BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

BNL Lecture: Hunting for Elusive Solar Neutrinos

After any earthly conflagration, the world looks for survivors to tell the story of what happened.

So it is with the ongoing solar conflagration, as scientists search for surviving particles to learn what happens during the intense hydrogen fusion reactions that take place deep in the sun's interior.

Neutrinos are the only particles created that can escape from the sun easily and quickly during these reactions. These elusive particles escape because the probability of their interacting with anything in their path is extremely small.

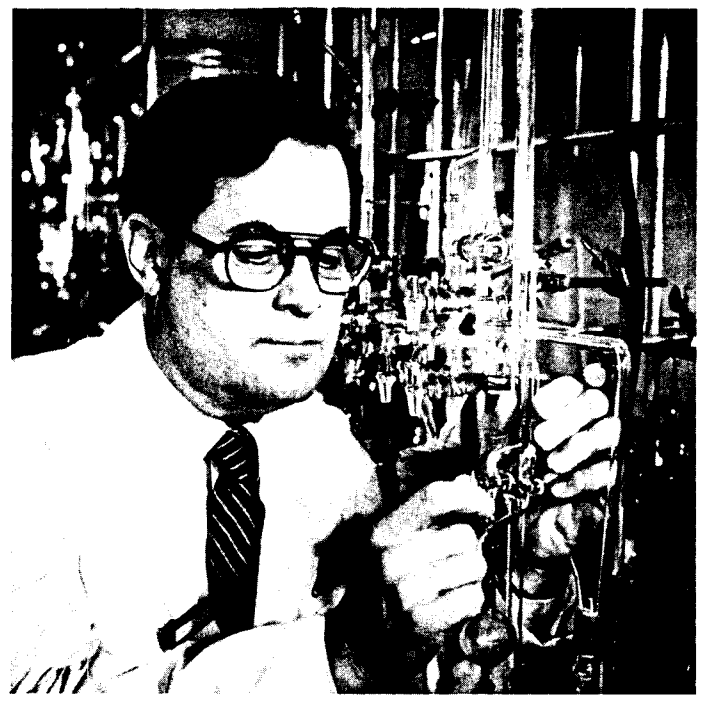
With nothing to stop them, billions of neutrinos reach the earth intact each second. If they can be made to interact here, what a story they might tell about what goes on inside the sun and the properties that help them survive it. But those same properties, that same elusiveness, makes their capture an incredible challenge.

At BNL, several members of the Chemistry Department have accepted this challenge by joining the international GALLEX collaboration in the quest to trap and detect solar neutrinos.

Leading the current BNL effort is Chemist Richard Hahn, who will talk about "Hunting for Elusive Solar Neutrinos" when he delivers the 266th Brookhaven Lecture on Wednesday, July 16, at 4 p.m., in Berkner Hall. His lecture will be introduced by BNL Senior Chemist Gerhardt Friedlander.

As Hahn will explain, there are at least two experimental approaches for looking at these interactions. In one approach, an incoming neutrino bounces off an electron, creating a blue light known as Cerenkov radiation and giving immediate information about the neutrinos' direction and energy.

In the second, or radiochemical, approach, a neutrino is trapped in an isotope, thereby forming a new radioactive isotope that can be removed from the medium and measured. This method is very sensitive, especially for the low-energy neutrinos that cannot be seen using the first approach.



At right, Richard Hahn with the system used to prepare gaseous counting samples of germanium-71 in the GALLEX experiment.

Photos on this page by Roger Stoutenburgh.

Below right, the logo for the GALLEX collaboration, depicting neutrinos streaming from the sun into the underground laboratory where the experiment is set up.

GALLEX
INTERNATIONAL SOLAR NEUTRINO RESEARCH COLLABORATION

The first and most well-known solar neutrino experiment was a BNL effort led by Raymond Davis and begun in 1967 deep in a salt mine in South Dakota. In this ongoing radiochemical experiment, neutrinos interact in a medium of 600 tons of common dry-cleaning fluid containing chlorine-37.

These interactions are triggered only by the sun's most energetic neutrinos, which constitute but a small fraction of its neutrino output. In these experiments, the researchers have found four times fewer neutrinos than the number predicted by a theoretical model of how energy and neutrinos are produced in the sun.

Called the "solar neutrino puzzle," this discrepancy has never been explained. However, the recent Kamiokande experiment in Japan produced a similar result. And, as Hahn will explain, the consensus of people in this field is that there are no serious flaws in either experiment.

So what accounts for the puzzle? Some theorize that the solar model may be wrong, but Hahn will also describe possible new neutrino properties that may be causing the discrepancy. As he will relate, suddenly the emphasis in this field has shifted from the neutrino being studied as a probe of the sun's interior processes to the sun being used as a neutrino factory providing a steady source of these elusive particles for study.

To study them — and perhaps to solve the solar neutrino puzzle — GALLEX was created. GALLEX stands for gallium experiment because, in this radiochemical experiment, the medium in which the researchers plan to capture neutrinos is an isotope called gallium-71 (^{71}Ga). When ^{71}Ga interacts with a neutrino, it forms a new isotope, radioactive germanium-71 (^{71}Ge), which can be removed from the medium and measured.

According to Hahn, gallium was chosen as the experimental medium because it is sensitive to the full range of neutrino energies coming from the sun. Gallium is 20 times more sensitive to neutrinos than is chlorine, an important fact because gallium is also much rarer and, therefore, much more expensive. The experiment will use 30 tons of gallium costing $15 million — the equivalent of about a year's worth of the world's production of this element.

To ensure that only neutrinos interact with the gallium, that no stray protons or neutrons interfere, this experiment is also located deep underground where only the least interactive particles — neutrinos — are likely to arrive. But instead of being in a mine, GALLEX is located in a tunnel in the Abruzzi Mountains in Italy, in the Gran Sasso underground physics laboratory.

Hahn will describe the intense efforts undertaken by the BNL team over several years, as well as their collaborators from France, Germany, Israel and Italy, in order to bring the experiment to this exciting point: Data collection is expected to begin within the next few months, though it will probably take at least half a year until the researchers have any idea whether they have all the pieces

(continued on page 2)

A New Year, a New ERC

ERC stands for BNL's Employee Relations Committee. Throughout the year, this group helps non-bargaining, non-scientific employees solve work-related problems that they were unable to resolve with their supervisors. ERC members are appointed by the Laboratory Director, to whom they are responsible. With each referral, their goal is to hear all sides of an issue and resolve it in complete confidentiality.

