or call Ext. 5053, to enter the Scoop of the Week Contest. If you scoop the Bulletin's informed sources and a story based on your idea is published, you'll win an official certificate for soft-serve, frozen yogurt.

On the Menu

At the Cafeteria

Luncheon served 11:15 a.m. to 1:30 p.m., grill open to 3:45 p.m., Cafeteria closes 4 p.m.

Monday, July 2	
Soup: Washington Chowder	.75/.95
Entree: Stuffed green peppers w/1 veg.	3.10
Entree: Roasted herb chicken w/1 veg.	3.10
Fitness: Macaroni & cheese w/1 veg.	2.95
Carvery: Hot pastrami sandwich	2.85
Tuesday, July 3	
Soup: Cream of mushroom	.75/.95
Entree: Chicken a la king w/1 veg.	3.10
Entree: Baked stuffed pork chops w/1 veg.	3.10
Fitness: Naverin of lamb w/1 veg.	3.10
Carvery: Hot roast beef sandwich	2.85
Wednesday, July 4	
Grill open 9 a.m. to 2 p.m.	
Thursday, July 5	
Soup: Mulligatawny	.75/.95
Entree: Roast L.I. duckling w/1 veg.	4.95
Entree: Deep-fried fish nuggets w/1 veg.	3.10
Fitness: Beef stew w/1 veg.	3.10
Carvery: Hot oven-roasted Black Forest ham	2.85
Friday, July 6	
Soup: Lobster bisque	.75/.95
Entree: Fish Creole w/1 veg.	3.10
Entree: Italian meatball hero	3.10
Fitness: Chicken chow mein w/1 veg.	3.10
Carvery: Hot turkey sandwich w/cranberry sauce	2.85
Breakfast served w/coffee, 7:30 - 10:30 a.m.	2.65

Mon.: 2 eggs, bacon & pancakes
Tue.: Western omelet, French fries, toast
Wed.: Spanish omelet, home fries, toast
Thu.: 2 eggs, bacon, cheese on croissant, fries
Fri.: French toast, 2 eggs, bacon, home fries

Note to Diners

On Wednesday, July 4:

- The Cafeteria will operate only the snack bar service, from 9 a.m. to 2 p.m.
- The Brookhaven Center will be open at 5 p.m. for normal operation.
- The vended-food service in Bldg. 912 will be in operation.

Cavani String Quartet

Special BERA Concert: Cavani String Quartet

The Cavani String Quartet, winners of the prestigious Naumberg Chamber Music Award in 1989, will appear in concert at Berkner Hall on Thursday, July 5, at 8 p.m. This special summer concert is being offered by BERA in conjunction with the Workshop on Experiments and Detectors for a Relativistic Heavy Ion Collider, to be held at BNL July 2-7.

Named for the 19th-century violin maker Vincenzo Cavani, the critically acclaimed quartet was formed in 1984, a year after the young musicians met at the Ohio State University School of Music. They are Annie Fullard, violin; Susan Waterbury, violin; Erika Eckert, viola; and Merry Peckham, cello.

In addition to the Naumberg Chamber Music Award, the quartet has captured prizes in the Cleveland Quartet and the Carmel competitions, the Chamber Music Chicago Discovery Competition, the Banff International, and the Coleman and Fischoff competitions.

Currently the quartet in residence at the Cleveland Institute of Music, the Cavani has performed in Europe, Canada, Mexico, and throughout the United States. NBC, ABC and PBS television have featured the quartet, and their music has been heard on National Public Radio in the U.S., Canada and the United Kingdom.

During the 1989-90 season, the Cavani String Quartet made its debut at Lincoln Center and was selected by Musical American for its Young Artists of 1989 roster. The musicians also premiered a new musical piece — a string quartet by American composer Donald Erb.

The Erb work, String Quartet #2 (1990), will be part of the Cavani's varied BNL program, along with Mozart's String Quartet in C Major, K. 157, and Tchaikovsky's String Quartet in D Major, Op. 11.

Tickets for the concert are $10 each, and can be purchased at the door the night of the performance.

Arrivals & Departures

Arrivals

Eugene Kaczynski.....Staff Services
Robert M. Lake.....NSLS
Steven J. Milder.....Chemistry
Frank Trapani.....Plant Eng.

