BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

Promising Research on Foot-and-Mouth Disease

If you ask a Vermont dairyman what he thinks about foot-and-mouth disease (FMD), he'll tell you not much, because he tries not to think about it. Though there is an effective vaccine and FMD has been eliminated from the United States, most of the world's beef and dairy cattle-producing countries are still plagued by it. A plague of FMD means economic disaster for livestock owners, for the disease is controlled by destroying infected and exposed herds.

In the search for a safer FMD vaccine, Biology Associate Soliman Bakr

Peter Horton

Soliman Bakr

is looking for immunologically active parts of the FMD virus. Working at BNL and at the U.S. Department of Agriculture's Plum Island Animal Disease Center, he has so far had promising results with a string of 15 of the 212 amino acids of a protein making up part of the coat surrounding the virus.

FMD is an acute, highly contagious viral illness that affects domesticated and wild cloven-footed animals. As its name indicates, FMD affects the feet and mouths of its victims, causing sores, lameness and anorexia. There is a high incidence of spontaneous abortions and a fifty percent death rate among young animals.

In countries where the disease occurs, livestock are vaccinated with chemically inactivated virus. However, the vaccine itself has been implicated in FMD outbreaks: Live virus either accidentally escapes from laboratories where vaccines are produced, or is administered in batches of incompletely inactivated vaccine. Therefore, a safer FMD vaccine is needed.

The FMD virus is a single strand of RNA enclosed in a protein coat. The protein coat contains 60 copies of four protein chains of amino acids. Previous research at the Animal Disease Center showed that one of the four chains, called VP_1, plays a major role in the induction of the immune response in infected and vaccinated animals.

The 212 amino acids making up the VP_1 chain were determined in order, and further study showed, more specifically, that a region near one end of the chain produces immunity to the disease.

"We want to produce synthetic vaccines using particular sequences of amino acids that are immunogenic," Bakr explains. Though he and his colleagues have not yet found all the exact sites, a sequence of amino acids 150 through 157 has been found to be immunologically active. To examine possible antigenic sites of viral protein, Bakr chemically synthesizes specific sequences of short peptides at BNL, where he works closely with Biologist John Dunn.

"The synthesis of these short peptide sequences is done manually, and it is a tedious process," admits Bakr. To synthesize a sequence of ten amino acids requires most of a week. After the peptide is refined and analyzed, it is ready to be used in studies to test its immunogenic response.

How does Bakr decide on which sequence of the 212 polypeptide amino acids to synthesize?

"We are looking at an area of the protein coat VP_1 polypeptide that varies in the different FMD viruses," explains Bakr. There are seven immunological types of FMD virus, and Bakr works mostly with what is called type A. The subtypes of each type bring the total of FMD viruses above 65. There are a few areas of VP_1 that vary among the types, and this varia-

(Continued on page 2)

Mort Rosen

Meeting outside Berkner Hall between sessions of the ICFA workshop on Superconducting Magnets and Cryogenics are (from left) Art Greene, chairman of the local organizing committee; Per Dahl, scientific secretary for the conference; Pat Tuttle, workshop secretary; Paul Reardon, chairman of the U.S. delegation to the ICFA panel; and Giorgio Brianti, chairman of the ICFA panel sponsoring the workshop.

Cooperating on a Super Scale

Usually, meetings of the International Committee on Future Accelerators (ICFA) are attended exclusively by scientists from laboratories and universities. But the ICFA Workshop on Superconducting Magnets and Cryogenics, held in Berkner Hall all this week, is unusual. Fifty percent of its 120 participants hail from industry.

Giorgio Brianti, chairman of the ICFA panel sponsoring the workshop, explained that the industrial participation is a logical outgrowth of a general explosion of uses for superconductivity over the past few years.

Superconductivity refers to the fact that, at temperatures near absolute zero on the Kelvin scale, some metals and alloys lose all resistance to electricity, becoming what are called superconductors. Though this principle was discovered in 1911, it has only gradually come into its own as an energy-boosting, cost-saving technology. In high energy physics, says Brianti, "it has been used primarily for detector magnets, or things related to detectors. In recent times, however, it is being used more and more for developing equipment for accelerators."

This equipment consists largely of superconducting magnets for high-energy proton accelerators. Physicists at CERN, the European high energy physics lab, where Brianti is technical director, are concentrating on superconducting radio frequency cavities to accelerate the particles in LEP, an electron-positron collider now under construction. But whatever the focus, superconducting technology has become an everyday practice at many high energy physics laboratories. BNL, Fermilab and Lawrence Berkeley Laboratory in the U.S., DESY in West Germany, KEK in Japan, Serpukov in the U.S.S.R., and CERN are all turning to industry for help in meeting the need for superconducting cable, cryogenic equipment and assembly line techniques.

If the demand were simply in high energy physics, perhaps industry would not be so responsive. But superconductivity has also become important to other fields, such as nuclear magnetic resonance, free electron lasers and fusion studies. Says Brianti, "Most of the industries represented here are active in all these fields. Developments in one field affect others, and the basic costs of development are shared among all."

Brianti sees this as a positive trend and predicts, "There will always be a close collaboration between laboratories and industry because superconducting magnets are not items that you buy in supermarkets."

In order for industry to do the job for the laboratories, however, there must be standardization. This is particularly critical in terms of measuring magnet performance. Explains Brianti, "It's important for industry to know that everyone is going to measure all design features in the same way." Because this topic is so critical, one of the five workshop sessions is devoted to accelerator magnet measurements. Other sessions have focused on general features and present status of magnets, superconductor development, magnet design and construction, and cryogenics.

The seeds for this workshop were planted about five years ago at an ICFA meeting held at Serpukov. As Brianti recalls, "There were about 30 laboratory people there, no industry. The issue was, 'Is it possible at all to make a large superconducting accelerator,' because none existed. And we

(Continued on page 2)

bnl Lecture: Neutrons Tell a Story

Neutron crystallography has been central to many areas of chemistry, such as the study of hydrogen bonding; the development of highly precise models for the amino acids, for nucleotides, for other important constituents of biological macromolecules; and an explanation of the bonding between hydrogen and transition metals. In the case of transition-metal hydrides, for example, the detailed geometries of hydride ligands have been determined in about 50 different compounds, some of which are models for important intermediates in catalytic reactions.