At the end of each year, the ERC meets to welcome new members and bid farewell to those who have completed their three-year terms. Shown here are: (back, from left) new committee chair William Kollmer Jr., Accelerator Development Department; Richard Eggert, Contracts & Procurement Division; Marguerite Marsch, Department of Applied Science; Richard Seebeck, Chemistry Department; (front, from left) Susan Foster, Employee Relations Counselor, ex officio; new member Michelle Cummings, Management Information Systems Division; Michael Schaeffer, Plant Engineering Division; new member Veronica Evans, Computing & Communications Division; June Herbert, Alternating Gradient Synchrotron Department; outgoing member Randolf Church, National Synchrotron Light Source Department; and outgoing member and last year's committee chair Nicole Bernholc, Safety & Environmental Protection Division.

To contact the ERC, call its special number, Ext. 4005, or contact the individual members: Cummings, Bldg. 459, Ext. 2077; Eggert, Bldg. 355, Ext. 4834; Evans, Bldg. 515, Ext. 2851; Herbert, Bldg. 911B, Ext. 4692; Kollmer, Bldg. 902A, Ext. 4005/4479; Marsch, Bldg. 426, Ext. 3275; Schaeffer, Bldg. 134C, Ext. 7941; and Seebeck, Bldg. 555B, Ext. 4313.

BNL Spends $29 Million On Long Island in 1990

BNL purchased more than $29 million worth of supplies and services from Long Island businesses in fiscal year 1990. Though that is $4.5 million less than the amount spent last year, it accounts for a larger percentage of the Lab's total procurement budget.

Between October 1, 1989 and September 30, 1990, BNL's total expenditure for supplies and services was $83.8 million, compared to $98 million for the same period in 1989. The Laboratory spent about 38 percent of these procurement funds locally this year, about five percent more than last year.

This percentage translated into 11,934 purchases made on Long Island in 1990 — 8,663 made in Suffolk County and 3,271 in Nassau County. In dollars, almost $22 million was spent in Suffolk, and about $7 million was spent in Nassau.

Most of the funds were spent on high-tech goods, construction, and technical services. For example, among BNL's largest purchases were $1.47 million worth of computer equipment and maintenance services from IBM's Long Island branch in Jericho, almost twice as much as last year. The Laboratory also increased its purchases by about 50 percent from another computer company, Digital Equipment Corporation in Melville, with $1.11 million worth of orders placed this year.

Of BNL's total $302 million budget, 57.5 percent went toward salaries and wages and 16.5 percent was spent on fringe benefits. Most of this money was also poured into the Long Island economy.

Mary-Faith Healey, Acting Manager for the Division of Contracts and Procurement, said, "We try to purchase goods and services from local companies whenever possible. Fortunately, we have a large number of reliable high-tech companies and a large technical labor pool we can draw from on Long Island." — Diane Greenberg

1990 — Warmest Year on Record at BNL

Hot, hot, hot — that's the way to describe 1990. The average annual temperature of 52.7°F made it the warmest year on record at the Lab site, where meteorological records have been kept since 1949. That beats the previous record of 52.2°F set in 1953. The yearly average temperature at BNL is 49.7°F.

BNL meterologist Bob Brown of the Department of Applied Sciences' Oceanographic and Atmospheric Sciences Division compiled weather records that clearly show the year's warming trend. Fifteen new highs were set during the balmy year of 1990. The most dramatic one occurred on March 13 when the temperature soared to 82°F. Just five days before, on March 8, the year's only low temperature record was set at 4.5°F.

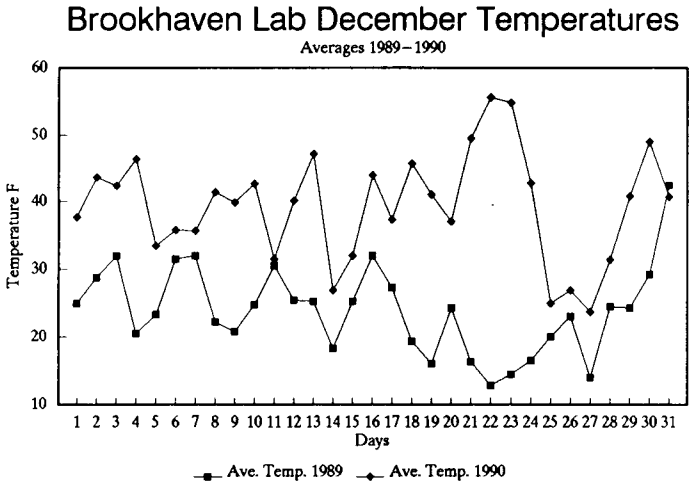
Other record high temperatures in 1990 were set in the colder months, from January through April and from October through December. March and November had the greatest number of record highs, with four records broken in each month.

December 1990 was the warmest twelfth month on record at BNL, with an average temperature of 39.4°F. That was in sharp contrast with December 1989 — the coldest December on record at the Lab, with an average temperature of 23.9°F.

A record-breaking snowfall also occurred in 1990 — seven inches on December 28.

No rainfall records were set in 1990, although it was a relatively wet year with a yearly precipitation total of 53.01 inches, which is 4.52 inches above the average annual precipitation at BNL. The wettest year on record was 1989, with total precipitation of 68.66 inches.

Brown has added 1990 to the list of meteorological extremes recorded at BNL since 1949. Notable on the list is the coldest year recorded at the Lab — 1967, with an average annual temperature of 47.5°F. The highest temperature ever recorded at BNL was 100.5°F on July 22, 1957, and the lowest temperature was -23°F on January 22, 1961. The maximum snowfall in a single storm was 23 inches in February 1978, and the maximum seasonal snowfall was 74.9 inches in 1966-67. The peak wind speed recorded was 125 miles per hour on August 31, 1954, during Hurricane Carol.



Two Decembers in a row brought two new monthly temperature extremes at Brookhaven National Laboratory since weather patterns first began to be recorded at the Lab site in 1949. December 1989 was the coldest December on record, with an average temperature of 23.9°F, while December 1990 brought the warmest average December temperature of 39.4°F.

Roger Stoutenburgh

One result of the warmest December on record: Dandelions bloomed behind Bldg. 703 for this photo taken on January 3.

In Memoriam

Walter Tucker, who started at BNL as an associate engineer in September 1947 and retired as a chemical engineer in 1985, died suddenly on New Year's eve, at the age of 73.