Departures

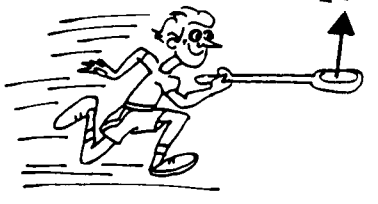
This list includes all employees who have terminated from the Lab, including retirees:

Margaret D. Alexoff.....Central Shops
Erik G. Cazzoli.....DNE
Donna M. Daugirdas.....P&GA
Jodi Greco.....Staff Services

1990 Picnic

August 25

Food & Fun !



The Fun Olympics at the BERA 1990 Fun & Food picnic on August 25 will feature crazy team sports for teams of adults of any age. Have a great time competing in unusual games and races. Anyone who would like to join in should fill out the accompanying form (the information will be used to balance the teams better) and send it to Liz Mogavero, Bldg. 510A, or Betty Pergan, Bldg. 179A. Space is limited, so don't delay.

In addition to the Fun Olympics, the picnic will have terrific food, soda and beer, dancing, children's activities — and places to relax on the grass. Buy tickets, at $10 each, from Michelle Cummings, Bldg. 459, Ext. 2077; Liz Mogavero, Bldg. 510A, Ext. 3940; Betty Pergan, 179A, Ext. 2937; Rosalie Piccione, Bldg. 355, Ext. 3160; Barbara Simpson, Bldg. 355, Ext. 7187; and Doris Terry, Bldg. 179C, Ext. 7610.

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 and/or appropriate bargaining unit, with preference to those within the immediate work group; (2) present employees within the Laboratory as a whole; and (3) outside applicants. In keeping with the Affirmative Action plan, selection decisions are made without regard to age, race, color, religion, national origin, sex, handicap or veteran status.

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

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

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

The vacancies listed below have been exempted by the Director's Office from the current freeze on open requisitions.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees only.

4262. INSULATION WORKER - Under general supervision, performs installation and removal of insulation and protective coverings around piping, ductwork, fixtures and devices as required. Performs limited removal and disposal of asbestos insulation in accordance with applicable environmental control standards, pursuant to laws and regulations governing the Laboratory. Will be trained and must be certified as an asbestos abatement worker to standards adopted for such work by New York State. Plant Engineering Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

4263. FACILITIES INSPECTOR (Maintenance Management) - Requires extensive experience in an applicable trade and broad knowledge of facilities maintenance. Familiarity with building systems and structures highly desirable. Responsibilities include performing inspections of physical plant facilities to determine condition, maintenance requirements and compliance with Plant Engineering maintenance programs; and compiling and updating building files, including pertinent constructions and utilities data as directed. Plant Engineering Division.

4264. TRAINING AND QUALITY ASSURANCE POSITION - Requires an AAS or equivalent, several years' relevant work experience including OJT and classroom instruction, and capability of maintaining training records on a computer data base. Will be responsible for the development and implementation of a training program for the Plant Engineering craftspeople, developing new QA procedures, conducting QA audits and providing training in these areas. Plant Engineering Division.

4265. ENVIRONMENTAL ENGINEERING POSITION - Requires a BS in environmental engineering or related discipline, experience in hazardous waste management, RI/FS process, CERCLA, RCRA, and groundwater remediation technologies. Additional requirements include familiarity with federal, New York State and Suffolk County environmental agencies and regulations, and ability to demonstrate responsible project management leadership. Will be responsible for the management, planning and execution of major environmental construction projects at the Laboratory. Plant Engineering Division.

4266. SAFETY ENGINEERING POSITION - Requires a BS in safety engineering or a related field, several years' relevant work experience, and experience in job-safety analysis, accident investigation and conducting safety awareness training. Will be responsible for the development and implementation of industrial safety programs for the Operations and Maintenance Division of Plant Engineering. In addition, will conduct safety inspections and safety audit compliances. Plant Engineering Division.

4267. ENGINEERING POSITION (Environmental Coordinator) - Requires a BS in environmental engineering or environmental management and significant relevant experience. Must be knowledgeable of applicable federal, state and local laws. Responsibilities will include the development and implementation of a coordinating plan for all environmental projects under the control of Plant Engineering, including oversight of environmental aspects of plant operations. Will interface with the Safety & Environmental Protection Division, regulatory agencies and assist the Manager, Plant Engineering, in development of future planning for environmental concerns. Plant Engineering Division.