In his Brookhaven Lecture, "What Can Neutrons Tell Us About Molecular Structure?" crystallographer Thomas Koetzle, Chemistry Department, will illustrate these contributions to chemistry with the results of studies carried out at Brookhaven. The lecture will be given in Berkner Hall on Wednesday, May 21, at 4:30 p.m.

Brookhaven has sophisticated equipment available for crystallographic studies. They include two fully automated spectrometers at the High Flux Beam Reactor (HFBR) and an x-ray station at the National Synchrotron Light Source (NSLS). As part of the proposed expansion at the HFBR, Koetzle says they plan to replace one of the spectrometers with new equipment, which would make intensity measurements up to an order of magnitude faster than at present. In a number of current research projects, x-ray data from the NSLS will be combined with neutron measurements from the HFBR to give complementary information on molecular and crystal structure.

Thomas Koetzle joined the staff of the Chemistry Department in 1970 as a Research Associate and now holds the rank of Chemist. He received a B.A. in 1964 and a Ph.D. in chemistry in 1970, both from Harvard University. His research interests are centered on the applications of neutron and x-ray diffraction to the analysis of molecular structure and bonding.

All those interested in getting together after the lecture are invited to go with the lecturer to a restaurant

Mort Rosen

Thomas Koetzle checks some experimental equipment at the HFBR.

off site. If you want to be part of this group, call George Rabinowitz, Ext. 7637.

Inside Info

At its annual conference in April, the Long Island Section of the American Society for Quality Control gave its McGrady-Seifer Award to **Marvin Shear,** BNL's Quality Assurance Manager. Shear was cited for his outstanding contributions to the Section in education, management, interaction with other professional organizations and the dissemination of developments in technology. In addition, he was chairman of the Program Committee for four years, and the professionally significant programs he presented were credited with helping increase the Section membership by more than 30%. The Long Island Section of the Society has over 1,000 members.

Equipment Demo

On Monday, May 19, from 10 a.m. to 2 p.m., representatives from Tandy/-Radio Shack Computer Division will be in Berkner Hall to demonstrate their MS-DOS line of Micro Computers. Models featured will be Tandy 3000 HD, 1200 and 1000 computers.

Arrivals & Departures

Arrivals

Stephen L. Dewey ..... Chemistry
Ronald F. Lankshear ..... DNE
Peter P. Sobik ..... Plant Engrg.

Departures

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

William A. Danaher ..... Central Shops
Sharleen T. Galbraith .. Cont. & Proc.

Addled Addresses

Brookhaven Na Tiona
Brook Cabin National Laboratory
Brookhaven Nat'l Bank
Brookhaven Nail
Brook Havez Laberation
Union Underwear Inc.
480 Brookhaven
Upton, N.Y. 11973.
Britt Harmon National

Note to Diners

The cafeteria will be closed on Saturday, May 17. On that day, snack bar service will be available from 9 a.m. to 2 p.m. at the Brookhaven Center.

Mort Rosen

Nobel laureate Jerome Karle, Naval Research Laboratory, came to Brookhaven last week to give a seminar in chemical sciences on "Anomalous Dispersion and Isomorphous Replacement: Some New Insights." It was an occasion looked forward to by scientists and by his daughter, Louise Hanson, who is a chemist in the Department of Applied Science. Here, father and daughter discuss Karle's talk and their respective research.

A Country Doctor Reminisces

After nearly 70 years as a physician, Emma Bellows has participated in the changes in the practice of general medicine and in the life of a Long Island "country" doctor. General medicine has become a speciality called family practice, and Hampton Bays, where Bellows was born in 1896 and had practiced until ten years ago, has become suburban. During these years, Bellows has helped change the perception of women in medicine by being the first woman physician on eastern Long Island.

In a lecture entitled "Women in Medicine & Medicine on Long Island," Bellows will tell about the changes and about her life as a physician. She will speak at 2 p.m. on Tuesday, May 20, in the Hamilton Seminar Room, Chemistry Department. The talk, which is sponsored by Brookhaven Women in Science, is open to the Laboratory community. Coffee will be served after the lecture.

In her book, Memoirs of a Town & Country Doctor, Bellows describes her father as an uneducated bayman who fished for cod in the winter and was an oysterman in the spring. To supplement the family income, Bellow's mother started a boarding house for people from New York City.

Notes Bellows, "I enjoyed the boarders. There was one doctor, Dr. August Wiegand, and his wife and two children, who came year after year, and he was particularly nice to me. I think it was then that I thought I would like to be a doctor. I had no way of knowing that medical schools were not open to women. Nor did I know that it took a lot of money to be a doctor."

During her high school years in Southampton, Bellows met a couple who had been missionaries in China. "The wife told us the most thrilling stories of life in China and, among other things, about the great need for doctors. It was then that I decided to be a doctor, but I didn't know how. I kept it to myself. I didn't dare tell my mother because she would laugh at the idea."

In her senior year, Bellows finally told her, and her mother didn't laugh, but offered to pay for her daughter's tuition for medical college — if she could find one that accepted women and get in to it. After high school, Bellows attended the New York Medical College for Women, from which she was graduated in 1918.

She began her internship at the Norwegian Hospital in the Bay Ridge section of Brooklyn, riding an ambulance to attend victims of the 1918 Spanish influenza epidemic and the worst subway accident in New York City history. After completing her internship at the New York Hospital for Women, Bellows joined the practice of one of her medical college professors, another woman physician, in the Highbridge section of the Bronx. She spent her first year using the trolley and subway to make 15 to 25 house calls a day.

Six years later, Bellows declared, "I am going to get out of this city somehow. I was so tired of medicine in New York that I said if I can't make a living practicing medicine in the country, I can get a job waiting on tables or something." Bellows didn't have to take a waitressing job: She established a successful practice in Southampton in 1943.

— photo by Newsday

Emma Bellows

She officially retired in 1976, but still makes house calls for patients her own age. She was named Distinguished Citizen of the Year by Southampton College in 1978.

A luncheon in Bellows' honor will be held before the lecture at noon, in Room B, Berkner Hall. If you wish to make reservations, please call Ext. 3541.

ICFA Meeting (Cont'd)

are rather pleased to see that five years later there is a machine at Fermilab and there is talk about a much larger machine."

The Fermilab machine is the Tevatron, which is now operating as a fixed target accelerator at an energy of 800 billion electron volts (GeV), with a goal of 1000 GeV, or one trillion electron volts (TeV). A second superconducting ring will convert the Tevatron into a 2 TeV collider, by about 1987.