After joining the Lab, Tucker worked on scientific programs in various areas, including the Hot Laboratory, Nuclear Engineering, and the Department of Applied Science (DAS) until 1979, when he became assistant to then DAS Chairman Bernard Manowitz. Tucker remained in this position until his retirement and also acted as a DAS consultant from 1987 to July 1990.

Said Manowitz, "Walt was an ideal administrator — fair, open to all, efficient, and yet humane."

Among the research for which Tucker was best known was the development of technetium-99m, now the most widely used diagnostic radioisotope in nuclear medicine.

Incorporated into a variety of radiopharmaceuticals, this radioisotope can image almost any organ in the body, and its half-life of only six hours reduces radiation exposure for patients. With this short half-life, however, the production source must be close to where the radioisotope will be used.

This problem was solved in the mid-50s, when Tucker and his colleague Margaret Green developed a technetium-99m generator from a concept suggested by BNL's late Deputy Director Warren Winsche. Eventually, BNL made and shipped these generators all over the U.S. and worldwide until, in 1966, the technology was transferred to commercial distributors.

Today, these generators are on the premises of most hospitals and research centers, as technetium-99m is involved in 85 percent of the over-12-million nuclear medicine procedures carried out annually in the U.S. alone.

Tucker is survived by his wife Lydia, daughter Virginia Freeman, and grandson Zachary Tucker, the child of Tucker's deceased son, Kenneth. Contributions in Walter Tucker's memory may be made to Sayville Methodist Church or Suffolk County Council, Boy Scouts of America.

Outreach Workshop

Stress and Heart Disease

Approximately five million Americans have coronary heart disease, and about 500,000 die each year from its most dreaded symptom — heart attack.

While the roles of cigarette smoking, elevated cholesterol and high blood pressure in heart disease are well known, what is not so well understood is how stress underlies these and many other physiological and psychological risk factors for heart disease.

So, just what is the role of stress as an underlying factor in heart disease, and how can it be controlled?

These questions will be answered in two parts during the next Outreach workshop sponsored by BNL's Employee Assistance Program (EAP).

"Heart-Smart Lifestyle Change: A Psychotherapeutic Approach to the Treatment and Prevention of Heart Disease" will be presented by Alan Weiss, Ph.D., on Tuesday, January 15 and 22, from noon to 1 p.m. in Berkner Hall. All are invited to attend; bring your lunch.

After reviewing the classic risk factors for heart disease, Weiss will discuss lifestyle factors that can be changed, such as smoking, exercise, nutrition and type-A behavior. He will examine what blocks change, including attachment to what is familiar, pride in being stressed out, defeatist attitudes, and low self-esteem.

Then, Weiss will focus on what is required to change behavior and live a healthier, less heart disease-prone life. In addition to stress-management techniques, and breathing and relaxation training, Weiss will outline the role of being optimistic.

A graduate of Adelphi University's post-doctoral program in psychotherapy and psychoanalysis, Alan Weiss is a licensed psychologist who is in his twelfth year of private practice in Huntington.

Over the past eight years, Weiss has worked extensively with people attempting to prevent or reverse heart disease through stress management. As a part-time staff member at the Northport VA Hospital, Weiss coordinates health psychology and stress-management programs.

To register for this workshop, return the bottom portion of the blue Outreach flyer that was mailed to all employees to EAP Staff Psychologist Donna Friedman, Bldg. 490. For more information on EAP and its Outreach series, call Ext. 4567.

Note to Employees:

Attendance at lectures, meetings and other special progams held during normal working hours is subject to supervisory concurrence.

Solar Neutrinos (cont'd)

of the solar neutrino puzzle in hand.

After taking his B.S. in chemistry/physics at Brooklyn College in 1955, Richard Hahn earned his M.A. and Ph.D. from Columbia University in 1956 and 1960, respectively, for nuclear chemistry research done at BNL.

He joined the BNL Chemistry Department in 1960 as a research associate, but left in 1962 to go to Oak Ridge National Laboratory as a staff scientist. There, he was the Director of the Transuranium Research Laboratory from 1974-84. Hahn left Oak Ridge in 1987, to return to BNL as the leader of Chemistry's solar neutrino group.

In addition, Hahn has been a visiting scientist at: Institut de Physique Nucleaire, Orsay, France, 1972-73; Gessellschaft fuer Schwerionenforschung, Darmstadt, West Germany, 1979; Lawrence Berkeley Laboratory, 1974-87; Lawrence Livermore National Laboratory, 1984-87; and Laboratorio Nazionale del Gran Sasso, Assergi, Italy, since 1987.

A recipient of the Radiation Industry Award of the American Nuclear Society in 1977, Hahn has been vice chairman of the National Research Council's Committee on Nuclear and Radiochemistry since 1987. He is a member of the American Chemical Society, the American Physical Society, Sigma Xi and Phi Beta Kappa.

After the lecture, those attending are invited to join the speaker for discussion and hors d'oeuvres. To join the lecturer for a dinner at a restaurant off site, call Jon Hanson, Ext. 4378.

No matter *what* crosses your path — remember the BNL Food Drive during the January pickup all next week. Many thanks to all contributors to last month's record-breaking 3,560 pounds of food for Brookhaven Town's needy.

Coming Up

Margaret Bogosian, BNL Patent Counsel and Deputy Manager of the Office of Technology Transfer, will speak next week on "The Union of Law and Science" and will also educate the audience about the BNL patent process. Sponsored by Brookhaven Women in Science, her talk will be at noon on Thursday, January 17, in Berkner Hall, Room D.

All are welcome; please bring a lunch. For more information, call Dorry Tooker, Ext. 2078.

Arrivals & Departures

Arrivals

Michael Blaskiewicz.....AGS
Susan L.K. Briggs.....S&EP
Michel Gonin.....Physics
Andrew J. Marone.....Accel. Dev.
Gary L. Schroeder.....S&EP
Douglas J. Warren.....Reactor

Departures

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

Eduardo E. Duek.....Physics
Wafaa M. Fawzy.....Chemistry
Joan A. Lemaire.....Supply & Mat'l.
James M. Roberts.....DAS

PSI Meeting

"Can We Talk?" will be the topic of an informal discussion at the next monthly meeting of the Upton Chapter of Professional Secretaries International (PSI). Members and guests are invited to attend on Thursday, January 17, at 6:30 p.m., in the South Dining Room, Brookhaven Center.