4268. ENGINEERING POSITION (Construction Projects) - Requires a BS in environmental science or engineering, and several years' relevant experience. Will be responsible for the coordination and inspection of all construction projects that contain elements of environmental concern. Must be knowledgeable in the areas of groundwater monitoring, storm and sanitary sewerage installations, potable and monitoring well construction and closings, landfill operations and hazardous waste disposal. Plant Engineering Division.

Motor Vehicles & Supplies

88 HYUNDAI EXCEL GL - h/b, 3-dr., white, 4-spd., am/fm cass., 57k mi., excel. cond., $3,500. Debbie, Ext. 2876.

88 FORD BRONCO II - 5-spd., ac, 42k mi., excel. cond., $9,600. 324-8150, leave message.

87 BRONCO II XLT - 5-spd., ac, p/w, p/l, cruise, 30k mi., extended warranty, visor, running boards, alarm, more, excel. cond. Richard, Ext. 2231.

87 WILDERNESS TRAILER - 33', queen bed, sleeps 6, 25' awning, many extras. 654-0810.

87 HONDA DX - 4-dr., a/t, $8,000. Ext. 2543.

87 TOYOTA COROLLA FX-16 - 18k mi., ac, am/fm stereo, tape, more, mint cond., $6,000. Ext. 7655 or 447-5860.

87 TOYOTA 4x4 - good cond., $7,000. 751-4539.

86 TOYOTA PICKUP 4x4 - alarm, 5-spd., 60k mi., tinted, 31" tires, am/fm stereo, more, excel. cond., $5,500. Danny, Ext. 2012 or 286-8541.

86 CHEVY CAVALIER - 5-spd., 62k mi., asking $3,200; '86 Plymouth Horizon, 5-spd., 46k mi., asking $2,800. Ext. 3731 or 331-7299.

86 PONTIAC FIERO - V-6, 57k mi., loaded, car cover, black, excel. cond. Ext. 3615.

86 VOLVO 240GL WAGON - a/t, ac, cruise, deep tint windows, 300-watt stereo, 29.5k mi., excel. cond. in/out, $12,500. 728-0273 eves.

85 TOYOTA TERCEL - h/b, 5-spd., ac, 2-dr., 47k mi., excel. cond., $2,800 neg. 874-3927 after 4 p.m.

85 HONDA CIVIC DX - sunroof, extras, mint cond. Danny, 744-8986.

84 VW - runs OK, body poor good for parts, $75. Augie, Ext. 3884.

84 FORD ESCORT - 4-dr., 4-spd., am/fm cass., 45k mi., new brakes & carb., excel. cond., $2,200. Abe, 475-1017.

84 RENAULT ALLIANCE - gray, 4-dr., valve job at 85k mi., 2 new tires, excel. cond., asking $900, neg. Janice, 345-3379 or 929-4522.

