



# BROOKHAVEN BULLETIN

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## Brookhaven And The Public In The Bicentennial Year

Open House '75 was such a smashing success that it will be repeated again this year. In fact, the response was so encouraging that the public will also be invited to two additional events: an **Energy Fair** and a series of **Summer Saturday Tours**. In support of these, the building containing the historic Brookhaven Graphite Research Reactor will be converted into an **Exhibition Hall**.

**Open House '76** will be held on Saturday and Sunday, May 15-16, and will follow closely the successful format of last year. It will again be devoted to displaying the strength and variety of Brookhaven's current research programs. Many areas of the Laboratory will be open to enable the public to see for themselves the research in progress.

The **Energy Fair** will run from May 10 through May 16 overlapping on the 15th and 16th with Open House. The Fair will feature a variety of exhibits to demonstrate the range of activities supported by ERDA and by industrial concerns working in this field. The Fair will thus serve as a regional showcase for energy programs.

Berkner Hall will serve as headquarters and exhibits will be placed on the surrounding grounds and parking lots under bubble structures or tents. While the energy exhibits and the Exhibition Hall may be viewed by the public May 10 through May 16, the remainder of the Laboratory site will be open only during the weekend of Open House.

The **Summer Saturday Tours** will feature a guided bus tour of the site including a long stop at the Exhibit Hall. Although the public will receive literature on the Laboratory's research programs, the facilities will not be open on these days. A tentative schedule for the tours is as follows:

- June 5, 12, 19, 26
- July 10, 17, 24, 31
- August 7, 14, 21, 28

As an **Exhibition Hall**, the Brookhaven Graphite Research Reactor (BGRR) will afford a spectacular setting for exhibits and models displaying the work of the Laboratory and is of particular interest in itself for the historical background it provides.

The high window bays, many balconies of different size and elevation and remnants of experiments, offer an unusual setting for both the historical and futuristic view of science and engineering at Brookhaven.

The BGRR was the first major machine built at the Laboratory. It was the first "atomic pile" in the world built specifically for peacetime research. Groundbreaking took place in August 1947 and the reactor was commissioned in 1950. Pictures of the loading face graced many Laboratory publications and appeared in many other texts and magazines. A wide range of significant research was performed with it. Worth noting is that it was built before "containment" of nuclear reactors was mandated and it was decommissioned in 1970 without difficulty and without hazard. It remains a monument to the new age of science ushered in after World War II.

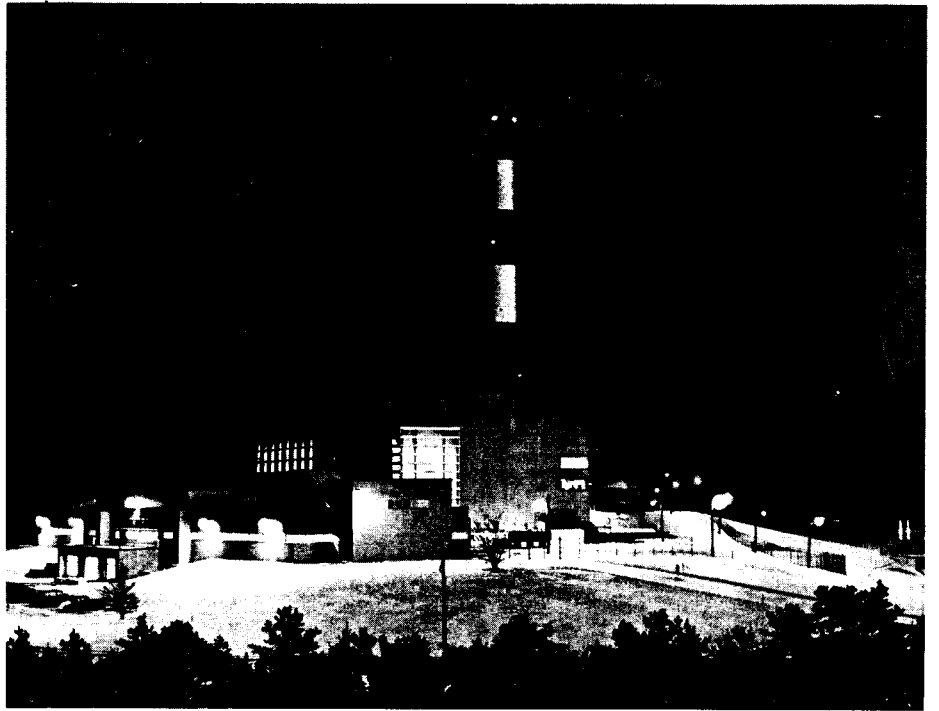
Several names for the Exhibition Hall have been suggested. One would be to call it "Exhibition" or "EXPO XXI", in anticipation of the 21st century, or recognizing the past, to call it the "Great Hall of the Sleeping Giant."