The much larger machine is the proposed Superconducting Super Collider (SSC), which would have an energy of 20 TeV. BNL is involved in developing superconducting magnets for the SSC, as well as for RHIC, a relativistic heavy ion collider proposed for the Lab. "That's why the workshop was held here," Brianti says. "There's so much going on in the magnet development area and we wanted the industrial representatives, in particular, to see that."

In addition, BNL is involved in a collaboration with DESY, which is building an electron-proton collider called HERA, to share magnet resources. The U.S.S.R. is also building a superconducting accelerator, a fixed target machine called UNK, which will reach energies of 3 TeV. Eight physicists from the Soviet Union shared their experiences with UNK at the workshop.

Another machine under consideration is the LHC, the large hadron collider that CERN is proposing to build in the LEP tunnel, which, says Brianti, was built with the idea that one might want to add another ring someday. If this possibility becomes a project, he says, "it could be built in five years. The tunnel and all the injectors are already there."

Brianti has a good feel for these things because, he says, "I am really an accelerator man. I have built accelerators all my life." He started in the early 50's, with CERN's PS, the proton synchrotron that was the equivalent to BNL's Alternating Gradient Synchrotron. In later years, he worked on a booster to increase PS intensity ten times, built all the experimental areas for CERN's 450 GeV Super Proton Synchrotron Collider, and has been in charge of the machine itself. Now he's more into the administrative end of things, but hopes to return to the technical arena someday.

In the meantime, being chairman of the ICFA panel helps him keep abreast of the fast-breaking changes in his field. Since it was officially organized in 1984, the panel's main activity has been setting up this workshop. Though it may seem difficult to organize a meeting an ocean away, Brianti says it was no problem. "Essentially, we did it all by telefax. And I found wonderful people at BNL like Art Greene and Per Dahl, who did it all."

And the workshop is doing exactly what Brianti says it is intended to do: provide an opportunity for an open exchange of information about superconducting magnets and enhance the collaboration between different groups from all over the world. The participants are receptive to this, says Brianti, because "in this field, we have good cooperation, even if we sometimes have competing projects. It's a very open field."

— Anita Cohen

Animal Disease (Cont'd)

tion involves the binding of antibodies against the different types of FMD virus.

"In selecting a segment for synthesis, another thing we look at is how likely that area is to be exposed," continues Bakr. "The more hydrophilic the amino acid, the more likely it will be on the outside of the protein coat and be involved in binding to animal cells and antibodies against the virus."

Experiments performed to assess peptide segments are done on Plum Island because they involve the FMD virus or parts of the virus. In what is called a competition-binding assay, Bakr's peptide sequence is mixed with antibodies that are known to bind with the virus itself. The virus is then added, and if the peptides inhibit the virus from binding with the antibodies, then that particular sequence mimics an immunogenic site of the virus.

"A sequence 150-164 did inhibit the virus from binding," reports Bakr. "Animals will be inoculated with these peptides in experiments in the near future."

In such experiments, guinea pigs or rabbits are injected with Bakr's particular sequence of amino acids. The antibodies the animals produce against this peptide are tested to see if they bind to the virus itself. The peptide sequence responsible for FMD immunity to the disease would cause the production of antibodies capable of neutralizing the virus.

Bakr performs the assay work at the Plum Island Animal Disease Center, in conjunction with Molecular Biologist Douglas Moore. Previous work on FMD on Plum Island was carried out by Dory Hardy, Edward Whittle and JoAnne Mugavero, now of the BNL Biology Department.

In 1954, Plum Island was transferred to the Department of Agriculture to establish a diagnostic and research laboratory to study FMD and other foreign animal diseases that would endanger the livestock of the U.S. and cause significant economic consequences if outbreaks were to occur in the United States. The laboratory was opened in 1956 on Plum Island. Studies on FMD include laboratory research, such as Bakr's, and trials of vaccines and diagnostic procedures.

Like Camp Upton, Plum Island was used as a training camp for World War I and II recruits. In the 1890's, the U.S. Government purchased the island, which contains 840 acres, is about 1.5 nautical miles off the northeastern end of Long Island and had been named for the beach plums along its shores. Farmers and sheep herders had owned the island since 1659, when it was purchased from Wyandanch, sachem of the Montauk tribe.

— Marsha Belford

Spring Splendor

...Nothing can bring back the hour of splendor in the grass, of glory in the flower. — *William Wordsworth*

The Hospitality Committee will celebrate the splendor of spring and the glory of May flowers for two hours at its annual Tea and Sherry Party. The theme is "Spring Splendor," and many varieties of herbs and plants, including orchids and bonsai trees, will be on display. Master gardeners will be there to answer any questions, and a slide show about Long Island wild flowers and pamphlets on different plants and gardens will be offered. All this will take place on Tuesday, May 27, from 3:30 to 5:30 p.m. in the North Room, Brookhaven Center.

Tea and sherry will be served, as will coffee, homemade breads and cookies, and fresh vegetables and dips. Spouses of Laboratory employees and guests are welcome. Babysitting will be provided free of charge at the Gym, Bldg. 461, 3 Center Street.

N.Y.C. Train Trips

The LIRR trips to New York City are sponsored by BNL and organized by Adrienne Usher, a member of the Hospitality Committee. The trips are scheduled for the first and third Wednesdays, of every month. In a month where there is a fifth Wednesday, a trip will be scheduled for that day. Saturday trips are scheduled on the last Saturday of every month; however, during December additional trips will be made. Although we travel into the city as a group, you receive individual return-trip tickets. You may return on any train the same day, including the train at midnight.

Tickets are sold on a first-come, first-served basis. The fare for the Wednesday trips is $5.25/ticket; Saturday trips are $6.75. Children under five years of age ride free. Make your reservations by sending a check (made out to BNL or Cash) to BNL, P.O. Box 322, Upton, NY 11973. For the Wednesday trips, checks must be received by the Friday preceding the trip; for the Saturday trips, the checks must be received by the Thursday preceding the trip. Put your telephone number and the date of the trip on the back of the check. Please send a separate check for each trip. Your reservation is made when your check is received. If you would like to have a confirmation of receipt of your check, please enclose a self-addressed, stamped envelope.

Departure: Patchogue LIRR Station: Wednesday, 7:55 a.m.; Saturday, 9:08 a.m. You should be at the station 15 minutes before departure time.