84 TOYOTA VAN - 56.7k mi., a/t, ac, am/fm radio, price neg. 924-1071 or 924-0693.

84 RENAULT ALLIANCE - sky blue, 2-dr., 75k mi., excel. cond., must sell, asking $800. Ext. 2294 or 286-5511.

82 FORD ESCORT - am/fm, 107k mi., asking $400. Bertrand, Ext. 3166.

82 NISSAN SENTRA - a/t, am/fm, 98k mi., used for commuting, $300. Joel, Ext. 5038.

80 DODGE COLT RS - 2-dr., h/b, 4-spd., am/fm, ac, 120k mi., needs work, asking $250. 928-0297.

80 CORVETTE - white, tan leather int., 25k orig. mi., mint cond. Ray, Ext. 2760 or 924-2430.

80 CHEVETTE - 4-spd., 2-dr., good cond., must sell, $400. Herman, Ext. 7333.

80 DODGE OMNI - black, 2-dr., sunroof, 100k mi., runs well, $300. Ext. 3578 or 924-7660 after 6 p.m.

80 DATSUN 510 - h/b, 140k mi., new brakes, good tires, runs, $400, neg. Mark, Ext. 3812.

79 HORIZON TC3 - new battery & exhaust, body good, runs well, needs clutch, $300. Ext. 7707 or 821-0125 eves.

79 CHEROKEE JEEP - Class III trailer hitch, a/t, ac, $1,495 neg. John, Ext. 3302 or 924-0651.

78 DODGE MOTOR HOME - 18', fully self-contained, sleeps 4, low mi., new tires, $7,500 neg. Joe, 689-8793 or 732-5445.

78 CHEROKEE JEEP - 4wd, needs work, $800. Mike, 878-0487.

77 OLDS DELTA 88 - red, many new parts, excel. body, $500. Pat, Ext. 4561 or 345-0483.

77 TOYOTA CORONA - s/w, good running cond., $200. Ching Yang, Ext. 3663 or 474-3845.

75 PLYMOUTH DUSTER - rebuilt engine, new tires, p/s, p/b, a/t, good cond., reliable, $900 neg. 821-9432 after 5 p.m.

74 GMC PICKUP - ¾-ton, a/t needs engine work, good tires & trans., make offer. Tony, 698-9274.

68 LINCOLN CONTINENTAL - white, black vinyl top, $700. Keith, 474-3863.

65 DODGE DART - slant-6 motor, good for parts, best offer. Frank, Ext. 2314 or 567-5131.

HOT DOG TRUCK - must sell, good cond., ready for business, $5,200. 744-1535.

TIRE - 6.45-14, w/5-hole rim, $10. Joe, pager 0925 or 728-1859 eves.

TIRE - steel-belted radial, Goodrich, P175/80R13, on Omni wheel, like new, $25. Connie, Ext. 2594.

DODGE SWINGER MOTOR HOME - 26', sleeps 6, 34.8 mi., generator, ac, stereo, CB, like new cond. Larry, 473-1456.

CHEVY PARTS - Crane dual-valve springs, Edelbrock valve covers, Moroso 11" air cleaner, timing set, stock cam. Glenn, 821-5165.

CAR TRAILER - light-weight, 400-lb., w/ramps, $400. Chris, Ext. 3615.

CAR STEREO SPEAKERS - 6"x9", Magnum XL series, never used, $100. Kathy, Ext. 3578.

TIRES - 4, Armstrong sports radials, 195/70/R15, like new, mounted on '78 280Z alum. rims, best offer. Ray, Ext., 2760 or 924-2430.

ROLL BARS - black, fit most small trucks; 2, Dick Cepek lights w/locking bar, good cond., $75. Pat, Ext. 3807.

TERRY TRAVEL TRAILER - 19½', self-contained, sleeps 6, awning, good cond., tow vehicle also avail., $2,100 neg. John, Ext. 3302 or 924-0651.

SLIDE-ON CAMPER - sleeps 4, make offer. 874-2838.

Boats & Marine Supplies

37' EGG HARBOR - 1969, dbl. cabin, twin 265-h.p. Palmers, 2 heads, shower, sleeps 7, $16,500 or possible trade for truck. Ron, Ext. 2214.

28' MORGAN - 1979, shoal draft sloop, great cruising boat, good speed, extensive equip. list., will deliver East Coast. Campbell, Ext. 4168.

25' MACH 1 - 1984, cruiser, 260-h.p. OMC i/o, sleeps 4, head, galley, VHF, DF, Loran, $14,000 or best offer. Mike, Ext. 7607 or 473-9124.

25' WELLCRAFT 250 NOVA - 260 Merc cruiser, VHF, DF, clean, runs well, $8,300. Jack, Ext. 7527.

22' CATALINA SAILBOAT - 3 sails, trailer & motor, $4,800. 929-8912.

22' RHODES - 1974, furling 150 Genoa, pop-top, '86 8-h.p. Evin., $3,500 neg. Ext. 3969 or 878-6580.

21' SEARAY - 1986, cuddy, 170-h.p., FWC, VHF, DF, full canvas, trailer, p/winch, extras, low hrs., mint cond., $12,000. 744-1535.

21' INVADER - 1984. cuddy. Volvo i/o, FWC, beautiful solid boat, excel. cond., asking $7,000. John, 331-3724.

20' SAILBOAT - 1985, f/g, w/sail & trailer, 7.5-h.p. ob., $3,000 neg. 654-2243 eves.

19' BOWRIDER CRUISER - 1972, '76 115-h.p. Johnson, full canvas, trailer w/elec. winch, $2,500. Frank, Ext. 2314 or 567-5131.