The success of Open House '75 was due in no small part to the generous outpouring of energy and commitment by Laboratory employees. Their enthusiasm and spontaneity carried over to the many thousands of visitors who toured the site. In turn, those who interacted with the public were rewarded by the experience.

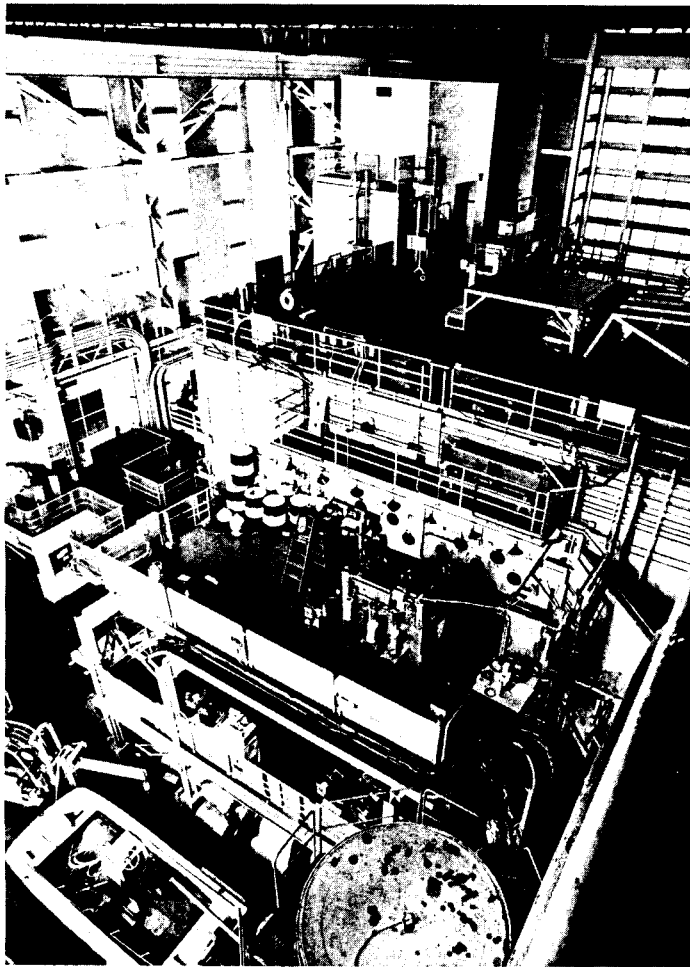
The events scheduled for 1976 will also depend on ideas and suggestions from all the staff. Of particular importance will be the identification of exhibits, memorabilia, research apparatus, literature and photographs which would be used in the Exhibition Hall.

In addition, individuals who have materials and apparatus in the BGRR Hall (Building 701) at the present time are asked to contact Carl Thien, Public Relations, on Ext. 2345, so that proper storage, disposal or display of the material can be arranged.

