

## Cronin And Fitch Win Nobel Prize For Experiment At AGS

James W. Cronin and Val L. Fitch have won the 1980 Nobel Prize in physics for experimental work done at Brookhaven's Alternating Gradient Synchrotron.

Cronin, Professor of Physics at University of Chicago, and Fitch, Professor of Physics at Princeton, led a research group from Princeton in 1963, which discovered a violation of a fundamental symmetry principle in the decay of neutral K-mesons. According to this symmetry principle, called Time Reversal, the laws of physics are the same if time were to flow in the opposite direction. (Actually, they measured a violation of CP invariance, which is equivalent to a violation of time reversal symmetry.)

There are two kinds of neutral K-mesons - the long-lived,  $K_L^0$ , and the short-lived,  $K_S^0$  meson. Previous experiments had shown that the  $K_S^0$  meson decays to two  $\pi$  mesons. Be-

cause of the supposed time-reversal symmetry in nature, physicists reasoned that the  $K_L^0$  meson could not decay to two  $\pi$  mesons.

Cronin and Fitch discovered that the  $K_L^0$  meson did indeed decay into two  $\pi$  mesons. They observed 45 two  $\pi$  events out of 23,000 decays.

### At the AGS

The research team also included James H. Christenson, a graduate student of Cronin's, and Rene Turlay, a visiting researcher from Saclay in France. The experiment was actually Christenson's doctoral thesis.

They submitted a proposal to BNL's High Energy Advisory Committee in April 1963 and a month later, the committee approved 200 hours of beam time at the AGS.

Cronin had done a previous experiment at the Cosmotron, and so they used his experimental apparatus. The

experiment was located in what is known as Inner Mongolia, a local term coined by Ken Green denoting the area inside the AGS magnet ring.

Set up time was minimal. But even then, the experiment progressed with remarkable speed, and the group had results before the end of the year.

Fitch commented on the time scale in a speech about the experiment during the AGS 20th anniversary in May this year. "The time interval between the proposal and collecting data... was amazingly short. Of course, that also represents the enthusiasm of the people that we had here to help us handle the work. We're so completely aware of the splendid cooperation from the BNL staff that made this experiment go."

He relayed a story about something that came out of the experiment. "One of my graduate students got his degree and... became an assistant

professor... and received one of the standard forms from the American Men of Science asking, 'When were you born? etc., etc., and finally, what is your special interest?' He wrote down 'CP violation in neutral K decay.' When the proof came back, it was 'carbon-phosphorus violation in neutral potassium decay.'"

### Not By Accident

The point of the experiment was to set even more stringent limits on the validity of the symmetry principle. Although they set out to look for  $2\pi$  meson decay, they did not expect to find it, and their results were a complete surprise.

The experiment was published in the July 27, 1964 issue of *Physical Review Letters*. Since then, a great deal of experimentation and theoretical thinking has been done by other physicists. But there is still no satisfactory theoretical explanation of the origin of CP violation.

Physicists are always in search of an all-encompassing theory that explains as much of the world as possible. They presuppose simplicity and symmetry.

Cronin and Fitch discovered that in one tiny corner of the subatomic world, there is a flaw - a breakdown of one of the basic symmetry principles of nature.

### Other Nobel Prizes

In addition to Cronin and Fitch, three other scientists have won the Nobel Prize in physics for work done while at Brookhaven. T.D. Lee and C.M. Yang, were prize winners in 1957 for doing theoretical work that suggested parity violation in weak interactions. S.C.C. Ting shared the prize in 1976 for his discovery of the J/psi particle with Burton Richter at SLAC.

### VLA Tunes In To The Universe - Story on page 2.



## 'Running on Empty'

At first glance, it looks like a standard 1980 Plymouth Volare parked among all the other government vehicles in the lot behind Staff Services. But this car is unusual. Its odometer shows distances in hundredths of a mile, the accelerator pedal is connected to a vacuum gauge which is affected by pedal movements, an instrument indicates miles per gallon and another shows fuel consumption in thousandths of a gallon.