Trips for the remainder of 1986 are:

Wednesdays	Saturdays
May 21	May 31
June 4, 18	June 28
July 2, 16, 30	July 26
August 6, 20	August 30
September 3, 17	September 27
October 1, 15, 29	October 25
November 5, 19	November 29
December 3, 17	December 6, 13, 27

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Lab Tests Suspended

Effective immediately, personal medical tests performed at BNL as a service to employees, have been temporarily suspended. These include such tests as blood analyses, cardiograms, and x-rays, which have been ordered by an employee's physician. The reason for the suspension is that some offices and labs in the Medical Department will be undergoing modification in the next couple of months. The free testing service will resume when the work is completed.

Theater Group

The BERA Theater Group will hold its May meeting in the North Room of the Brookhaven Center on Wednesday, May 21. Socializing begins at 7:30 p.m.; the business meeting will be at 8 p.m. The program will include readings from one-act plays under consideration for a summer production. Members of the Laboratory community are invited to attend. For further information, contact Karl Swyler, Ext. 7171.

Softball

League I
Games of May 6

Phoubars	5	Moles	3
Dirty Sox	9	Six Pak	8
A-Team	10	Cool 'n Gang	8

League II
Games of May 7

Magnuts	12	Binary Bombers	3

League III
Games for week of May 5

Kidz-R-Us	8	Septembers	7
Turkeys	11	Who Cares	10

League IV
Games for week of May 5

Foul-Ups	13	Underalls	4
Who's on First	20	No Feedback	10
Sandboxers	18	Mudville Sluggers	5

Bowling

Red/Green League

High games were bowled by F. Griswold 231, R. Larsen 226/219/625 scratch, J. Morris 222, H. Marshall 218, D. Jesaitis 213, R. Jones 208.

Cafeteria Menu

Week of May 19

Monday, May 19		
Cream of spinach soup	(cup)	.65
	(bowl)	.85
Baked herbed chicken w/ 1 veg.		2.45
Hot vegetable plate (lite weight)		2.25
Baked ziti w/ garlic bread		2.45
Hot Deli: Corned beef	(bread)	2.35
	(roll)	2.35
Tuesday, May 20		
U.S. Senate bean soup	(cup)	.65
	(bowl)	.85
Pot roast of beef w/ potato pancake		2.45
Broiled fish w/ 1 veg. (lite weight)		2.55
Hot vegetable plate (lite weight)		2.25
Hot Deli: Sloppy Joes		2.35
Special at Hot Deli Area		
Top your own potato		1.50
Wednesday, May 21		
Tomato Rivé soup	(cup)	.65
	(bowl)	.85
Baked pork chop w/ cornbread dressing		2.45
Cheddar & spinach quiche w/ 1 veg.	(lite weight)	2.45
Hot vegetable plate (lite weight)		2.25
Hot Deli: Turkey garden club		2.45
Thursday, May 22		
Garden vegetable soup	(cup)	.65
	(bowl)	.85
Lasagna with garlic bread		2.45
Shrimp & broccoli stir fry		2.45
Fruit plate w/ yogurt (lite weight)		2.35
Hot vegetable plate (lite weight)		2.25
Hot Deli: Baked Virginia ham	(bread)	2.35
	(roll)	2.45
Friday, May 23		
New England clam chowder	(cup)	.65
	(bowl)	.85
Turkey tetrazzini w/ 1 veg.		2.45
Spinach pasta w/ lite style sauce		2.45
Fresh vegetable plate w/ pita	(lite weight)	2.25
Hot Deli: Fried clam boat		2.35

Tick Talk

Apparently ticks have already put in an appearance at the Par Course, so it is time to issue the annual warning. For the benefit of some of our foreign visitors, ticks are small hard-shelled creatures who like to feed on blood and, when fully engorged, resemble coffee beans. They are found in the woods and in the tall grass.

If you notice a tick crawling around you, remove it with blunt tweezers. If it has already bitten, use blunt forceps to grasp it at the point of attachment and pull it straight out. Do not leave any part of the tick embedded in the skin.

The American Dog Tick is responsible for Rocky Mountain spotted fever and the Northern Deer Tick can cause Babesiosis and Lyme Disease. Not all ticks carry disease, and most people do not suffer any illness as a result of a tick bite. However, if a rash, fever or general run-down feeling results after a tick bite, see a physician.

Two types of insect repellents protect people against ticks that transmit Lyme Disease: those containing 0.5 permethrin and 30% DEET. And don't forget to wear protective clothing when hiking in the woods or running in the fields.

Food Drive For Needy

Monday, May 19 through Sunday, May 25, is Long Island Hunger Awareness Week and, in observance, the Town of Brookhaven is conducting an in-house food drive. As a participant in the drive, the Laboratory will set up containers in the BERA Sales Office for the receipt of **canned goods,** which will be distributed to Brookhaven's needy citizens. The Sales Office is open from 9 a.m. to 2 p.m. and contributions from employees will be accepted through May 29.

BNL is a member of a steering committee, called Interface, which is a partnership between the Town of Brookhaven and various local businesses and corporations to provide services for the needy through the volunteer efforts of its members.

I.B.E.W. Meeting

Local 2230, I.B.E.W. will hold its regular monthly meeting on May 19 at 6 p.m. in the Knights of Columbus Hall, Railroad Avenue, Patchogue. On the agenda will be regular business, committee reports and the president's report.

The Magic of Science

Every student was a winner at the 35th State Science Congress held at the Lab, May 8-10. After presenting their scientific research, ten science students were awarded plaques for highest honors, eleven received high honors and eleven others honors. In addition, there were thirteen categories of special awards, so many students went home with more than one prize.