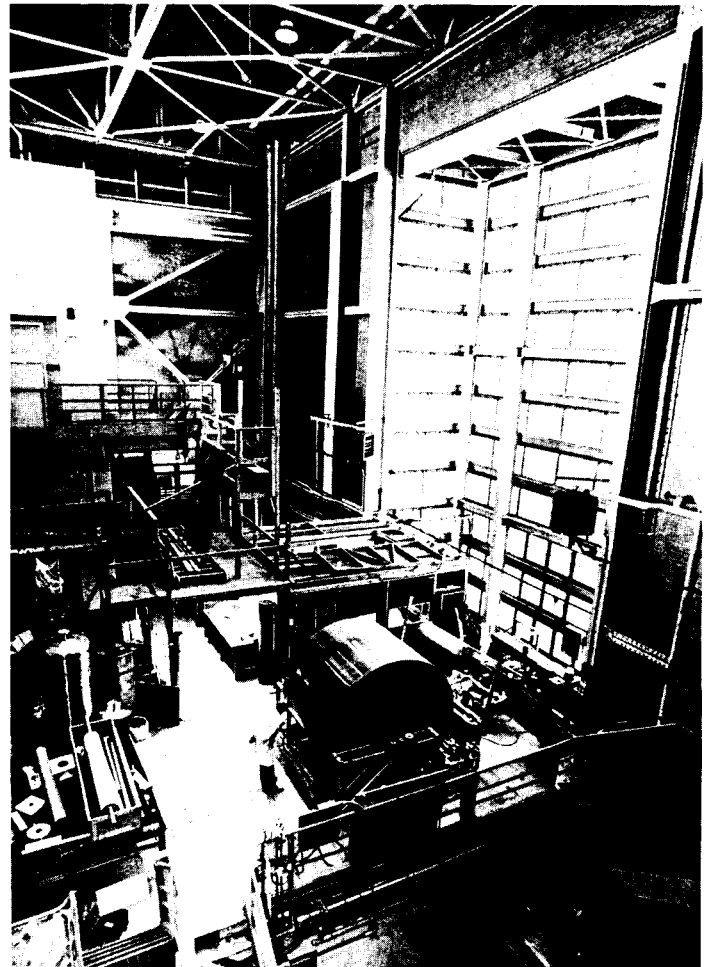
There is a great deal of work to be done in the next few months to put these ideas into successful operation, so please return the form on this page to the *Brookhaven Bulletin*, Building 460, by February 20.



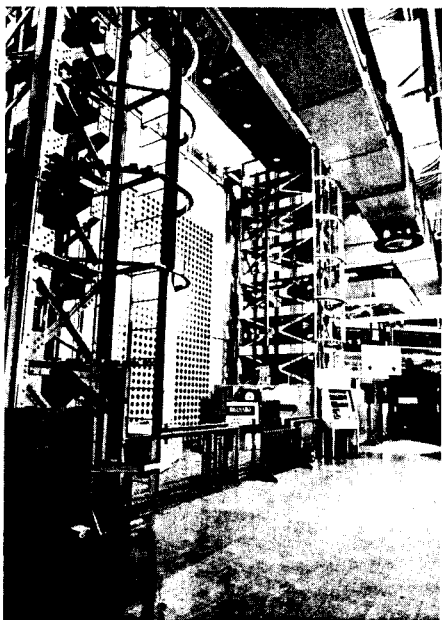
Exterior of the old Brookhaven Graphite Research Reactor which will begin a new life this year as a permanent Exhibition Hall featuring exhibits of past and present scientific research projects, as well as those envisioned for the future. —photo by Walton



Experimental balconies on the west floor.



Window bay and an east balcony of the BGRR.



The loading face of the Brookhaven Graphite Research Reactor which has been photographed from every angle over the years and featured in many publications.

Open House '76	- -	May 15-16
Energy Fair	- - -	May 10-16
Saturday Tours	-	June 5 - Aug. 28

I have a suggestion for:

Open House '76	<input type="checkbox"/>	The Energy Fair	<input type="checkbox"/>
Saturday Tours	<input type="checkbox"/>	The Exhibition Hall	<input type="checkbox"/>

I can provide exhibit material as follows:

.....

.....

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I would be happy to assist in the following way:

.....

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.....

Name..... Dept..... Ext.....

Please return to: *Brookhaven Bulletin* (Bldg. 460).

# Neon Lights Up Neutrinos Here

The high energy program at Brookhaven started into the new year with two "firsts" in particle physics. The first pulsed horn narrow band neutrino beam was successfully operated, and the 7-foot bubble chamber was tested using a filling of 90 percent pure neon.