Two signs, front and back, give a clue. They identify the car as a training vehicle (those specials instruments were installed by the BNL motor pool) for a DOE-sponsored program called Driver Energy Conservation Awareness Training, or DECAT for short.

It's a new program at Brookhaven and at other government and private facilities through which DOE is encouraging energy conservation on our nation's highways. DECAT is based on a Reynolds Electric and Engineering Col, Inc. project conducted at the Nevada Test site in 1976-77 for the Department of Energy. It emphasizes what managers of large fleets as well as individual operators can do to stretch their gasoline dollars through more fuel-efficient practices without impairing or sacrificing transportation resources.

Last April, Nick Pisco, Administrative Services Supervisor in the Staff Services Division, went to Nevada to take a DECAT course for instructors in the program. He spent two and a half days learning how to save energy behind a wheel and developing his own style for teaching energy conserving techniques to drivers back at the Lab.

Initially, Pisco will teach employees who are professional drivers and those who drive frequently in their jobs.

The course packs a lot of information in a three and a half hour session. It includes a thirty minute slide presentation covering trip planning, vehicle purchase, maintenance, instrumentation, and driving skills. Then comes a behind-the-wheel segment in the Plymouth Volare where driving techniques can be practiced. The session ends with a viewing of a film "Running on Empty" and a general wrap-up discussion.

Pisco says the practical portion in the car is a most effective way to teach good driving skills. He has mapped out a 5.7 mile road course that includes driving on site and on the William Floyd Parkway. It's designed to be driven in about nine minutes and every student gets two tries.

The first class was held last week.

During the driving segment, Pisco was first behind the wheel. On his initial run, he did a classical take off on a bad driver - excessive braking, improper acceleration, weaving. His time was 8 minutes 50 seconds, 14.4 mpg. On his second run, he applied the techniques he is teaching, and with good results - 9 minutes 10 seconds, and 17.8 mpg.

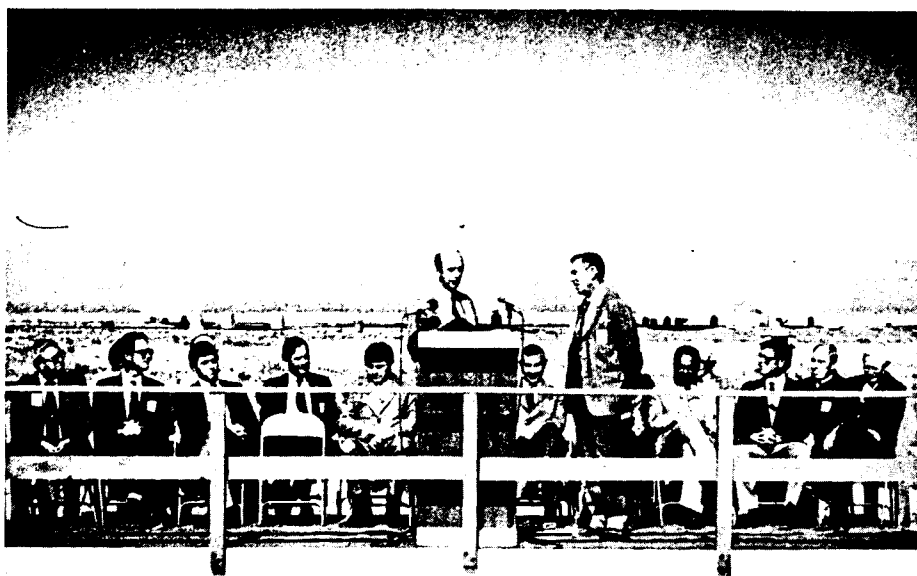
A student was next. First run - 9 minutes 6 seconds, 18 mpg. Second

run - 9 minutes 3 seconds, 20.6 mpg. Every student tried for fuel economy on the first run and did even better the second time. As Pisco says, seeing the fuel click away in thousandths of a gallon makes them very aware of how they are driving.