Cafeteria Menu

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

Monday, January 14	
Soup: Cream of tomato	.75/.95
Entree: Beef vegetable stew w/1 veg.	3.10
Entree: Taco bar w/1 veg.	3.10
Fitness: Chef's choice w/1 veg.	3.10
Carvery: Hot pastrami sandwich	2.85
Grill: Grilled Reuben	2.95
Tuesday, January 15	
Soup: Country vegetable	.75/.95
Entree: BBQ Spareribs w/1 veg.	3.10
Entree: Chef's choice w/1 veg.	3.10
Fitness: Baked fish Veronique w/ 1 veg.	3.10
Carvery: Hot roast beef sandwich	2.85
Grill: Zesty pizza burger w/fries	2.00
SPICE: Light waffles	
Wednesday, January 16	
Soup: Chicken Calcutta	.75/.95
Entree: Chicken curry w/1 veg.	3.10
Entree: Baked ziti w/1 veg.	3.10
Fitness: Chef's choice w/1 veg.	3.10
Carvery: Hot Black Forest ham sandwich	2.85
Grill: Double cheeseburger	2.35
SPICE: Submarines by the inch	
Thursday, January 17	
Soup: Corn chowder	.75/.95
Entree: Garden-style vegetable quiche w/1 veg.	3.10
Entree: Chicken breast Parmesan w/1 veg.	3.10
Fitness: Sauteed beef, pepper & onions w/1 veg.	3.10
Carvery: Hot corned beef sandwich	2.85
Grill: Chili dogs	2 for 1.70
SPICE: Soup & sandwich special	
Friday, January 18	
Soup: Shrimp gumbo	.75/.95
Entree: Pasta primavera w/1 veg.	3.10
Entree: Chef's choice w/1 veg.	3.10
Fitness: Baked fish w/lemon butter sauce & 1 veg.	3.10
Carvery: Hot turkey sandwich	2.85
Grill: Fried fish fillet	2.85

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Five Most Popular Gospel Groups Return for 10th Annual Extravaganza

February is Black History Month — and this is the tenth year that the Lab's Afro-American Culture Club (AACC) will celebrate this special month with a Gospel Extravaganza. The event will be held on Saturday, February 2, at 7 p.m., in Berkner Hall.

For this tenth anniversary Gospel Extravaganza, the AACC has chosen five of the most popular choirs that have performed at the Lab in previous years to return for encores.

They include two local groups: the East End Community Choir of Long Island, now composed of over 100 singers from various townships, denominations, races and cultures; and the Loving Brothers from Amityville.

Other featured groups will be the Exciting Stephens Singers from Jersey City, New Jersey; the Institutional Radio Choir from Brooklyn; and the Somerset Young Adult Choir from the First Baptist Church in Somerset, New Jersey.

Tickets cost $10 for adults and $6 for children 12 and under. There will be no reserved tickets, and no tickets will be sold at the door. So order early, since tickets have sold out fast in previous years.

To order tickets, contact any of the following: Pauline Dixon, Ext. 5209, Bldg. 197D; April Donegain, Ext. 2459, Bldg. 134A; Fran Ligon, Ext. 3709, Bldg. 185A; or Bruce Penn, Ext. 7213, Bldg. 197C.

Aerobic Dance & Stretch Classes

Thinking about burning off those calories put on during the holidays? Join the Aerobic Dance Club!

Classes in aerobic dance are held on Tuesdays and Thursdays, at the Recreation Building in the apartment area, while stretch classes are on Mondays at the Physics lounge, Bldg. 510. Classes run from 5:15 to 6:15 p.m., and mats are recommended.

Each session of aerobic dance or stretch costs $30, payable at registration. To register, attend the next classes:

- Stretch — Monday, January 14.
- Aerobic Dance — Tuesday, January 15, and Thursday, January 17.

For information, call Pat Campbell, Ext. 3483, or Janet Sillas, Ext. 2345.

Mountain Club

The Mountain Club is planning an easy day hike on the Greenbelt Trail in Nassau County, on Sunday, January 20. The hike will be seven miles long, on mostly flat terrain. Bring a lunch, trail snacks and at least one quart of water. Dress for windy winter weather, and wear waterproof shoes with good treads.

The hike is free. Those interested should meet at the Cold Spring Harbor train station at 10:55 a.m. All BNL employees and their families are welcome. There is no rain date.

For more information, call Susan Hobbie, Ext. 7511.

Microcomputer Club

The next meeting of the Microcomputer Club will be on Thursday, January 17, in the conference room in Bldg. 475. Jerry Cadwell will give a talk and demonstration on "How to Assemble a PC."

Anyone in the market for a new hard disk, floppy drive, additional memory, new video graphics card, math coprocessor or modem is invited to come to the meeting to see how to install these items and save money.

All are welcome. Both new and old club members will receive a free utility disk. If you have any suggestions, contact Irving Montanez, Ext. 2540.

Here's a Toast to . . . the BNL Toastmasters Club

"Friends, Romans, countrymen — lend me your ears . . ."

Few people ever need to speak in public as brilliantly as Shakespeare's Mark Anthony.

But anyone may want to toast a friend at a party or explain a new procedure clearly to a group of strangers.

Now, for those who can already perform such tasks without flinching, but who wish to improve their skills; for others who think of any public speaking with deep alarm, but would like to change their attitude; and, of course, for those who simply enjoy the challenge of holding an audience — a new club has been founded: the BNL Toastmasters.

A Brookhaven Employee Recreation Association (BERA) club as of November 5, the BNL Toastmasters has already attracted almost 20 regulars — who meet on Tuesdays from 5:15 to 7 p.m. to practice speaking to a group.

"It's not at all a class," said Margaret Foster, who started the club. "People are all self-motivated and come in at their own levels. Some come because they *do* get butterflies, others feel they want help in organizing their speeches. Some are not used to speaking English and need practice."

Foster explained that different people are assigned each week to give feedback on the strong points of the prepared speeches, and maybe some areas that could be improved. "It's a very friendly atmosphere," she added, "and everyone joins in."

Adit Sambamurti (standing) speaks extemporaneously on Procrastination Day to a supportive audience of fellow Toastmasters (seated from left): Club President Margaret Foster, Barbara Austen, John Lydick and Lars Ensign.

The growth of the club has been very much a group affair, Foster said. People who have been actively involved since the beginning include Barbara Austen, who arranges the program with help from Carol Archer, Casper Sun and Adit Sambamurti; Greg Van Tuyle, who handles publicity; Shelley Landon, club secretary; Ronnie Evans, treasurer; Juanita Heyliger-Turner, coordinator; and Darryl Kaurin, who writes a weekly newsletter.