In previously built neutrino beams at the Laboratory, the energy of the neutrinos has been spread out over a wide range (wide-band beams), and thus, the energy of the incoming neutrino in any given neutrino interaction was not known. In certain experiments, however, it is crucial to know the energy of the incoming neutrinos. The narrow beam was designed to provide neutrinos whose energy is defined to a precision in the range of 10 to 15 percent. The energy of this neutrino beam can be varied from about 2 to 10 GeV.

The neutrinos are produced in two body decays of an energy selected beam of  $\pi$  and K mesons. The selection of the mesons is performed by two magnetic focusing horns



Two of the men responsible for the engineering and design of the narrow band neutrino beam, from left, Gary Smith and William Sims.

and an appropriate system of absorbing collimators. The horns consist of cylindrically symmetric electrical conductors, are pulsed with currents of the order of a quarter million amperes and produce circular magnetic fields around the axis of the beam. The shape of the conductor of the first horn is tailored so that  $\pi$  and K mesons of a unique energy are steered through the openings of the collimators, while all other particles are stopped. The second horn steers these selected mesons into a 60-meter long tunnel, where the mesons decay into muons and neutrinos. The muons are stopped by a 35-meter thick iron shield and the billion or so neutrinos easily pass through to the detector, the 7-foot neon filled bubble chamber.

The whole system was completed and installed in its final location in the neutrino



From left, Roger Baker and Robert Dagradi, supervisors at the 7' bubble chamber.

area, and tested with protons on the target on December 10. The test consisted of measuring the radial and energy distributions of the muons in the muon shield using an elaborate system of ionization counters installed and operated by C.L. Wang and others. The measured muon distributions



George Kalbfleisch

agreed well with what was expected from the design of the beam.

As part of the electrical test, the horns withstood about 300,000 current pulses without any visible signs of deterioration.

The engineering, design, construction and installation of the beam was carried out by Lou Repeta, John Walker, Gary Smith, Bill Sims and others at the AGS.

The narrow band beam will first be used in experiments at the 7-foot bubble chamber filled with liquid neon to study in detail the neutral current interactions of neutrinos. Experiments will be conducted by a Brookhaven team headed by George Kalbfleisch and by a Columbia University group headed by Charles Baltay.

Since neon is expensive and scarce, the national laboratories agreed to pool their gas supplies of neon and deuterium for bubble chambers. A test of the 7-foot chamber filled with neon was conducted in December. A large quantity of crude neon gas was trucked to Brookhaven from FermiLab, and added to the supply of gas already on hand. After the crude neon was liquefied, most of the major impurity, helium, was boiled off in the process. The 15 tons of neon were then transferred to the 7-foot chamber and "topped off." Kalbfleisch estimates that this amount of neon is enough to light up all the neon signs in the world.

The chamber was then pulsed to try to make it sensitive to cosmic ray tracks passing through it. However, the chamber did not respond, as residual helium bubbled out of the solution under the reduced pressure of the expansion pulse. Several days of pulsing were required to purge the helium. Finally it was possible to expand the chamber properly, but no tracks were seen.

The hydrogen content of the neon was less than three percent at this time and it was decided that more hydrogen would be needed to reach a suitable operating point. Hydrogen was added and the chamber became sensitive. The first cosmic ray tracks were observed December 21.

The chamber has so far been made sensitive only in the top two-thirds of the volume. The tests were terminated before Christmas in order to return the neon to FermiLab, where it will be used in their 15-foot bubble chamber in February and March. Most of the neon was returned in liquid form in two deliveries in a special tank truck supplied by FermiLab. It is expected that the neon will be returned to Brookhaven in time to perform final tests and be used for a physics run of the 7-foot bubble chamber exposed to the narrow band neutrino beam, possibly this summer.

The operation of the 7-foot bubble chamber facility and the handling of the neon gas and liquid were expertly carried out by the Particle Detection Division of the AGS under the guidance of Robert Louttit and Albert Prodell, with the assistance of William Schneider and the crew of the 7-foot chamber.