But even when a driver is being very conscientious, gas consumption can be affected by other factors, he adds. Wind, rain, passenger load and  
(Continued on page 2)



In a new program on site, Nick Pisco, Staff Services Division, teaches drivers energy conservation awareness. Seated in a car equipped with special instruments, Pisco explains their functions to some members of his first class, (from left) Al Lorentsen and Nelson Tyler, Supply and Materiel Division, and Richard Auspaker, Safety and Environmental Protection Division.



With radiotelescopes in the background, dedication ceremonies were held last week for NRAO's Very Large Array in New Mexico. Standing are (left) Donald Langenburg, National Science Foundation Deputy Director, and David Heesch, former Director of NRAO, who early on promoted the idea of the VLA. Seated between them is Morton Roberts, Director of NRAO. On the far right is Gerald Tape, recently retired President of AUI.

## VLA Dedication

On the Plains of Augustine, a remnant of an ancient lake bed between Magdalena and Datil in west central New Mexico, a powerful new instrument of science – the Very Large Array – was dedicated on October 10, 1980. It demonstrates once again the fruitfulness of the concept of AUI and the institutions, Brookhaven National Laboratory and the National Radio and Astronomical Observatory, created to provide instruments to advance science and thereby the wellbeing and stature of the United States.

The VLA consists of 27 radiotelescopes, each having precisely constructed aluminum parabolic surfaces, 25 meters in diameter, fully steerable, weighing 210 tons each.

The telescopes are arranged along three equally spaced radial arms having a "Y" array, two arms of which will be 21 kilometers (13 miles) long and the third 19 kilometers (11.8 miles) long. The telescopes are moved via a double standard-gauge railroad track to 72 stations to provide different configurations. Radio signals from space are concentrated by the parabolic dishes to receivers held at the apex of the antenna, there being four "horns" tuned to different frequency bands of interest. The signals are amplified and sent to the central control

building by waveguides, there to be sorted and analyzed to give maps of celestial objects. Each antenna (radiotelescope) is electronically linked to every other antenna in the array, forming 351 "interferometer" pairs which utilize a telescope called earth-rotation aperture synthesis to observe a distant radio source as it moves across the sky.

The construction of the VLA started in 1972 under the auspices of the National Science Foundation, preceded by design work at NRAO's facilities in Green Bank, West Virginia, carried out in 1962-63. It cost a bit over 78 million dollars and is by far the most ambitious astronomical observatory ever built.

Early results have been exciting and significant. Observations range from the sun and planets of our solar system to the most distant extra galactic objects. The temperature of the atmosphere and surface of Venus has been determined in detail. One of the most remarkable astronomical objects observed with the VLA is a double quasar associated with the radio source 0957 + 561. Evidence suggests that these images are of the same object, created by the bending of light waves and radio waves by an intervening galaxy. —R.C. Anderson

## IBEW Meeting

Local 2230, I.B.E.W. will hold its regular monthly meeting on Monday, October 20, 1980, at 8 p.m. in the Knights of Columbus Hall, Railroad Ave., Patchogue. There will also be an afternoon meeting at 2 p.m. for shift workers in the Union office at 31 Oak Street, Patchogue. On the agenda will be regular business, committee reports and the President's report. **Please note date.**

## Driver Training (Continued)

even a cold engine can make a difference. Still, good driving skills alone can mean an average of 10% improvement in miles per gallon.

Pisco drives a 1977 Chevy Malibu. Although he has always thought he was a good driver, when he began applying the techniques he now teaches, he went from 15 mpg to 17 mpg, a 14% improvement.

Pisco says the DECAT program is very effective. Everyone who goes through the course can help this country cut down on energy consumption – and save themselves money – just by using common sense techniques not commonly applied.