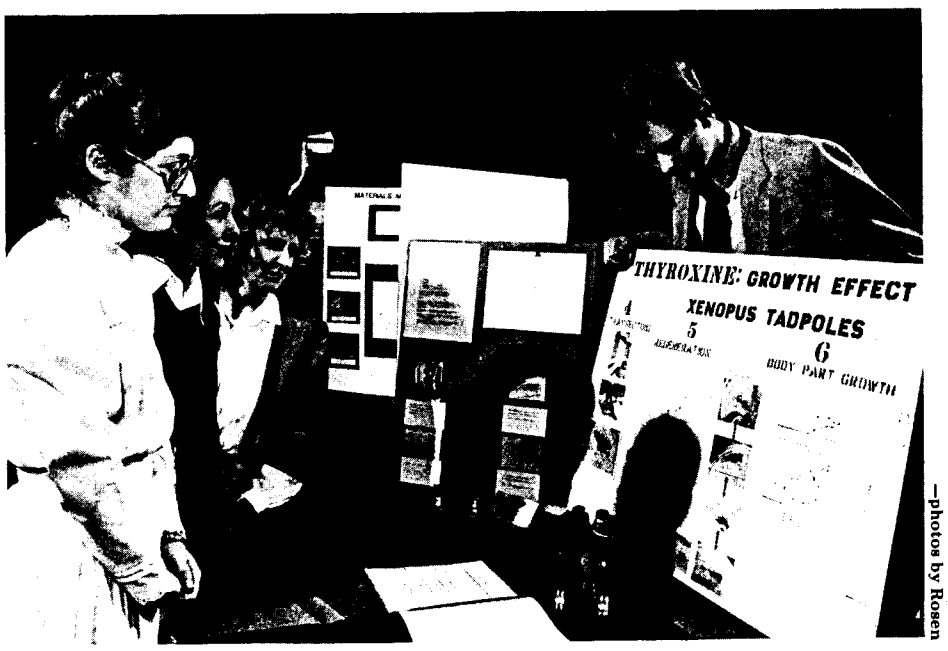
Twelve BNL scientists and four from SUNY at Stony Brook judged the presentations of the 32 high school students from around the state. The future scientists, winners of regional competitions, gave ten-minute presentations on their research projects and answered questions for five minutes. The projects included "Biological Sensitivity to Ionizing Radiation," "Heat Transfer Experiments Using Taguchi Fractional Factorial Designs," and "Eat and Learn."

Bilal Khan's project was on Celestial Motion.

The judges from BNL were: Daniel Benz, Medical; Russell Dietz, Department of Applied Science (DAS); Arokiasamy Francis, DAS; Francis Healy, Safeguards & Security; Norman Holden, Department of Nuclear Energy (DNE); Ruth Kempf, DNE; Clovis Linkous, DAS; Robin Leonard, Biology; Edwin Popenoe, Medical; James Vaughn, DAS; Avril Woodhead, Biology; and Martin Zucker, DNE.

After the presentations on Friday, the students were treated to unique and exciting demonstrations of scientific principles combined with some "real" magic. This "Magic of Science" was conjured up by Benz, Kempf, Krishnan, Bill Lynch and Nancy Lynch. Saturday, BNL tour guides ushered the students around the site.

The Science Congress is an annual activity of the Science Teachers Association of New York State, and was directed by Research Collaborator Chirakkal Krishnan, DAS, and co-directed by Donald Metz, head of Office of Educational Programs. The Lab last sponsored the State Science Congress in 1978.



—photos by Rosen

Keith Freer, Fayetteville Manlius High School, shows his project to visitors at the Science Congress.

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 present Laboratory employees.

2433. GENERAL COMMUNICATIONS CLERK - Performs semi-routine communications service duties including incidental typing, maintenance of office records and files, processing of mail and other office functions. Staff Services Division.

2434. SPECIAL SERVICES ATTENDANT - Performs various service duties in connection with conferences, meetings and special events. Staff Services Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

2435. MECHANICAL DESIGNER (HVAC) - Requires AAS in mechanical technology or equivalent. In addition, a minimum of five years' experience in the design of HVAC systems and related ancillary equipment is necessary. Duties include drafting, field investigation and specification writing. CADD experience is highly desirable. Plant Engineering Division.

2436. PROGRAMMER ANALYST - Requires BS in computer science or a relevant field or the equivalent background and 2-3 years' pertinent experience. Will manage the dedicated Protein Data VAX computing system which will include a high-performance graphics work station. Will write and document software for data evaluation and be responsible for implementation of on-line access service. Proficiency in FORTRAN and C is required. Chemistry Department.

Autos & Auto Supplies

74 VW BUG - $500. 331-5411 eves.

71 DODGE CHAMPION - sleeps 6, new shocks, tires, brakes, generator, good cond., $7,000. Henry, 929-4673.

CHEVY TRANS. - 3 spd., low mi., $75. Ext. 3783.

73 COLEMAN YORKTOWN POP-UP CAMPER - sleeps 7, heater, awning, excel. cond., $1,300. Ext. 2886 or 929-4850.

78 SUBARU - new brakes, exhaust, body good, eng. needs work, high mi., $800. 588-9134.

79 JEEP CHEROKEE - 4 WD, quadra track, CB, tape deck, low mi., excel. cond., $4,450. 467-0787 after 6 p.m.

74 CADILLAC - Fleetwood Brougham, fully loaded, p/s, p/b, a/c, am/fm, 4 dr. sedan, 68k mi., $1,975. Fred, Ext. 3259 or 473-8622.

75 GRANADA - 56k mi., a/t, a/c, good tires, excel., $1,300. Ext. 7699 or 821-1435.

74 GRAN TORINO - new brakes, tires, am/fm, 40 chan. CB, p/s, p/b, runs well, $600. Charlie, 289-5216.

82 TOYOTA SUPRA - 5 spd., loaded, garaged, mint, anti-theft device, 30k mi., $9,200. 698-9301.

78 PLYMOUTH HORIZON - high mi., white, 4 dr., h/b, $800. Dan, Ext. 2319.

82 SUZUKI GS750T - 5.5k mi., sissy bar, rack, cover, $1,500. Paul, 698-6895 days.

RIMS - 13", 4 lugs, 14" 5 lugs, 16" 5 lugs. Ext. 2950.

78 DATSUN B210 - runs well, body good, high mi., needs clutch. Doug, 475-6859 before 2 p.m.

76 VOLVO - 264DL, 45k mi., excel. cond. Ext. 3985.

79 YAHAMA 650 - Special, excel. cond., extras, $900. Ext. 2223 or 929-6421.

YAMAHA - 250cc, gold and black, $125. Roy, Ext. 4664 or (212) 691-4396.

82 IMPALA WAGON - big V8, p/s, p/b, a/c, am/fm, stereo, 39k mi., good cond., $5,000. Ext. 4392.

75 SAAB - many new parts, GLE int., am/fm cass., best offer. 744-5079 eves/wknds.

75 PLYMOUTH - Gold Duster, 6 cyl., a/c, good running cond., $550. 924-3236.

DIFFERENTIAL - fits 3/4 Chevy pickup. John, Ext. 2172 or 744-4386.