At a recent Toastmasters meeting, Greg Van Tuyle (standing, left) chose "Lost Holidays" for the Table Topics, charging Darryl Kaurin (standing, right) with an impromptu speech on "Beethoven's Birthday." Listening are members (clockwise, from back, left) Sharon Jones, Juanita Heyliger-Turner, Carol Archer, Adit Sambamurti, Srini Iyer, Barbara Austen, John Lydick, Lars Ensign, Beth Yu Lin and Wei Chen.

— Photos by Roger Stoutenburgh

The club is run on guidelines set out by Toastmasters International (TI). "It's a parent organization with a network of clubs, conferences and contests held regularly, and educational material available," said Foster. "We follow their suggested meeting programs and use their manual on preparing speeches, which are very helpful."

At a typical meeting, the Toastmaster of the Day is host. He or she first introduces the Table Topics Master, who chooses appropriate subjects for impromptu speaking and calls on each member to speak extemporaneously for one to two minutes.

"Humor is often an important ingredient of these short, spontaneous talks," said Van Tuyle. "The more whimsical ideas you can work in, the better. They lighten everyone's mood and make people less nervous."

After the table topics, members give prepared speeches. These have specific objectives — for example, to introduce yourself or to inspire an audience — and a time limit.

Said Ronnie Evans, who has given her third such talk, "I enjoy it. The TI manual has guidelines for the different types of speeches, each one building on the previous one. It's a learning experience each time, and the group is very supportive."

In October, a carload of BNL Toastmasters went to the TI fall conference at the World Trade Center, New York City. "With two more dues-paying members," Foster said, "we can receive our charter as an official TI club, part of TI's international network.

"I've been involved with Toastmasters at the National Institutes of Health and elsewhere," Foster continued, "and have seen how people can gain confidence and speaking skills while having a good time. I felt that BNL, where so many people need to talk in public for various reasons, had the potential for a Toastmasters club."

The rapid growth of the club, which started just three months ago with eight or nine people who answered Foster's wanted ads in the Bulletin, proves that it suits people here — and just one visit will show that members have a great deal of fun.

— Liz Seubert

Call for Women Volleyball Players

Women volleyball players are needed for the Monday and Wednesday mixed leagues. Contact Kathi Barkigia, Ext. 7661, for more information.

Bowling

White League

Sam Logan had a 222, Dick Adams 218, Gerry Riker 186, Brigita Gordon converted the 3/7 split, Joe Mayeski the 6/7. The Good Guys are the first half winners.

Purple League

Gene Hassell had a 214, John McCarthy 202, Kay Conkling 200, Mary Scheidet 194, Pat Manzella 191, Sharon Smith 186, Rich Scheidet converted the 6/7/10. Get Serious are the winners of the first half.

Classified Advertisements

Placement Notices

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

Each week, the Personnel Division lists new placement notices. The purpose of these listings is, first, to give employees an opportunity to request consideration for themselves through Personnel, and, second, for general recruiting under open recruitment. Because of the priority policy stated above, each listing does not necessarily represent an opportunity for all people.

Except when operational needs require otherwise, positions will be open for one week after publication.

For more information, 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.

8728. SECRETARIAL POSITION - Requires AAS in secretarial science and several years' relevant experience. Excellent typing, communication and telephone skills required, as are excellent word-processing skills. WordPerfect experience preferred. Shorthand and IPAP/JCARS experience highly desirable. Reposting of Job #4348. Staff Services Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

8659. ENGINEERING POSITION - Requires a bachelor's degree in fire protection engineering or a related engineering degree, with several years of experience in highly protected risk class of insurance and/or experience in life-safety code evaluations (NFPA 101). Good written and verbal communication skills a must. Responsibilities will include designing, developing and conducting loss-prevention programs. Safety & Environmental Protection Division.

8965. COMPUTING/ANALYST POSITION - Requires MSCS and three years' experience, preferably with VAX VMS systems. Experience working with an interface to large commercial packages, participating in the development and maintenance of large in-house codes and ability to design and document systems desired. FORTRAN, ASSEMBLER and PASCAL required; C and ADA useful. Will be involved in database, code and systems management; networking, graphics and technical support. Physics Department.

Motor Vehicles & Supplies

89 T-BIRD - full power, 32k mi., 100k mi. warranty, excel. cond., $10,500. Jeff, Ext. 5262.

89 VOLVO 760 TURBO - metallic blue, alarm, leather seats, air bag, sunroof, ski pkg., prof. maintained, 32k mi., $18,000. Ed, Ext. 3499.

88 FORD BRONCO II XLT - 4wd, a/t, ac, am/fm, p/s, p/b, loaded, 12k mi., $11,000. John, Ext. 5487 or 798-3766 eves.

87 FORD BRONCO II XLT - 5-spd., ac, cruise, p/w, 30k mi., ext. warr., visor, running boards, alarm, more, $9,000. Susan, Ext. 5149.

86 HYUNDAI EXCEL - 4-dr., 4-spd., excel. body, loses oil, needs eng. work, $650. Larry, Ext. 4295.

85 GMC PICKUP - ½-ton, a/t, ac, am/fm, p/s, p/b, p/w, cap, 75k mi., excel. cond. Steve, Ext. 7936 or 243-1755.

85 FORD LTD WAGON - 6-cyl., ac, a/t, excel. cond., $4,000. Barbara, Ext. 2456.

84 CHEVY CELEBRITY - 4-dr., vinyl top, V-6, a/t, ac, p/l, p/w, stereo, remote mirrors, 83k mi., v.g. cond., $2,200. Bob, Ext. 4551 or 475-3612.

84 FORD ESCORT - 53k mi., good body, 1-yr.-old exhaust system, not running, best offer. Frank, Ext. 2314.

84 CAMARO BERLINETTA - 6-cyl., a/t, ac, p/s, p/b, Eagle ST tires, 70k mi., $3,200. Ed, Ext. 3499 or 821-0063 eves.

84 OLDSMOBILE CUTLASS SUPREME - p/s, p/b, ac, high mi., excel. cond., asking $2,000. Ken, Ext. 7311 or 349-3462.

84 CAPRI RS-TURBO - T-top, ac, new clutch, brakes, exhaust, must sell, $1,500. Ted, Ext. 7615.

83 CHEVETTE - a/t, ac, am/fm cass., new brakes, water pump & timing belt, v.g. cond., $1,550. Ralph, Ext. 4171.

83 SUZUKI GS 550L MOTORCYCLE - good engine, tranny needs work; '74 Yamaha TX650, needs work, $250 for both. Chris, 751-2655.