## Stony Brook Events

**Speaker:** Earth & Space Sciences Prof. Roger Knacke, "Maya Astronomy," October 17, 7:30 p.m., 001 Earth & Space Sciences Bldg. Telescope viewing to follow, weather permitting. An Open Night in Astronomy.

**Theatre:** Clifford Odets' "Awake and Sing," October 17 and 18, 8 p.m., Theatre I, Fine Arts Center. Students, sr. citizens, \$2; faculty, staff, alumni, \$3; others, \$4. Information: 246-5678.

**Concert:** Hermann Baumann, horn, and Tashi (clarinet and strings), October 19, 3 p.m., Main Auditorium, Fine Arts Center. Part of the Fine Arts Center's Music II Series. Students, sr. citizens, \$6; others, \$12, \$10, \$8. Series tickets, \$40, \$34, \$27. Information: 246-5678.

**International Folk Dancing:** Every Monday, 8-10:30 p.m., Tabler Cafeteria. Students, sr. citizens, \$1; others, \$2.50. Starts October 20. Information: 935-9131.

**Film:** "Belle de Jour," October 21, 5, 7, 10:30 p.m., Stony Brook Union Auditorium. 25¢ with University ID, others, \$1. Tuesday Flix Series.

**Speaker:** Political Science Prof. Steve Brown, "What Would Happen If None of the Presidential Candidates Should Receive a Majority?" October 21, 8 p.m., 214 Old Physics.

**Concert:** Electronic Music featuring the Sonic Union, 8 p.m., October 23, Recital Hall, Fine Arts Center. Students, sr. citizens, \$1; others, \$2.

**Concert:** Frank Zappa, October 26, 7 & 11 p.m., Gym, \$8.50, \$6.50. Sponsored by Student Activities Board. Information: 246-7085.

## Businesswoman Berezin To Speak

Evelyn Berezin, former president of Redactron Corporation, and now consultant to The Burroughs Corporation, will be the next speaker in the Women in Science Lecture Series. Her talk is entitled "Small Technical Businesses." Open to everyone, the lecture is on Tuesday, October 28, at noon in Room B, at Berkner Hall.

Ms. Berezin has had twenty-seven years of technical and administrative leadership in communications and data processing equipment. She was primarily responsible for organization of Redactron, and was president from its inception to the spring of 1978. Redactron now has the second largest installed base of word processing typewriters in the world, and is considered an industry leader in the development of sophisticated editing and communications systems. Redactron Corporation is a subsidiary of Burroughs Corporation.

Before forming Redactron, Evelyn Berezin was technical assistant to the president, Digitronics Corporation, and in charge of advance product and market speed commercial digital communications terminal in this country.

Following the lecture, a luncheon will be served at 1:00 p.m. in Room A. Reservations can be made by calling Gail Williams, Ext. 3338. Seating is limited.

## Women In Science

The BNL Women In Science will host a wine and cheese social to introduce the recently elected officers of the organization. The social will be held at the Recreation Building on Wednesday, October 22, from 4 to 6 pm. All members and prospective members are invited to attend. For information or transportation call Harriet Fadem, Ext. 4853.

## Patent Awarded

David Edwards, Jr. and William Schneider, Accelerator Department, were awarded U.S. Patent No. 4,214,473 for "Gaseous Trace Impurity Analyzer and Method." Their invention provides a simple and relatively inexpensive apparatus for measuring the content of trace impurities in gas. The apparatus does not require a specially trained operator, and it permits rapid analysis of the trace impurities.

## Retiree



Marion C. Gaffga recently retired from her position as Principal Secretary in the Physics Department. She first came to the Lab in 1951, left in 1956, and returned in 1969. She and her husband Robert, who retired from the Lab last month, have relocated to Florida, where they plan to "enjoy the sunshine."