# Ting Honored For "J" Particle Discovery

Cited "for powerful new experimental techniques that have extended the range of validity of quantum electrodynamics, determined the properties of vector mesons and culminated in the discovery of new particles of matter," Professor Samuel C.C. Ting of MIT has been selected a recipient of an E.O. Lawrence Memorial Award for 1975.

In the fall of 1974, Professor Ting headed the research group at Brookhaven which made headlines with the discovery of the "J" particle. Based on that discovery, laboratories in Italy, the United States and Germany have found a whole family of similar particles. These particles are characterized by their heavy mass, which is larger than three times the mass of the hydrogen atom, and seem to live about 1000 times longer than most of the ordinary subatomic particles.

Other 1975 winners of the Lawrence Award are:

- Evan H. Appelman, Argonne National Laboratory
- Charles E. Elderkin, Battelle Pacific Northwest Laboratory
- William A. Lokke, Lawrence Livermore Laboratory
- Burton Richter, Stanford Linear Accelerator Center

The Awards will be presented at a ceremony in the State Department on February 12.

# Radeka Honored

Veljko Radeka, head of the Instrumentation Division, has been elected a Fellow of the Institute of Electrical and Electronics Engineers, Inc. This distinction is given to those who have shown evidence of outstanding and extraordinary qualifications and experience in the field of electrical and electronics engineering. Only about two percent of the Institute's 175,000 members have been so honored. Radeka was singled out for "contributing to the theory and practice of nuclear detector signal processing."

# French Club Meeting

The French Group of BNL will gather for a social evening on Thursday, February 12, at 8:00 p.m., at the Recreation Building in the Apartment Area.

There will be a showing of slides from France presented by Jim Ho of the Physics Department, who recently returned from an extended stay in Europe.

Do join us for this lovely tour from Paris to Dijon, down to the Riviera. Refreshments will be served. Donation \$1.00 for non-members.

# Bank Notice

The Bankers Trust of Suffolk on site will be closed on Thursday, February 12, Lincoln's Birthday.

# Mother Nature Frowns On Bicycle Club Meeting

Not only did the ground hog miss his shadow, but a half day Lab snow closing resulted in poor attendance at the Bicycle Club meeting on February 2. A second try is scheduled for Tuesday, February 17 at 12:30 p.m. in Room A in Berkner Hall. Both racers and tourists are urged to attend and help organize a schedule of races and tours for the coming season.

# Official & Special Events

Wednesday, February 11

Navy Meeting

Thursday, February 12

Lincoln's Birthday

Monday, February 16

Holiday - Washington's Birthday

Wednesday, February 18

Navy Meeting

Thursday, February 19

Long Island Bone Metabolism Meeting - Room C - Berkner Hall

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# Arrivals & Departures

## Arrivals

- Judy C. Ferrero ..... Accelerator
- Emilie Gerard ..... Medical
- Andrew H. Kuniyuki ..... Biology
- Vincent Lettieri ..... Mech. Engrg.
- Robert M. McClafferty ..... Plant Engrg.
- Kathleen A. Persek ..... Photo. & Graphic Arts
- Jerome D. Quigley ..... Plant Engrg.
- Peter S. Rudman ..... App. Science
- Oscar Sanchez ..... Plant Engrg.

## Departures

- Joseph H. Stakes ..... App. Math

# Yoga Classes

Yoga classes will be held on Wednesday evenings from 5:30 to 6:30 p.m. in the Recreation Building starting on February 18. A fee of \$20 for the 10-class series will be due at the first session.

For reservations call Eena-Mai Franz, extension 4337, or Gay Levine, 929-8725. Keeping fit is not for women only!

# Selected Reading

New Sci. 68, December 11, 1975  
'A roving plumber' behind professor Otto Frisch FRS, the real Robert Frisch. R. Walgate. 644-7

Science 190, December 26, 1975  
The Haemmerli affair: Is passive euthanasia murder? B. J. Culliton. 1271-5  
Somber reflections on congress by a retiring member. L. J. Carter. 1276

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

Sci. Gov. Rep. 6, January 15, 1976  
Congress creates high-powered science-policy group. D.S. Greenberg. 1-2  
New president states rousing plans for AAAS. D.S. Greenberg. 5-7

# Trip To New York City

The Hospitality Committee is planning a group railroad trip to the city on Wednesday, March 3. Departures will be 8:59 a.m. from the LIRR station in Patchogue. The round trip fare for adults is \$2.45; children under 6 years ride free.