69 CHEVY MALIBU - new brakes, batt., good running cond., $400 neg. Ben, 473-7681 after 5 p.m.

77 DODGE VAN - 6 cyl., a/t, p/s, p/b, seats 8, excel. in/out, $2,300. 369-0432.

74 MG - $400. Ext. 7633.

77 PLYMOUTH - Trailduster, 4x4, 360 eng., a/t, a/c, p/s, p/b, 76k mi., body bad, mech. good, many new parts, $2,900 neg. Ken, Ext. 2350 or 698-4254.

77 DATSUN B210 - excel. cond., 4 spd., a/c, no rust, new front end, clutch, am/fm, $1,700. 928-4683.

75 FORD GRANADA - 87k mi., stand., excel. running cond., dependable, $595. Ext. 2455 or 331-1432.

66 FORD MUSTANG - convertible, 6 cyl., a/t, good for restoration, $2,100. 589-5490 after 6 p.m.

DATSUN 240Z - good for parts, best offer. Frank, Ext. 2022 or 399-4480.

77 VIKING POPUP - 21', stove, elect. refrig., dual gas tanks, $1,900; 81 BRONCO, auto. locking hubs, 2 sets, 4 WD, $60. Dan, Ext. 4987 or 698-7322.

75 IMPALA - blue, a/c, a/t, p/s, p/b, am/fm, 72.5k mi., body good, recent tuneup, reliable, $875. Ext. 4118 or 928-5714.

78 DATSUN B210 GLX - h/b, a/t, good cond., new trans., $700. Ext. 3954.

78 FORD FAIRMONT - p/s, p/b, a/c, 2 dr., 102k mi., cass., blue, $1,500. Ext. 4805 or 924-8113 eves.

83 NISSAN PULSAR - Ltd. Ed., sedan, p/s, a/c, 5 spd., stereo, 44k mi., mint, $5,300. Ext. 2198 or 744-4662.

78 MUSTANG - 4 spd., 4 cyl., runs well, new tires, $1,400. Ext. 2842 or 3883.

85 SUZUKI MADURA - 700cc, V4, excel. cond., low mi., $3,100. Jim, Ext. 4986 or Joe, 799-5026.

RADIO - Delco, am, fits Chevy pickup, 1973 to 1986, $10. Tony, Ext. 2462.

79 TOYOTA CELICA - 5 spd., sunroof, h/b, am/fm cass., new radiator, 78k mi., $3,100. 567-8609.

82 CHEVY S10 - long-bed pickup, cap, p/s, hd suspension, rust proof, excel. cond., 4 spd., $3,495. 477-0462.

79 VOLARE WAGON - white, 71k mi., p/s, p/b, new a/t, excel. cond., $2,200. Ext. 7505 or 698-8605.

TIRE - 15x78, new, 4 ply, Goodyear on GM rim, $35. Ext. 3312.

SUZUKI GS250t - 10k mi., extras, excel. cond, $649; custom fiberglass truck cap, Toyota short bed, $249. Jack, Ext. 4411 or 929-8287.

67 CHRYSLER - convertible, 383 V8, a/t, p/w, p/s, p/b, new top, seats, am/fm. Tony, 698-9274.

83 TRANS AM - mint in/out, 5 spd., a/c, T-tops, more, $10,495. John, 744-0290.

84 BRONCO II - V6, a/t, 2 tone, am/fm cass., oversize tires, Meyers power angle snowplow, will separate, $9,900. Ext. 3341 or 981-9474.

79 YAMAHA 650 - Special, excel. cond., extras, $900; 71 DODGE CORONET, p/s, a/c, a/t, 4 dr., good running cond. Ext. 2223 or 929-6421.

84 GMC - pickup, 4x4, 4 spd., V6, p/s, p/b, a/c, buckets, cap, 34k mi., excel. cond., $9,000. 368-6704.

75 OLDS DELTA 88 - p/b, p/s, a/t, a/c, am/fm cass., runs well, new tires, $600. Ext. 2337 or 2788.

70 MONTEGO - 1,400 mi. on reb. eng., a/t, new exhaust, front, paint, clean, depend., $500. Dick, Ext. 4289 or 878-2421.

79 TOYOTA COROLLA - a/c, am/fm, good running cond. Mike, 821-9709.

85 CHEVY PICKUP - 8' bed, excel. cond., bronz, $500; 76 Buick Regal Landau, V8, a/t, p/s, p/b, a/c, p/w, runs well, clean, $1,400. Jim, Ext. 4669.

80 OLDS OMEGA - 2 dr., a/t, V6, p/s, p/b, am/fm cass., $2,000. Bill, 472-4684 wknds.

69 NIMROD - popup trailer, needs new canvas, $200. Sam, Ext. 2018 or 928-3568.

76 BUICK REGAL - needs exhaust system, 150k mi., $300. Mike, Ext. 7625 or 924-0341 eves.

83 DODGE VAN - custom L.M., loaded, $13,000. 281-2176 after 4 p.m.

80 YAMAHA 850 - excel. cond., fairing, trunk, 52k mi., $1,495. Al, Ext. 2697.

MUSTANGS - 71 coupe, 6 cyl.; 72 fastback, 8 cyl., many extra parts. Bob, 588-0186 after 6 p.m.

76 FORD GRANADA - clean in/out, $800. Frank Perez, Ext. 3531.

75 DUSTER PARTS - doors, windows, bumpers, grill etc. 924-0960.

Boats & Marine Supplies

TANZER 22 - excel., glass, new sails, roller furling, shoal draft, K/CB, 6 HP Chrysler, $7,700. Ed, Ext. 7943 or 589-3992.

81 ALUMINUM PRAM - good cond., w/oars, $125. Jim, Ext. 4215 or 878-8012 eves.

18' FIBERGLASS GLASTRON - 115 HP Evinrude, galvanized trailer, $2,600. Tony, Ext. 2462.

18' BOWRIDER - 1982, 4 Winns, 90 HP Merc., galv. trailer, low hours, excel., loaded, $7,900. 981-6141.

16' V HULL BOWRIDER - 1983, 4 Winns, 120 HP Merc. cruiser, 15 hrs., full canvases, galv. trailer, power winch, garaged, $7,500. 286-8797.

16' SLOOP SAILBOAT - wood, fiberglass bottom, trailer, anchor, $650. Ext. 3773 after May 13 or 878-8113.

28' OWENS - 327 CI, new hard top & canvas, sleeps 4, eng. needs work, boat in solid cond., $1,500 firm. 281-0360 or beeper 360.