## Arrivals & Departures

### Arrivals

Thomas Bottiglieri.....Adm. Sys/Data Proc.  
Robert J. Danowski.....Plant Engrg.  
Keelin M. Fendler.....Energy & Env.  
Dora B. Krimer.....Biology

### Departures

Nesim Abuaf.....Nuclear Energy  
George D.J. Green.....Biology  
Daniel N. Eriksen.....Nuclear Energy  
Juanita H. Mac Evoy.....Energy & Env.  
Tsuneo Tanzawa.....Energy & Env.

## Heroic Deed



BNL Firefighter, William Leigh-Manuell, has been named "Suffolk County Fireman of the Year" because of his heroic actions on January 26, 1980. Leigh-Manuell is also a volunteer fireman of the West Sayville Fire Department. While enroute to the Lab that day, he discovered a fire at a local boarding house. Without benefit of protective turnout gear or breathing apparatus, he rushed to the aid of a trapped resident and saved her life. He will be honored at the Annual Dinner-Dance of the Suffolk County Volunteer Firemen's Association tomorrow night at the Polish Hall in Riverhead.

## NYC Train Trip

The Hospitality Committee is planning a group railroad trip to the city on Wednesday, October 29. Departure will be at 7:55 a.m. from the Patchogue LIRR station. Round-trip fare for adults is \$3.25, children under six years ride free.

Reserve a ticket by sending your fare through the U.S. mail to P.O. Box 322, Upton, New York 11973, no later than Thursday, October 23. Make checks payable to "Brookhaven National Laboratory." Your tickets will be given to you on the train. Refunds will be made only if cancellations are received by the Friday preceding the scheduled trip.

## Selected Reading

Nat. Rev. XXXII (20), October 3, 1980  
Poland's smoking gun. L. Labedz. 1200-02 +  
Nature 287 (5780), September 25, 1980  
Electronic publishing: Keyboard papers. J. Redfearn. 266-67  
New Sci. 87 (1220), September 27, 1980  
Wind engineers save builders' blows. A. Hunt. 914-16  
Sci. News 118 (13), September 27, 1980  
Heart attack risk greater on Monday. 199  
New Scientist 88 (1221), October 2, 1980  
The perils of second-hand smoking. S. Stock. 10-13  
Saturday Review 7 (14), October 1980  
Can performing arts survive the unions? J. Vitullo-Martin. 36-9  
American Scientist 68 (5), September-October 1980  
The control of hypertension: A therapeutic breakthrough. N.M. Kaplan. 537-45

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## Food Alert

Information has been received by the Department of Energy indicating a problem with the following products: mushrooms produced by United Canning Corp., North Lima, Ohio, and Four H Corp., Imlay City, Michigan, and cooked, frozen flight meals produced by Ariston Airline Catering and Supply, Wrightstown, New Jersey. The United Canning Corp. mushrooms come sliced, in 16 ounce cans coded with a sideways T, top to the left, then J9UG. The Four H Corp. mushrooms come in 16 ounce cans, coded F7-H90/L141. Affected flight meals are beef sirloin steak, Lot 80162, NSN 8970-00-165-6902, and egg omelet with ham, Lot 80165, NSN 8970-00-165-6905.

## Cooking Exchange

An Oktober Fest is the theme of the next Cooking Exchange Meeting on Wednesday, October 22 at 12:30 p.m. in the Recreation Building. "The Men" (husbands or friends of members) will prepare such German dishes as Rouladen, Sauerbraten and dumplings.

The meetings are open to people affiliated with the Lab and their family members. There is a charge of \$1 per person and babysitting is provided at 25¢ per child.

For further information call Ruth Fernow, 928-8465. "Guten Appetit!"