82 CHEVETTE - 4-dr. h/b, ac, am/fm, requires work, does not run, make offer. Ken, 924-6893.

82 CHEVY CHEVETTE - 2-dr., 4-cyl, a/t, am/fm cass., new battery, clean in/out, runs well, must sell, $950. Roger, 924-8213.

82 OLDS CUTLASS - 80k mi., 4-dr., am/fm tape, ac, $1,500. 751-3930 eves.

81 PONTIAC - s/w, runs, new radiator, gas tank, exhaust system, needs work, 61k orig. mi., asking $850. Ext. 7786.

81 ESCORT - tow car, 32' Vogue motor home, new engine & trans., cellular phone, am/fm stereo, sleeps 6, $24,000. Tallon, Ext. 5454 or 821-5801.

81 GMC PICKUP - blown, 6-cyl., 3-spd., m/t, asking $400. 475-2509.

80 CHEVY MALIBU - 4-dr., p/s, p/b, a/t, small V-8 267, gauges, all factory, orig. owner, garaged, like new, $2,000. Al, Ext. 3992 or 331-1003.

80 FORD VAN E-250 - 6-cyl., a/t, p/b, p/s, heavy-duty suspension, windows, great for work van, new tires & brakes, $1,000. Jim C., Ext. 4150.

79 SUBURBAN - new tires & batt., 37k orig. mi., a/t, p/s, p/b, am/fm cass., 4wd, $2,000. Tirre, Ext. 3288.

79 BUICK CENTURY WAGON - rebuilt engine, clean in/out, $1,500. Duke, Ext. 2957 or 289-3586.

79 HONDA ACCORD - h/b, high mi., running cond., $450. Ext. 5177 or 689-5152.

79 COLT - a/t, ac, 160k mi., runs well, $500 or best offer. Harvey, Ext. 3758.

79 CHEVROLET PICKUP - trailer special; '82 Corvette 350 CID, new a/t, p/s, p/b, ac, p/w, p/dl, asking $3,000. 475-2509.

79 MALIBU WAGON - needs exhaust, new motor, battery, tires, trans., asking $900. 395-4683.

79 TOYOTA CELICA GT - 5-spd. h/b, sunroof, reliable, new muffler, ask. $850. Marty, Ext. 2521.

78 LTD - does not run, good body, make offer. Kirk, 924-6723.

77 BETHANY POP-UP TRAILER - sleeps 6, opens from sides, gas stove, sink, ice box, $900. Bill, 732-8793.

74 CORVETTE - a/t, white, black int., good cond., $6,500 firm. Slim, Ext. 4806.

70 VOLVO 1800E - '72 Honda 600; '62 DAF 750, BNL retiree selling collection, all cars good shape, reasonable offers please. Bill, 477-0301.

68 VW BUG - personally rebuilt engine, new brakes, runs well, must sell, $500. Ted, Ext. 7615.

62 CHEVY NOVA - 4-dr., 6-cyl., runs well, good station car. Bob, Ext. 4428 or 467-4222.

DOORS - for use w/Jeep CJ7 soft top, black, $40. George, 878-8177.

TIRES - mud terrain 35", 15" rim, low mileage. 447-6758 after 6 p.m.

TIRES - 15" on GM rims, $30 ea. Ext. 2058.

SNOW TIRES - two P195/75 14", two 175/80 13", on rims, 5k mi., $50 per pair. Joe, Ext. 4259.

BLOCK - small C6, stall speed converter, flywheel; ig pool filter, best on market; Grant GT steering wheel. Wayne, Ext. 3084.

Boats & Marine Supplies

19' BAYLINE BOWRIDER - 1988, 125-h.p. Force, p/tilt, p/trim, am/fm cass., low hrs., full canvas, galv. Escort trailer, $6,000. Ext. 7125 or 929-8641.

19' BOWRIDER CRUISER - 1972, w/1976 115-h.p. Johnson, canvas, trailer, w/elec. winch, $2,500. Frank, Ext. 2314 or 567-5131.

Furnishings & Appliances

COUCHES - Herculon, matching, 2 seaters, brown/tan/gold striped, good cond., $100/ea. Harriet, Ext. 3487.

DINING ROOM SET - oval table w/3 leaves, 2 armchairs, 4 side chairs, $500; china closet, $375, $800/both. Arleen, Ext. 4519 or 924-6051.

DISHWASHER - Hotpoint, portable, works well, $50. Frank, 928-9834.

LOVE SEAT - gray, from Macy's, excel. cond., orig. $450, sell for $150. Ext. 2679 or 472-6922.

BOXSPRING & FRAME - queen, Spring Air, 2½ yr. old, still under warranty, excel. cond., $125. 345-5365.

REFRIGERATOR - 18 cu. ft., freezer on bottom, frost-free, $75; pasta maker, w/ravioli attach., manual operation, $20. Ext. 5177 or 689-5152.

REFRIGERATOR - ice maker, make offer. Bob, Ext. 5286.

WASHER - GE, dryer, Kenmore, both in working cond., $50/each. Ext. 2338.

WASHER/DRYER - GE, 1989, excel. cond., $300 & $200. Bertrand, Ext. 3166 or 281-7808.

Tools, House & Garden

FIREPLACE INSERT - good cond., best offer. 399-3390.

FIREWOOD - seasoned hardwood, cut, split, delivered, $125/full cord. Dave, 331-4629, leave message.

FIREWOOD - seasoned, hardwood, split, delivered locally, $130/cord. 924-2035.

LADDER - aluminum, 24', extension, like new. 325-0447 after 6 p.m.

LAWN MOWER PARTS - most makes, used. Dan, Ext. 4987 or 698-7322.

SNOW PLOW - for Dynamark tractor, never used, $100; blond oak 4-drawer dresser, w/headboard, $100. 744-8567.

SNOW PLOW - Meyers, 7'6", w/pump & piston, $350 neg. Fred, 878-4254.

STORM DOORS - unused, 36"x80", full glass, 30"x80", crossbuck, bronze, w/screens, at cost. Janet, Ext. 4049 or 744-8087.

WOOD STOVE - Vermont Castings, vigilant w/coal insert, $650. Ext. 7130 or 929-8323.