There are some tickets still available for a two-hour backstage tour of the Metropolitan Opera House on March 3, beginning 3:45 p.m., at a cost of \$4 for each non-Guild member. Opera Guild members pay only \$2.

Send your money for either event, or both, to Ruth Dimmler, BNL Hospitality, P.O. Box 322, Upton, N.Y.

# Soccer

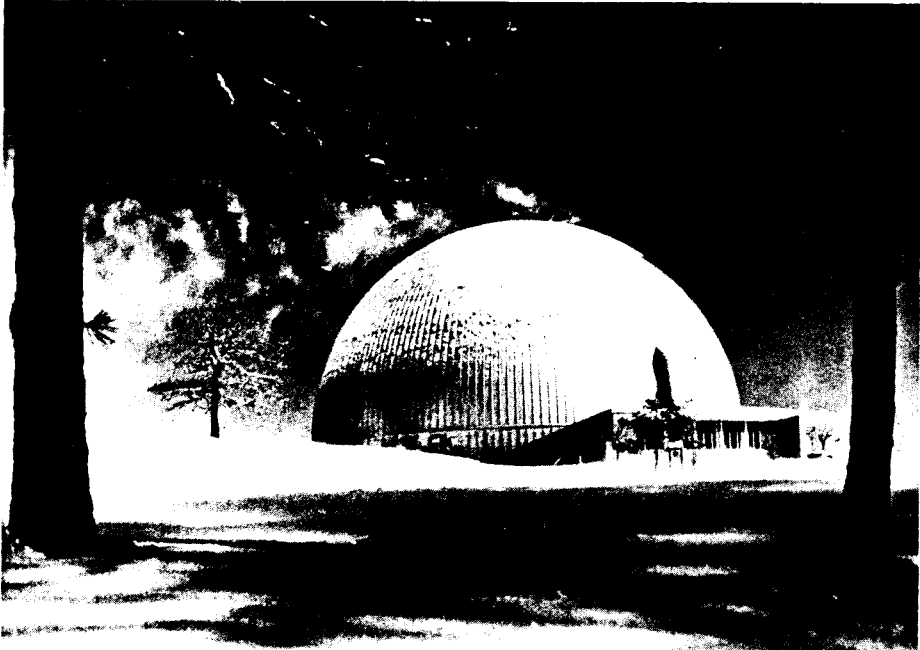
PHY-AMD-INST are comfortably at the top of the league entering February. AGS obtained 3 goals from Rafferty, Keane, and Fleischman, as well as good defensive play by Halliwell to offset 2 goals for the PHY-AMD-INST by Emery. AGS was in excellent position to gain ground if they then could get by the cellar dwelling DAS-CHEM-MED squad. DAS-CHEM-MED however played their role of spoiler well. AGS could not solve the scoring problem as Saklyo turned them back several times in one-on-one situations.

In the second half, Isaacs scored on a rebound to give DAS-CHEM-MED their third victory of the year over AGS. DAS-CHEM-MED then continued their strong defensive play against PHY-AMD-INST, but were equally matched as both teams had to settle for 0-0 tie.

## League Standings

	W	L	T	Pts.
PHY-AMD-INST	10	3	7	27
AGS	10	9	1	21
DAS-CHEM-MED	3	11	6	12

**Winter Drops A Bundle**



The High Flux Beam Reactor silhouetted in the snow and beautifully recorded on film by Mort Rosen. According to many reports the groundhog saw his shadow on February 2, and we can expect winter to continue for another 6 weeks. All one of our meteorologists will say is that this winter is closer to normal than the four previous mild winters, and no one can really predict what will happen - not even the groundhog.

**Bowling News**

Cathy Van Noy

**Ping League**

The "Pinsplitters" are still holding third by three points with the "Spares" in second and the "Fiscal Assets" in third. Helen Keeley converted the 5-10 and Lindora Boyd converted a nice split which I missed. High games for the evening went to Cathy Van Noy with 195-184-179 for a 558 scratch series. Marie Brenner had a nice game of 185.