## Cafeteria Menu

### Week Ending October 24, 1980

#### Monday, October 20

French onion soup	(cup)	.50
	(bowl)	.60
Corned beef & cabbage		1.55
Turkey brazil & rice		1.55
Hot Deli - Pepperoni, egg, onion & pepper hero	(on bread)	1.45
	(on roll)	1.55

#### Tuesday, October 21

Cream of spinach soup	(cup)	.50
	(bowl)	.60
Roast top round of beef w/1 veg.		1.55
Seafood quiche & 1 veg.		1.55
Hot Deli - Pastrami	(on bread)	1.55
	(on roll)	1.65

#### Wednesday, October 22

Chicken vegetable soup	(cup)	.50
	(bowl)	.60
Baked lasagna & 1 veg.		1.45
Swedish meatballs w/noodles		1.50
Hot Deli - Roasted fresh ham w/barbecue sauce	(on bread)	1.50
	(on roll)	1.60

#### Thursday, October 23

Navy bean soup	(cup)	.50
	(bowl)	.60
Roasted chicken & 1 veg.		1.55
Beef hash & 1 veg.		1.45
Hot Deli - Philadelphia style steak sandwich	(on roll)	1.60

#### Friday, October 24

Seafood chowder	(cup)	.55
	(bowl)	.65
Yankee pot roast & 1 veg.		1.55
Broiled fillet of fish & 1 veg.		1.45
Hot Deli - Roasted turkey breast	(on bread)	1.55
	(on roll)	1.65

## Symposium



Mort Rosen

After a successful first symposium in 1977, Brookhaven hosted last week the second International Symposium on the Production and Neutralization of Negative Hydrogen Ions and Beams. Sponsored by the DOE Office of Fusion Energy, it was organized by the neutral beam development group of the Accelerator Department and chaired by Theodoros Sluyters, pictured on the left with H. Stanley Staten, DOE Project Manager. The interest in negative ion beam development has been growing rapidly in the last couple of years with its applications spreading to low and high energy accelerators. The main thrust in negative ion beam development remains the future need for higher energy beams to be injected in next generation fusion reactors.

## Basketball

A sign up sheet is now posted in the gym for all new players. The season begins the first week in December. Team captains will contact those who have played before.

## Bowling

### Pink League

High games were bowled by Renie Rosati 176, Deb Johnson 176/482 series, Marie Grahn 172, Audrey Blake 166, Marge Stoeckel 165, Millie Connelly 163. Congrats to Maryann Larsen, a new bowler, for a game 57 pins over average. Substitutes are still needed for our league. Anyone interested please call Helen Keeley Ext. 4649.

### Red League

This Isa Team won 11-0 over the Freon Loaders. R. Barberich grossed 649, F. Powers 636, J. Sauls 627, R. Marlow (203) 624. The Sandbaggers took 11 from the Phoubars. A. Dick grossed 634, E. Meier (200) 628, R. Jones 600, C. Bohnenplusch a 201 game. The Strangers won 7-4 over the Trouble Shooters with F. Pond grossing 608. The Old Timers split 5-6 with Light Source. J. Roesler had a (202) 625 gross and R. Adams (201) 624 gross. The 76'ers managed 3 against the Pinball Wizards. J. Petro grossed 625, J. Morris 619, R. Larsen

## Brush-up Your Math

The Technician Tutorial Mathematics classes are holding sessions now on Wednesday and Fridays. Wednesday morning sessions (10 to 11:30) will be devoted to a review of arithmetic, the metric system and the use of calculators. Wednesday afternoon sessions (2 to 3:30) will cover basic algebra and plane geometry. Friday mornings (10 to 11:30) will be a preparatory class for college or technical mathematics.

If you have attended the classes in the past and still have your copy of Algebra II and Trigonometry by Dressler/Rich and are not using it, please either give or lend it to the class until we can obtain more copies.

There is still time to enroll in any of the three sessions. For information call LeRoy Jefferson on Wednesday or Friday from 8:30 a.m. to 5 p.m. at Ext. 2527.

## Runner's Corner

Bob Moritz of Patchogue led 147 runners to the finish line in the Jack Baer 10 km run. His time of 33:02 established a new course record. Mike Bergkamp, Chemistry, who fought Moritz for the lead early in the race, held on for a 3rd place finish earning the top BNL title. In the women's race, Marylynne Caruso recorded a time of 43:56 to win top women's honors in the race. Jackie Howe (45:18) raced to the top BNL women's spot. Both Bergkamp's and Howe's name will be recorded on a plaque honoring Jack Baer.