19' MARQUIS CARRIBEAN - 1974, V-hull, large open deck, full canvas, galv. Cox trailer, 70-h.p. Johnson ob., $1,750. John, Ext. 2788.

19' O'DAY MARINER - CB, 6 h.p., fully equipped, ready to sail, $2,750. Dave, Ext. 2109 or 472-9199 eves./wknds.

18' SOL-CAT CATAMARAN - beach wheels trailer, extras, excel. cond., $1,750. 821-0686.

17' SHARPIE - plywood, good cond., $100 firm. 475-0831.

17' O'DAY DAY SAILER - good cond., 4-h.p. Evinrude, trailer, asking $2,000. Dick, Ext. 2881 or 286-3372.

17' FOLDBOAT - 2-seater w/paddles, flotation, good cond., $250 neg. Anthony, 286-7583 after 6 p.m.

12' CRESTLINER - alum., semi-vee, $350; Sunfish w/daggerboard dolly. 286-1097.

OUTBOARD MOTOR - 1984, 115-h.p. Johnson, VRO, p/tilt & trim, controls, s/s prop., low hrs., excel. cond., asking $2,200. John, Ext. 2788.

OUTBOARD MOTOR - 7.5-h.p. Mercury, brand-new, shortshaft manual start, used on dinghy, mint cond., $750. Brian, Ext. 2799.

JET SKI - 1987 Kawasaki 550, <30 hrs., w/trailer, mint cond., $2,500 neg. 395-1554 after 6 p.m.

Tools, House & Garden

LAWN MOWER - good cond., runs well, $35; rake, wheelbarrow, pitch fork. Dave, Ext. 5460.

SCREEN HOUSE - portable, 12' square, good cond., $250. Rich, Ext. 4446.

LAWN MOWER - Jacobsen ride-on, $150. Carol, Ext. 2474 or 475-7454 after 7 p.m.

Sports, Hobbies & Pets

ROWER - $50. 475-2509.

BICYCLE - BMX Mongoose, boy's, 20", excel. cond., $25; framed backpack, new, $20; 2-man backpacking tent, excel., $20. 473-6546.

BOWS - PSE Nova RH, $40; Golden Eagle Cam Hunter RH, w/case, $150; both 30" draw, 60 lbs. Bill, Ext. 2377 or 698-1971.

BICYCLE - Ross, girl's, 23", blue, 3-spd., v.g. cond. Ext. 4449 or 751-8403 after 6 p.m.

BICYCLE - Sears, man's, 5-spd., good cond., $20. Ext. 4003.

BICYCLE - Shogun, 12-spd., alloy frame/wheels, hardly used, mint cond., $225. Toni, Ext. 5247.

ROTTWEILER PUPS - AKC, male & female, 7 weeks old, shots, wormed, champion background. 821-6753.

POOL LOUNGE - inflatable, twin size, $10. Kathy, 722-2203.

RC TRUCK - Double Dare, 4wd, 4 wheel steering, Monster Mash motors, brand-new, w/trigger controller & servos. Danny, Ext. 2012 or 286-8541.

RECORDERS - Moek, soprano & alto, barely used, $10 & $15. 751-3551.

BICYCLES - Raleigh Gran Prix, 10-spd., 21½", silver, $80; 25½", blue, $100, extras. 744-0892 after 5 p.m.

Audio, Video & Computers

TURNTABLE - cassette player, radio, modular system, Magnovox three-in-one, needs some work, $50 neg. Fred, Ext. 4353.

STEREO TUNER - amp, turntable, cassette, Fisher, cass. not working, $250. Walter, Ext. 4958.

PROJECTORS - Kodak 850H slide, autofocus, zoom, stack loader, 15 trays, case, $175; Showmaster 800, 8mm projector, $25. Albert, 727-6481.

RECEIVER - Marantz #2275, 100 watts per channel, $50; Fisher cassette recorder, $30. Bill, Ext. 2377 or 698-1971.

TELEVISIONS - 19" b&w, $15; 13" b&w, $15; 12" color, $30. Bill, Ext. 2807 or 281-0557.

COMPUTER - Commodore 64 system, and/or component parts, used, works. Pat, Ext. 2836.