19' EVINRUDE - fiberglass, tri hull, needs outboard motor, $750, w/trailer, $1,250. 732-3707.

17' MANNINO GARVEY - 1979, good cond., 1984 50 HP Merc.; excel. control, mint cond.; 17' Shore Land'r trailer, 1985, mint, $2,800 for all, will sell sep. 654-5437 eves.

22' CATALINA SLOOP - 1982, many extras, excel. cond., in water. Ext. 7518 or 589-5490.

26' PEARSON - 1972, 16 HP Evinrude, 5 sails, incl. spinnaker, DF, VHF, extras. Ext. 4099 or 689-9214.

20' SHARPIE - good work boat, $400. John, 283-8774.

SAWYER CANOE - DY Special, green, w/52" Gillespie paddle, lifevest, tie-down carrier kit, $850. 821-0137.

18' BOAT HULL - fiberglass, deep V w/windshield and steering, very good, $900. 269-9510 after 7 p.m.

84 CENTURY B2000 BR - 170 FWC I/O, full canvas, 8 hrs. on eng., DF, used one season, in water, $8,900. John, Ext. 4255 or 929-4450.

16' DURATECH - alum. runabout, 25 HP elec. start Chrysler, new Dilly trlr., extras, $1,000 neg. Sanchez, Ext. 3848 or 281-6498.

SUNFISH SAILBOAT - multicolored sail w/Shoreline trailer, both excel., $1,100; 1983 trailer, 18'-20', 2,500 lbs., excel. cond., $600. John, 283-8774.

85 YAMAHA - 40 HP, manual controls, Tiller steering, less than 20 hrs., $1,800. John, 283-8774.

Miscellaneous

STEREO SPEAKERS - Audio-Lab, 3 way, 12" woofers, $70 pr.; 27" Fuji 10 spd. bicycle, excel., $150; Marcy incline weight bench, excel., $45; weights, 110 lbs., barbells, dumbells, excel. $45. Otto, 472-0339.

BOY'S BIKE - 16", $20; new folding doors, $30; wood desk, $40; child's bureau, $50; love seat, $75; (2) end tables, $25; infant's car seat, $10. 751-1474.

PIANO - old upright, w/bench, all keys work, needs tuning, $35. Jim, Ext. 4215 or 878-8012 eves.

UPRIGHT FREEZER - man. def., 19 cf, very good cond., $100. John, Ext. 5152 or 281-2471.

SHOWER DOORS - sliding glass, $50; GE stereo w/record player & reel to reel, $100; trash compactor, $50. Ext. 5234 or 286-3377.

HO TRAIN SET - and layout, best offer. Ext. 4192 or 744-2461 after 6 p.m.

TUFTED SOFA - kidney shaped, white & gold, excel. cond., $125. John, Ext. 2050 or 588-6853 after 6 p.m.

DINETTE TABLE - 42" round, (2) 9" leaves, (4) chairs, excel. cond., $125; utility table, 24" x 28", new butcher block formica top, $50. 325-0314.

COMPUTER MONITOR - RGB color, works w/IBM or Commodore, $150. Roy Ext. 4664.

DARK ROOM EQUIPMENT - b/w, color, compl., $750 neg. 878-1873 after 5 p.m. or wknds.

THEATRE TICKETS - (2), "Personals", Minetta Lane Theatre, off Broadway, Sat. eve. May 24, Orchestra seats, orig cost, $32 ea., sell $20 ea. 878-2239 or 878-9035.

PORTABLE DISHWASHER - w/chopping block top, $65. Carol, Ext. 7215 or 363-2268 after 6 p.m.

PROM GOWN - apricot, size 7, excel. cond., best offer. 878-2239.

SEARS GENERATOR - 1800W, 5 HP, $275. John, Ext. 4243 or 924-3492.

RIDING MOWER - Yardman, 25", completely reb. w/new 5 HP eng., $350. Tom, Ext. 4084 or 878-1060.

TRESTLE TABLE - w/benches, (2) chairs, 72" long, $200; air cond., $100; child's rocking horse, $25. Ext. 5234 or 286-3377.

TABLES - (2) end, (1) coffee, honey pine, excel. cond., $175. 289-3667 after 7 p.m.

DANISH COUCH - w/wooden arms, $25; formica stereo cab., $15; Bogen amp; Hedstrom stroller. Josie, 689-9234.

SUNGLASS SAMPLES - semi precious stone, jewelry at wholesale price. Sue, Ext. 3183.

AIR CONDITIONERS - (2), 6000 BTU, $50 & $75; Amana full size microwave oven, $100. Sue, Ext. 2050 or 289-6844.

TRS MOD3 COMPUTER - 48k, 2 dr., RS232, $350; LPVI printer, $250; orig. owner, software and manuals. Larry, Ext. 4295.

LAWN MOWER - 21", 3.5 HP B&S eng., good cond., s/p doesn't work, $50 or best offer. Ext. 7505 or 689-8605.

ANTIQUE KITCHEN RANGE - gas, porcelain/cast iron, $100. Ext. 2022 or 399-4480.

SOFA - excel. cond., $95. Ext. 4192 or 751-7787.

8" TABLE SAW - Atlas Powermate, new motor, extras, excel. cond., $85. 821-0945.

SEWING MACHINE - new Singer portable, w/ attach. Jean, 286-4815 or 286-8698.

HONDA GENERATOR - 120 V, AC, EM2200 W, deluxe, 10 hr. tank, auto. oil, new, $600 or best offer. Cheryl, Ext. 2272 or 732-7634 after 6 p.m.

SUPER 8 MOVIE CAMERA - Bell & Howell, w/power zoom, carry case, $40; maple crib, $40. Sal, Ext. 2460 or 744-9822.

MOVIE PROJECTOR - Bell & Howell, regular & super 8, $50; hammock w/wrought iron frame, $10. Mike, Ext. 4987.

AIR HOCKEY TABLE - $10; VW radio, am/fm stereo, $40. Ralph, 928-6654 after 6 p.m. wknds.

MAXELL DISKS - 5-1/4", ds/dd, new, 10/$10; portable typewriter, $25. Jim, Ext. 3372.

FISHING ROD - Shakespear Ugly Stick, bait, casting, new, $25. John, Ext. 5152 or 281-2471.

11" BOAT - Runabout, $135; mahogany desk, 34x60, needs refinishing, $25; file cabinet, 52" H, $15. 878-6637.