605. The Designers won 3 in a match with the Blue Jays.

### Green League

The Sparks are still in first as they took 8 from the Old Timers II. W. Kristiansen bowled a 206. The Pinball Wizards took 8 from the 76'ers. The Blue Jays took 8 from the Designers with N. Parrinello bowling a 203 and L. Jacobson 230. The Trouble Shooters could only salvage 4 from the Strangers with R. Scheidet having a 243. The Light Source split with the Old Timers. The Phoubars lost 11 to the Sandbaggers.

### Purple & White League

Ed Meier rolled a new high series with games of 245/245/168-658. Gloria Brown bowled a 209 and Betty Jellet had games of 181/180 for a 512 series. Other good games were bowled by Ken Riker 210, Bob Glasmann 209, Bob Jones 208, Pat Manzella 202, Marge Belligan 192, Nancy Erickson 191, Elsie Murray 182.

Congrats to Eddie Arnold who has been elected President of the New York State Bowling Proprietors Association.

## Faster Service

New, yellow envelopes for mailing medical bills to Personnel Services can now be obtained from all department and division offices. Employees are encouraged to use these envelopes when submitting their medical bills. It will help expedite the processing of medical claims.

## Puppeteer At BNL

Jacques Chicoineau, a renowned puppeteer, will appear at Brookhaven on Wednesday, October 22 to present a lecture-demonstration entitled "Marionettes: An Art as Old as the World." The program, sponsored by *Le Cercle Français de BNL* will take place at Berkner Hall at 8 p.m. on October 22. A donation of \$3 (\$1.50 for students) will be requested from those who are not members of the BNL French Group.

Mr. Chicoineau's early career was as a production manager in the French pharmaceutical industry, but at the age of 39 he came to the United States to start a second career as a teacher. His activities as a puppeteer stem from his use of them as a teaching device. He has appeared with his marionettes in many states, in France, and in Switzerland.

After his lecture, which will be in French, Mr. Chicoineau will demonstrate his marionettes in a dramatized version of "The Curé of Cucugnan," adapted from Alphonse Daudet's "Letters from my Mill." Those whose French is not fluent may find it helpful to read the story beforehand.

## Mountain Club

Neither rain nor sleet nor mud stayed three hearty Mountain Club members from reaching the summit of Mt. Marcy, the highest peak in New York State, recently. When the weather finally cleared, the spectacular fall foliage provided compensation for the earlier poor weather. Anyone interested in the club should attend the next meeting, tentatively scheduled for Tuesday, October 21 at 7:30 p.m. in the North room of Brookhaven Center. On the agenda are discussion of plans for the rest of the year, election of new officers and a slide show. Reminder: Annual dues should be paid to Anita Swoboda before the end of this month.

## International Exchange Of Nuclear Data



The Fifth Meeting of the Nuclear Reaction Data Centers was held at Brookhaven recently. Representatives from the NEA Data Bank, Saclay, the IAEA Nuclear Data Section, Vienna, the Karlsruhe Charged Particle Group (KACHAPAG), Germany and the NBS Photoneuclear Data Center met with members of the National Nuclear Data Center to discuss matters concerning the exchange of nuclear data. Some of the conference attend-

ees were Joseph Schmidt, IAEA, Vienna; Gail Wyant, Meeting Secretary, BNL; Hans Lemmel, IAEA, Vienna; Charles Dunford, Chairman, BNL; Sol Pearlstein, Centerhead, BNL; Tom Burrows, BNL; Everett Fuller, NBS; Nigel Tubbs, NEA, Saclay; Alyce Daly, Assistant Secretary, BNL; Peter Johnston, NEA, Saclay; and Vicki McLane, BNL.

Doug Humphrey