Sports, Hobbies & Pets

EXERCISE BIKE - Schwinn Air-Dyne, model AD-3, pulse meter, wind screen, like new, asking $400. 878-0926.

EXERCISE BIKE - $40. Arleen, Ext. 4519.

EXERCISE EQUIPMENT - Nordic Track Pro ski machine, $500; Ultra Shaper, adjust. resistance pull bar, $75. Brian, Ext. 7519 or 234-9487.

FISH TANKS - 2, king & queen stand, 29", filters, heaters, full hoods, fluorescent lights, 80 lbs. gravel, $250. Janet, Ext. 2345 or 929-3910.

HOCKEY SKATES - boy's, size 5, CCM brand, like new, $40. Bosshard, 924-5220.

NINTENDO GAME SYSTEM - w/guide book, $60, w/2 games, $90; games sold separately, $20/each. Matt, 928-8465.

ORGAN - Lowrey GX700, excel. cond., worth $26,000, asking $16,000. 727-4448.

PIANO - Pease, upright, v.g. cond., best offer. Ext. 2949 or 427-2435.

ROWER - mechanical, no electronics, easy to use, excel. cond. Harriet, Ext. 3487.

SKIS - Techno Pro, high performance, 170 cm, w/Salomon 447 bindings, v.g. cond., $110. Ext. 2683 or 751-2469.

SKIS - cross-country, 180 cm, Kneissel, w/poles, $80; Kastle, FWI, 170 cm, w/GEZE bindings, $240; both excel. cond. Les, Ext. 2920.

Ads Due Early

Because BNL will be closed for Martin Luther King Jr.'s Birthday on Monday, January 21, the classified ad deadline for the Friday, January 25 issue of the Brookhaven Bulletin has been moved up one day, to 4:30 p.m. on Thursday, January 17.

SKI BOOTS - Lange, woman's size 8, $25; Nordica, woman's size 7½, $25, both in excel. cond. L. Kukacka, Ext. 3065.

SLED - 5', flexible, $20; very large restaurant colander, $25; blacksmith's vise, $35; Chevy truck wheels, 3-8 lug, 16", $25. 698-0654 after 4:30 p.m.

TOYS - He-Man, 20 doll figures, 4 vehicles, Snake Mountain, $25/all; Thunder Cat play set, $5. 472-3254.

Audio, Video & Computer

VCR - Canon VR-HF 720, HQ, 107-channel, cable-ready tuner, 8 program/1-mo. timer, on-screen display, 1 yr. warr., $400. 331-1003.

COLOR TV - GE Solid State, 19", cable ready, red color comes & goes, otherwise v.g. cond., $20. Ext. 2679 or 472-6922.

EGA MONITOR - & board, $225; Koss headphones, wireless, like new, $50. Jim, Ext. 4584.

MOBILE CELLULAR PHONE - Technophone, compact model, $200 neg. Sue, Ext. 7235.

TV - 41", Pro-Screen, NEC stereo, excel. cond., $1,700. Pete, 727-7483.

COMPUTER WORKSTATION - w/separate printer stand, v.g. cond., $100. 924-2298 eves.

Miscellaneous

AIRLINE TICKET - 1, United Airlines, Islip to Denver, round-trip, Feb. 21-26, perfect for ski weekend, $218. Mark, Ext. 5299.

AIRLINE TICKET - 2, round-trip, San Jose, CA from Islip, Feb. 14-19, return flight into JFK, $495/both. Marie, Ext. 4207 or 732-2668.

ELECTRIC SMOKER - Smoker Outers, for fish, fowl, meat, new. 325-0447 after 6 p.m.

LEG SUPPORT - new, Velcro, $10; Tiffany style lamp, $20; twin bed, yellow, $50; decoy, $65; wicker chair, $100. Kathy, 744-2203.

OPERA TICKETS - Metropolitan, matinee, Verdi's Rigoletto, orchestra central, Jan. 12. Ext. 3922.

MAGAZINE COLLECTION - Playboy, missing only 2 issues from 1/79 to 12/90, plus misc. issues pre-1979, best offer. Pete, Ext. 7955.

WOMEN'S COATS - size 10-12, grey Persian lamb, $100; wool w/Persian lamb collar, $50; all wool, $35. 475-4005.

Free

CAT - female, declawed, trained; also litter box. Ext. 3079.

DOG - tricolor shepherd mix, 7 mo. old, all shots, outdoor animal. Gerry, Ext. 3751 or 399-4929 after 5 p.m.

APPLIANCES - 2 GE washing machines; 1 GE dryer, not working; 1 Hotpoint refrig./freezer, working cond. 727-3863.

Car Pools

EAST ISLIP-OAKDALE-BOHEMIA - need 1 more driver for car pool. Frank, Ext. 2314 or 567-5131.

DEER PARK - need 1 driver. Ken, Ext. 7311 or 349-3462.

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

HAMPTON BAYS - 1-bdrm. apt., furn., priv. ent., eik, large l/r, closets, beach, no pets, ideal for single person, $550/mo., incl. all + sec. 728-0992.

HOLTSVILLE - 1-bdrm. apt., large, l/r, eik, priv. ent., w/w carpet, full bath, walk-in closets, 15 min from Lab, off-street parking, $675/mo. incl. util. 289-2159.

MASTIC BEACH - all new 1-bdrm. apt., full bath, full kit., priv. ent., yard, driveway, for single, $550/mo. pays all. Anthony, 281-2513.

MIDDLE ISLAND - 2-bdrm. condo, 1½ baths, 4 yrs. old., furn., all appl., 5 min. to Lab., $875/mo. + util. 751-8351.

MILLER PLACE - barn apt., 5 rooms, fp, deck, panoramic view of Mt. Sinai harbor, priv., semi furn., near beach, no pets, avail. Feb. 1, $800/mo. + util. Sue, 928-6368.

NORTH SHIRLEY - 1-bdrm. apt., furn., l/r, eik, w/w, 5 min. from Lab & stores, priv. ent., 1 person, nonsmoker, no pets, $490/mo. incl. util. 281-8044.

PORT JEFFERSON VILLAGE - 1-bdrm. apt., l/r, kit., full bath, w/w, priv. parking & ent., $700/mo. incl. all. Tallon, Ext. 5454 or 821-5801.

RIDGE - 3-bdrm. ranch, eik, l/r w/fp, 2½ acres, quiet area, full bsmt., minutes from Lab, $950/mo. + util. Jim, Ext. 4606 or 654-5049.