**Black N Blue League**

The "Question Marks" are two points ahead of the "Fudpuckers" as we approach the 8th week of the second third. A reliable source on the "Fudpuckers" said their captain may soon be put out on waivers. A Big "Congratulations" to Renee Flack who rolled three 157 games to win her triplicate award from WIBC. Pat Lebitshi made it look easy as she converted the 6-7-10 split. High games were Charlie Tomesch 204 and Pat Lebitshi 178. Pots were won by Howie Bell 242 and Pat Lebitshi 231.

**Wanted**

A Bevy of Brookhaven Beauties and Gorgeous Guys for Charlie Brown's lemonade stand (in the lobby) and Scene Stealers (backstage crew). Call Ruth Galvin, Ext. 2867.



Carl Goodzeit as Linus.

**Red League**

"Congrats" this week to J. Roesler for his 216 game, 592 scratch and 679 gross for a club award. J. Sheehan missed a club award by 10 pins. Other nice games were Joe Scesny 226, Walt Reams 204 and Ken Riker 200.

**Purple and White League**

The opening of the first new round found 4 teams winning seven points for a four way tie. V. Walker had a nice evening rolling a 175-455 scratch and 665 gross which is the new league high. Betty Roche rolled a nice 168. For the men, Jon Scott broke records with a 209-246 for a 654 scratch which is the new high single and triple.

The following week found the "Sea Gulls" off to an early lead by taking another 7 followed by the "Alley Oops" who have a 12-2 record. Betty Roche rolled a nice 199-469 scratch which is a new high. Other nice games were rolled by Marie Turano 164 and Marge Belligan 163. Bob Brown won his club award with a 690 gross, Jon Scott 215-552, Art Lipman 214 and Jim Petro 205.

The BNL tournament will be over when this edition reaches you but I hope that each league has at least 90% participation. The Purple and White League had 70% at the last count and the Pink League had 99%. The Black N Blue League had about 50% at last count. We may not all be winners in this tournament but it should make you feel good that you, along with thousands of bowlers all over the states are helping a disabled veteran because he helped you.

**Peanuts Gang On Stage**

"You're a Good Man, Charlie Brown" comes to Stage Two (Exhibit Hall) on February 13, 14, 15, 20, and 21 at 8:30 p.m. with a matinee at 2:30 p.m. on the 21st.

The cast of the show, directed by Ruth Galvin, includes: Carl Goodzeit, Accelerator, Linus; Bob Kinsey, DAS, Charlie Brown; Bill Love, Physics, Schroeder; Bonnie McNair, Lucy; Jane Love, Patty; Bruce Martin, Applied Math, Snoopy; and



Jane Love as Patty, Bruce Martin as Snoopy.

**Monday Morning Blues**

Many people were still snug in their beds last Monday at 6 a.m. when the rain suddenly turned into snow and near-gale winds started turning everything and everyone in the area upside down. At Brookhaven, the temperature then was 32°; by 7 a.m. it had dropped to 23°; by 8 a.m. to 16° and at 9 o'clock it was down to 11°.

Although notice had been given to most radio stations that the Lab would not open until 10 a.m., and a subsequent notice that the time had been extended to noon, there was a general snafu in communications. Some stations had the notice on the air by 7 a.m., another broadcast it about 8:15 when some hardy souls were already slipping and sliding to work. According to reports, one station even said that the Lab was closed all day. Some radio stations were impossible to reach because of the flood of callers cancelling various activities.

In any case, officially the Lab resumed normal operations at noon.

Because of the confusion, the Director has decided that employees will be paid as if the Laboratory was on Emergency Operational Status from 0800 to 1200. The rules for payment are in accordance with the Supervisors' Personnel Manual, Section 15.

Employees who could be spared will suffer no loss in pay because of their being released at 1600. Employees required to work beyond 1600 but within their scheduled workday will receive no additional pay.