RADAR DETECTOR - Escort, w/case & cords, $135; Marlboro amplifier, 60 watts, for guitar/bass keyboard, 15" speaker, $125. Dave, 821-3009.

STEREO RACK SYSTEM - Soundesign, dual cassettes, turntable, more, excel. cond., asking $145. Ext. 3731 or 331-7299.

Free

CATS - Balanese/Javenese for adoption. Ramona, 928-3088.

SOFA - good condition. 874-2838.

Lost & Found

LOST - about 6 keys on a key chain w/black leather fob. L.P. Chan, Ext. 3867.

Yard & Garage Sales

E. PATCHOGUE - Sat., June 30, baby items, clothes, tools, household goods, 32 West Masem Sq. 286-1060.

N. PATCHOGUE - June 30-July 1, 9-4 p.m., tools, furniture, household goods, 99 Franklin Street near N. Patchogue Fire House.

PATCHOGUE - June 29-30, 10-4 p.m., until everything is sold, housewares, furnishings, books, misc., 200 Jayne Avenue.

Car Pools

CENTER MORICHES - ride needed to work, will share expenses. Bob, Ext. 3932.

PATCHOGUE - ride needed to BNL, will pay. Ellie, Ext. 7328.

NASSAU/QUEENS - LIE Exit 36 or further west needs one or two drivers. Rich, Ext. 4134.

PLAINVIEW - Exit 43, LIE, 4th driver needed. Elliott, Ext. 2495.

Real Estate

Real Estate advertised for sale or rent is available without regard for the race, color, creed, sex or national origin of the applicant.

For Rent

BELLPORT VILLAGE - 1-bdrm. apt., upstairs, kitchen-l/r combo, full bath, w/w carpeting, $675/mo. all. + 1 mo. sec., single, nonsmoker, no pets. Jim, 758-0393 after 6 p.m.

CALVERTON - 2-bdrm. townhouse, 1½ baths, w/w, appl., patio, deck, $750. 878-0874 after 5 p.

CENTER MORICHES - 1 bdrm. apt., upstairs, unfurn., 10 min. to BNL, priv. ent., kitchen-l/r combo, full bath, w/w, $550/mo. includes all, 1 mo. sec. Mike, Ext. 4028 or 924-5231.

EAST MORICHES - 2-bdrm. apt., ground floor of Victorian house, bath, kit., d/r, l/r, large yard, 3 blocks to bay, shops, school, $710/mo. + util. Mona, Ext. 5056 or 878-9384 eves.

EASTPORT - 3 bdrm., 2½ baths, 2,000 sq. ft. home, large porch, water view, 1 acre, gar., 5 appl., furniture avail., ready July 1. Ray, Ext. 2012 or 325-0928.

HOLBROOK - 1-bdrm. apt., kitchen-l/r combo, bath/shower, w/w, priv. downstairs ent., $575/mo. includes all + 1 mo. sec. A. Romano, Ext. 4024 or 472-0430 after 6 p.m.

NORTH SHIRLEY - 2½ rm. apt., furn., priv. ent., newly decorated, 1 person only, nonsmoker, no pets, 5 min. from Lab and stores, $500/mo. pays all. 281-8044.

SELDEN - Village in the Woods, 1 bdrm. co-op, upper unit, eik, d/r, l/r, pvt. balcony, ask. $725/mo. w/1 mo. sec. 696-5386.

RIDGE - 1-bdrm. apt., l/r, kit., pvt. driveway, yard w/deck, 5 min. from Lab., $625/mo. includes all + 1 mo. sec. 924-0577.

SMITHTOWN/COMMACK - spacious studio, eik, full bath, a/c, cable, $500/mo. all or $400 w/some housecleaning. Ext. 2830 or 543-0487.

SPRING HILL, FL - on Lake Theresa, 2-bdrm. ranch, 2 baths, $550/mo. + util., lease for year, fish, swim, boat. 261-2719 after 5 p.m. 261-2719.

For Sale

BROOKHAVEN HAMLET - 3-4 bdrm. 2 baths, l/r w/fp, Jennaire, d/w, d/r w/atrium door, fam. rm, walk-in closets, new roof, vinyl siding, igp, walk to water, schools, parks, $144,900. Jan, 286-3623.