TABLES - end and coffee, heavy colonial pine, new cond. Richie, Ext. 2175 or 734-7342.

TEDDY RUTPIN DOLL - the first talking bear, $75 firm. Maria, Ext. 7692.

FURNITURE - sofa, loveseat, ottoman, blue floral print, like new, $500. Ext. 2875 or 543-4099 after 6 p.m.

ELECTRIC CAR SET - 20' track, many extras; misc. toys & games, ages 5 & up. S. Spark, Ext. 4111.

4 KW GENERATOR - new 8 HP eng., heavy, $375 neg. Sanchez, Ext. 3848 or 281-6498.

IBM TYPEWRITER - Executive model D, full working cond., $400. Jane, 473-8760.

FURNITURE - piano, couch, bed, dressers, tables, chairs, love seat, more, May 24-26. Jayne, Ext. 2178.

GE STEREO - record changer, 8 track, speakers, $25. 751-1884.

STORM DOOR - w/screen, brown, 32"x72", left-hand hinge, $75. 567-5570.

TENNIS RACKETS - (2), Prince Series 125, $125 ea.; (1) Comp., $50.; all gut. Ext. 7130 or 929-8323.

RIDING MOWER - Lawnboy, 30", needs motor, $50; loveseat, $100; 90" sofa, $100; floor polisher, $60. Ext. 4156.

SPICE RACK - w/18 bottles, glass tops, very good cond., $10. Mike, Ext. 2705.

CAMPER TRAILER - 6 pers.; freezer; desk; reas. prices. 281-6099.

HANG GLIDER - Quick Silver B, used once, $350 or best offer. 286-1829.

COAL/WOOD STOVE - Godin, oval, parlor, w/chimney, excel. cond., $350. 286-1829.

Yard Sales

BAYPORT - 298 Gillette Ave., May 16-18, 10 a.m.-4 p.m.

ROCKY POINT - Soundway Dr., Tides N., Sat. May 17, 8 a.m.-4 p.m.

Car Pools

DEER PARK - need people for door-to-door car pool. Chris, Ext. 2326.

Real Estate

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

For Rent

EASTHAM, CAPE COD - 4 bdrm. house, sleeps 8, completely furn., dishwasher, washer/dryer, deck, 10 min. to beach, weeks open in July and Aug. 722-3865.

N. SHIRLEY - furn. studio apt., w/kit., priv. ent., 1 person, non smoker, no pets, 5 min. from Lab/-stores, $400 mo. incl. util., plus sec. 281-8044.

HUNTINGTON - spacious studio apt., full size stove & refrig., priv. ent., wet bar, near shopping & hwys., 40 min. to Lab, $500 mo. 472-2544.

WADING RIVER - furn. house, waterview, newly remodeled, SWR schools, avail. 9/86 to 6/87. Ext. 3822 or 929-6527 eves.

WHITE MTS., NH - 3 bdrms., 2 baths, riverfront condo., cable TV/HBO, fp., priv. deck, view, pool, tennis courts, clubhouse, jacuzzi, near all area attractions, shopping, golf, July/Aug., $425 wk., June/Sept., $390 wk. (914) 232-4039.

RONKONKOMA - near LIE and beach, Connetquot schools, immac., 3 bdrms., l/r, d/r, eik, w/w, $695 mo. plus util. Ext. 2830 or 543-0487.

BERKSHIRES CHALET - 3 hrs. from NYC, 3 bdrms., 2 baths, fully equip. kit., elec. heat, deck w/spectular view, near lake, hiking trails, 1/2 hr. from Tanglewood Theater summer stock. 929-6946 after 6 p.m.

HILTON HEAD, SC - condo, 2 bdrms., beach, pool, tennis, golf, sleeps 6, many extras, $400 wk., Lab only. 585-9149.

LONDONDERRY, VT - chalet on lg. swimming pond, hiking trails, tennis, near lake, canoeing, fishing, golf, theater music festivals, antiqueing, wkly. 757-5599 after 4 p.m.

For Sale

W. SAYVILLE - 3-4 bdrms., Calif. ranch, brick front, 2 full baths, gar., cent. air in house and full bsmt., eik, d/r, l/r, fam./rec. rm., lg. patio w/outside shower, all appl., w/w, extras, mint cond., walk to golf course and bay, $146,900. 589-2681.

RIDGE - 1 acre bldg. plot, 100'+ x 400'+, 80% cleared, 20% wooded, ready to build, $49,500. 924-3236.

OAKDALE - Idle Hour section, near water, 2-story Tudor, 4 bdrms., 2 baths, garage, attached full apt. w/priv. ent., located on 1/2 acre on dead end st., $210,000. 363-6940 eves.

Wanted

HOUSE TO SIT - free, exp., rel., caring, any duration after 6/27. Jack Allentuck, Ext. 2412.

CAMPING EQUIPMENT - gas stoves, grills, trailer for new Boy Scout Troop. Ext. 5289.

DOOR - to fit 68-72 Chevy pickup, left side. John, Ext. 2172 or 744-4386.

OUTBOARD MOTOR - 2-5 HP for 16' Daysailor. George, Ext. 5288 or 878-8177.

SUMMER HELP - room, board, sm. salary, light housework, child care, Shoreham on Sound. Ext. 3401 or 744-6229.

PORTABLE CRIB - V. Stone, 589-5200, Ext. 219 M/W/F.

FEMALE HOUSEMATE - 2 bdrms., Mt. Sinai area, immac. house, 1-1/2 acres, quiet area, furn., all util. & cable TV, $475 mo. plus sec. 473-6432.

HOUSE TO RENT - 7/4 — 8/4, 2 bdrms. min., near Lab or Stony Brook, visiting Professor. Dr. Liu, 246-6108 or 751-3540.

FEMALE HOUSEMATE - own room, 6 mi. from Lab., $250 mo. incl. all. Pat, 281-0973 eves./wknds.

HOUSE TO RENT - in SWR school dist., needed by fam. of 4, June-Jan., or summer. Per, Ext. 5125 or 744-2275.

RIMS - 950x16.5 for Ford F250, 4x4, 8 holes, need 5 or less, must be good cond. Artie, Ext. 2957.

Free

RABBIT - white, dwarf. Nancy, 821-9547.

BLACK LAB - 2 yrs. old w/lg. dog house. Chris, Ext. 4185 or 698-9116.

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