According to on-site police, the electricity went off in the apartment area around 1 a.m. Monday and linemen worked through the night. There were other power "dips" in various places at the Lab about six hours later. Snow removal crews were on the job early in the morning and Lab roads were negotiable for those who made it to work.

**Volleyball**

**Mixed League Results - Week of 1/26**

Medicine Ballers	2	High Balls	1
Diamonds	3	Spikers	0
Terabits	3	Set Ups	0
Trolls	3	Nuts & Bolts	0

**Mixed League Standings**

	Wins	Loses
Terabits	25	2
Trolls	23	4
Set Ups	16	11
Nuts & Bolts	14	13
Diamonds	13	14
Medicine Ballers	7	20
Spikers	6	21
High Balls	4	23

**Men's League First Round Results**

Cool Tools (Winner)
Spikers
Atom Spikers
Busters
Easy Aces
Circuits

**Slo-Break Basketball**

Dr. K

The first game of the double header on January 22 was decided by the size advantage enjoyed by the Spuds who defeated the Persuaders 60-48. The starting forwards and center of the Spuds tallied 53 of the 60 Spud points. This terrible threesome consisted of Dennis Nordstrom (20 points), Jeff Gaffney (18 points) and Bob Dory (15 points). The Persuaders played gallantly led by Jim Garrison with 18 points. LeRoy James and Brant Johnson added 12 points apiece to the Persuaders total.

In the second game the Browns met the Condors in a hard fought contest between the League's cellar dwellers. Even double teaming did not dull the Moose's antlers as he scored 29 points in the 57-52 Brown victory. Fox Smith was the other Brown in double figures with 13 points. Mac Thomas and Mike the Spike Dagg had 13 and 12 points for the Condors. Dr. K barely stitched up 10 points. Bob Brown came off the bench and gave the Condors 9 points.

In the first game of the double header on January 29, a hale, healthy and hot Spuds team trounced the gallant but hurting Persuaders 75-52. The Spuds were led to victory by Dennis Nordstrom with 28 points, Jeff Gaffney with 18 points and Bob Dory with 16 points. The Persuaders, although lacking several key players, attempted to pull victory from the jaws of defeat. Wayne Smith played excellently with 20 points as did Jim Lynch with 12 points. At the end of the first quarter Les (L-cubed) Lawrence emerged from a phone booth with his gym shorts and sneakers on, and contributed 8 points. Brant Johnson rebounded, played defense and put in 8 points in this losing cause.

In the second game of this double header, the Condors massacred the Browns 69-45. The Browns had the antlers taken out of their offense by the absence of the Moose, still had some teeth in it, as Fox Smith scored 19 points. Pete Stillman went into double figures with 10 points. Dave (OJ) Tang and Alex Pittmen contributed 6 points apiece. Scoring for the Condors was provided by the outside shooting of Jim Vaughn with 17 points and Mike the Spike Dagg with 22 points. Dr. K operated on the inside and put in 11 buckets (22 points) and was so happy he even took a shower afterwards.

The four highest scorers at the end of the first half were:

Player	Games	Total Pts.	Pts./Game
Moose	5	168	33.6
Gaffney	6	126	21.0
Nordstrom	6	122	20.3
Vaughn	7	92	13.1
Dagg	6	91	15.2

Sharon Smith, Physics, The Little Red-Headed Girl.

Pianist Nancy Bernius and percussionist Bill Trigg will provide the music for the singing and dancing. And songs - twelve in all - include "Snoopy," "The Red Baron," "Baseball Game" and "Supertime."

Children will be delighted with the cast's portrayal of the characters from Charles Schulz's comic strip "Peanuts." Parents are urged to bring them. The matinee on Saturday, February 21, is being scheduled for

the children who find the 8:30 p.m. performance beyond their bedtime. At the matinee, during intermission, a clown will entertain the children.

Tickets are priced at \$2.00 for BNL employees and others. Children under 18 and adults over 65 will be admitted for \$1.00. Tickets may be obtained from Blanche Laskee in Personnel, Rita Straub in Medical, Pat Towey in Physics, Eena Mai Franz in Chemistry and at the Cafeteria during lunch.



Bob Kinsey as Charlie Brown, Bonnie McNair as Lucy.