CENTERPORT - 200' waterfront on Northport Harbor, dock, 4-5 bdrm., 4 baths, 0.6 acre, $595,000. Bob, Ext. 4044 or 261-3890.

CORAM - Tanglewood Hills, 4-bdrm. ranch, 2 baths, 2-car gar., huge attic, gas heat, fenced, sewers, new carpet & paint, $130,000. Ext. 3791 or 928-7154 after 7 p.m.

EAST MARION - beautiful 1 acre building lot, adjacent to Greenbelt. 325-0447.

EAST MORICHES - 5-bdrm. country home, formal d/r, kitchen, l/r, fam. rm., 2 full baths, laundry rm., greenhouse, large screened porch, near water, reduced to $225,500. 878-2452.

MASTIC - 3-bdrm. ranch, 2 baths, fenced ½ acre, 2 car gar., close to LIRR, low taxes, city water. Ext. 3506 or 281-2002.

MATTITUCK - 2 bdrm., full bsmt., gar., deck, porch, walk to beach, near marina, $185,000. Dave, Ext. 5460.

MATTITUCK - 3-bdrm. house, 1½ baths, fin. bsmt. w/fp, bar, ¾ acre, low taxes, $134,000. 298-8537.

MIDDLE ISLAND - Coventry Manor, 3-bdrm. townhouse, 2 baths, kit., l/r, d/r, laundry rm., cac, 5 appl., patio, pool, tennis, carpet, ask. $102,000. Rosalie, Ext. 3160 or 289-5704 after 5 p.m.

MIDDLE ISLAND - Lake Pointe, 2 bdrm., l/r-d/r combo, all appl., cac, gas heat, hot water, wood deck off master bdrm., pool, tennis & clubhouse, cul-de-sac, asking $77,500 neg. Bob, 924-7316.

PORT JEFFERSON - Harbor Hills, 3 bdrm., 2½ baths, 2 kitchens, d/r, l/r, fam. rm., den, fin. bsmt. w/sep. ent., in-law suite, 2-car gar., priv. beach, country club. 331-7350.

RIDGE - 3-bdrm. townhouse, 1½ baths, cac, w/w, all appl., upstairs newly carpeted, encl. redwood patio, storage room, low monthly main., 5 min. to Lab, price reduced to $93,000. Mary, 924-4328.

SELDEN - Village in the Woods, 1-bdrm. deluxe co-op, upper unit, eik, d/r, l/r, pvt. balcony, ask. $72,000. 696-5386.

SETAUKET - custom house, 3-4 bdrm., deeded beach rights, 3VSD. 473-4666.

SHOREHAM - 3-bdrm. Colonial, 1½ baths, l/r w/fp, d/r, eik, den, fin. bsmt., work rm., gar., low taxes, $169,000. Peter, 821-9513.

WADING RIVER - 5-bdrm. multilevel contemp., wooded acre, skylights, cathedral ceilings, sunroom decks, pool, gourmet kitchen, jacuzzi, fp, 3-rm. rental apt., red. to $196,000. 283-0155.

HUBBARDTON, VT - 38 deeded acres situated on town-maintained road w/power and telephone, largely wooded w/view of Lake Bonsoseen, ask. $39,000, neg. Tom, Ext. 2823.

Wanted

BABY'S CAR SEAT - for toddler. 924-4181.

TRAINS - Lionel & American Flyer, priv. collection, pays top $. Carole, Ext. 7100.

HOUSE TO SIT - free, reliable, caring, exp., any period after July 20, vacation free of anxiety. J. Allentuck, Ext. 2412.

SLIDE PROJECTOR - Kodak Carousel 800 35mm w/zoom lens. Wick, Ext. 7527.

COLOR TV - large screen, 25", needed for shut-in, reasonable. 744-9802.

BABY-SITTER - for 8-yr.-old girl, Saturday eves, must be responsible, Holbrook area. 567-7752 after 6 p.m.

SAXOPHONE - alto for student. Dan, Ext. 4597.

VIOLIN - ¾ size, reasonable, for intermediate ability student. Ext. 7707.

WITNESSES - to damage done to yellow Datsun sta. wagon, parking lot in front of Photography, Tues., June 26. Call Police Group, Ext. 2238.

Ads left out of this issue due to lack of space need not be resubmitted to appear in the next issue.