SHIRLEY - 3-bdrm. house, 5 min. from Lab., fenced yard, $900/mo., avail. Feb. 1. Bertrand, Ext. 3166, 281-7808 or 718-278-3349.

STONY BROOK - house to share, 1 bdrm., furn. l/r & kit., flexible dates, $400/mo. Steve, Ext. 3928 or 689-5379.

WADING RIVER - 2 bdrm., 1 bath, priv. ent., priv. beach, nice area, 10 min. to Lab., $625/mo. John, Ext. 4028 or 929-1029.

YAPHANK - 4-bdrm. restored Victorian, patio, 5 mi. from Lab., large treed property, avail. now. 924-7106 days & weekends, or 924-3066 eves.

YAPHANK - 2-bdrm. house on wooded 2 acres, 10 min. to Lab., $750/mo. + util. John, Ext. 3675 or 924-3528 eves.

CLAREMONT, NH - 2-bdrm. condo, 40 mi. to Killington, Okemo, Magic Mt., Mt. Sunappe, $300/wk., $225/wknd. Frank, Ext. 7749 or 758-7913.

CATSKILLS - 3-bdrm. chalet w/sleeping loft, fully furn., near Hunter & Windham Mts., great for skiing. Kay, Ext. 4501 or Bea, Ext. 3642.

HILTON HEAD, SC - 2-bdrm. condo, 2 baths, sleeps six, tennis, golf, beach, pool, Jan. & Feb. $250/wk. Guy, Ext. 3147 or 589-5378.

KEY WEST, FL - April 20-27, sleeps 4, on water, terrace, sep. bdrm., kit., w/d, jacuzzi, VCR, pool, gym, priv. beach, boat/water sport rental, walk to town, Tiki Bar. Sheryl, Ext. 5384.

ST. THOMAS - week of April 27 to May 4, 2 adjoining units at Bluebeard's Castle, ea. has bath, mini kit., TV, ideal for 2 couples or family of four. John, 924-4262.

For Sale

CORAM - Strathmore East, 4-bdrm. ranch, 2 baths, cath. l/r, 2-car gar., gas heat, fenced corner lot, $120,000. Ext. 3791 or 928-7154 after 7 p.m.

MASTIC - 3-bdrm. ranch, 2 baths, ½ acre, estate driveway, grape arbor, low taxes, city water, close to LIRR, ask. $118,000. Ext. 3506 or 281-2002.

MASTIC - 3-bdrm. ranch, 2 baths, bsmt., fenced, skylight, all appl., 100x100, $16,000 over existing $100,000 mtg., owner helps w/closing costs. 399-5051.

MIDDLE ISLAND - 3-bdrm. ranch, eik, den w/fp, d/r, l/r, 1½ baths, screened porch, patio, full bsmt., wooded ½ acre, $155,000. 924-6051.

MIDDLE ISLAND - Coventry Manor, 3-bdrm. townhouse, 2 full baths, kit., l/r, d/r, laundry rm., cac, 5 appl., encl. patio, pool, tennis, clubhouse, ask. $99,000. Ext. 3160 or 289-5704 after 5 p.m.

RIDGE - 2-bdrm. house in adult community Leisure Knoll, a/c, newly carpeted & decorated, walking distance to rec. hall, pool, tennis, lots of extras, 5 mi. to Lab, $135,000. 744-3366.

SHOREHAM - 3-4 bdrm. contemp. ranch, ½ acre, eik, 1¾ baths, l/rm d/r, large workshop/storage rm., ig sprinkler, 5 appl., 5 min. to Lab., $149,500. Ext. 2833 or 744-7172.

Wanted

CAR COVER - 13', for small car. John, Ext. 7671.

COUPONS - all, but especially for diapers. Mail to Gibbons, Plant Engineering, 134C.

EXERCISE BIKE - recumbent, either Protec PTS Turbo 1000 or Tuntari E504, must be in excellent condition. Jim, Ext. 7917.

FIGURINE - Avon Heavenly Blessings Nativity, shepherd boy w/sheep. Ext. 4475 or 929-3251 eves.

HOUSEMATE - to share 4-yr.-old, 2-bdrm condo, 1½ baths, partially furn., 5 min. to Lab., $450/mo. + ½ util. 751-8351.

HOUSEMATE - M/F to share Mastic Beach house, 3 bdrm., kit., l/r-d/r, w/d, cable, clean, quiet, 10 min. to Lab., $350/mo. + ½ util. 399-6947.

MAGAZINES - from 1950 to 1970, *Car, Handy Man, Life*, etc. Bob, Ext. 4428.

MOTHERS & TODDLERS - to meet every Wed., 9:30-11:30 a.m., Rec. Bldg., all welcome, esp. w/young children. Terry George, Ext. 3009.

MOTORCYCLES - old dirt bikes, any cond., Hodakas and Can-Ams preferred. 369-5906.

NORDITRAC SKI TRACK - good cond., reasonable. Dave, Ext. 4612.

O-TYPE BLOOD - or any type platelets, + or -, for 6-yr.-old Alisha, leukemia victim, daughter of M. Sussman, S&EP, ongoing need, Ext. 4212.

PAILS - looking for empty, clean, spackle buckets and used tennis balls to help train little leaguers. Gerry, Ext. 3751 or 399-4929 after 5 p.m.

PEOPLE INTERESTED IN LAS VEGAS TRIP - 5 days, March 3-8, $419 includes all, need 4 people. Rosalie, Ext. 3160.

RETIREMENT PARTYGOERS - for John M. Sullivan, Jan. 23, 5 p.m. Rec. Bldg. For reservations, Fred Kuehl, Ext. 7947.

SERVICE & BODY MANUALS - for 1981 Oldsmobile. Tony, Ext. 7214 or 423-9750.

SKIERS - to ski Hunter Mt., Jan. 30, $45 for lift and bus. Nick, Ext. 3884.

STROLLER - 2-child, good cond. Ext. 3405.

JUNK 1980-81 TOYOTA TERCEL HATCHBACK - for parts, will pay finder's fee. Bill, Ext. 4312 or 281-6498.

TRAINS - Lionel & American Flyer, priv. collection, pays top $. Bruce, 924-4097.

TUBED AUDIO COMPONENTS - working or not, by Marantz, Macintosh, REL, ARC, also Collins S-line ham gear. Jim, Ext. 4584.

WINDOWS - old, wood, double-hung, or alum.; wood-burning stove, used, airtight, reas. price. Dan, Ext. 4987 or 698-7322.

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