

FermineWS

FERMI NATIONAL ACCELERATOR LABORATORY

Laboratory achieves antiproton accumulation record

Record setting antiproton accumulation rates were achieved over the recent Christmas and New Year's holiday. While many of us were enjoying a little R&R, members of the Accelerator Division were gearing up to meet a challenge.

At the All Experimenters meeting held on December 30, Director **John Peoples** challenged the Accelerator Division to stack Pbars at greater than 2.5×10^{10} per hour. Later that same day his challenge was met by the operating crew in the Main Control Room when an instantaneous rate in excess of 2.5×10^{10} per hour was documented. Later, when reviewing the log, the crew realized that they had, in fact, obtained this goal earlier on December 25. (See chart below)

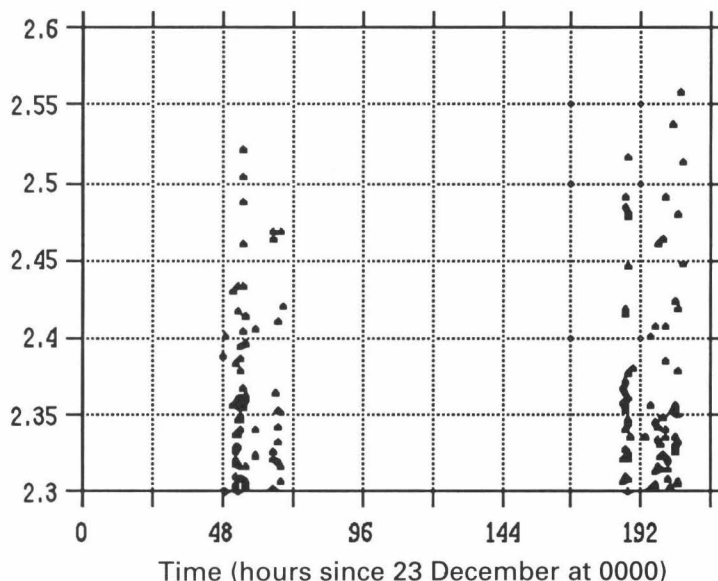
Breaking this mark underscores a more important feat. Over the past weeks, the average antiproton accumulation rate and the efficiency of producing antiprotons have increased steadily. "A special effort has been made in the last month to improve the stacking rate," said **Elvin Harms**, AD/Operations Specialist. The stacking rate averaged over one week's operation has increased to nearly 1.75×10^{10} per hour, an increase of about 60% in the past three weeks. "This has been an on-going endeavor," said Harms. "It is the culmination of the efforts of many people in the Accelerator Division."

There is no single reason for the accumulation rate improvement, according to **Bob Mau**, Accelerator Operations Head. "This was a community effort," said Mau. "The rest of the Accelerator Division opened the window which allowed the Operations Group to break the stacking record."

According to **Craig Moore**, AD/Fixed Target Run Coordinator, one of the most important reasons we improved our stacking ability was due to improved Main Ring bunch narrowing following some RF voltage adjustments. Other significant improvements making this achievement possible include: an increase in the Main Ring intensity on cycles devoted to antiproton production; stabler beam out of the Linac due to the replacement of some switch tubes in station 3; improvement in the lithium lens system; and hours of tuning and studying source performance by members of the AD/Pbar and AD/Operations groups.

This record setting antiproton accumulation rate provided for a more efficient running of E760 which uses antiprotons stored in the Accumulator for data taking during the fixed target run. An improved stacking rate means less time needed for replenishing the stack and more time for data taking. It also bodes well for the upcoming Collider run.

**Antiproton Stacking Rate Record
23-31 December, 1991**



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This is the second in a series of articles celebrating the 25th anniversary of Fermilab (1967-1992).

Throughout 1992, Ferminews will feature Timeline: A date to remember as a regular column dedicated to milestones that occurred during the first twenty-five years of physics at the Laboratory.

Ferminews welcomes employee submissions, either in the form of written articles or story ideas, to the column.

Timeline: A date to remember

January 3, 1987

Proton/antiproton collisions at 1.8 TeV

Improving its status in *The Guinness Book of World Records* was not a consideration for Fermilab's Tevatron collider during its 1987 run. The world's most powerful particle accelerator had already attained a record high proton/antiproton collision energy of 1.6 trillion electron volts (TeV) during the early morning hours of October 13, 1985 in a test run using the partially-completed Collider Detector at Fermilab (CDF). The focus was now on what new physics trophies might await the Tevatron when its collision energy approached the 2 TeV threshold beginning January 1987.

The European high energy physics consortium, CERN in Geneva, Switzerland, had been running physics at 630 GeV since 1982. In 1983, just two years before Fermilab broke into the TeV range, CERN's Carlo Rubbia and Simon van der Meer discovered the Z and W particles, the Z being the so-called "glamour particle" of the 1980s. Their work earned them the 1984 Nobel Prize in Physics. Clearly, to the victors went the spoils.

Former Fermilab Director **Robert R. Wilson** understood the truth to this maxim even before the final magnet had been installed in the Main Ring in 1971. With an eye cast toward the next generation of accelerators, Wilson and his engineering teams designed Fermilab's Main Ring with a hollow space below its conventional copper-coiled magnets to one day accommodate a string of superconducting magnets. In the service buildings that accessed the tunnel, additional room had been left to house the electronics, power supplies and cryogenic system to support what would later be called the Energy Saver (read Tevatron). The nascent superconducting industry would be hard pressed to support the magnet research and development that geared up at Fermilab after the Main Ring reached its design energy of 200 GeV, but it would meet the challenge. Looking even further down the road, Wilson wrote in a 1977 memo that he had "arbitrarily designated straight sections B and E as being completely available for experiments with colliding beams." Only five years would pass before BØ was excavated. It was Fermilab's second director,

Leon Lederman, though, who would take over the reins of the ambitious project imagined and anticipated by Wilson and see it through to fruition.

Reaching higher energies wasn't simply a matter of piecing together a giant \$250 million Energy Saver set from *Accelerators-R-Us*. Many of the elements for the proposed superconducting accelerator did not exist — let alone in a prepackaged form. The Saver project would require an elaborate and massive liquid helium cryogenic system to cool its magnets to near absolute zero. It would call for high-speed computers to guide proton beams through the magnets. It would need massive detectors linked to high-speed computers to study the collisions. Beyond the purely technical demands, the Saver required money.

The United States Department of Energy (DOE) would authorize funding for a ring of superconducting magnets to be installed under the Main Ring in 1979, formally initiating construction of the Energy Saver project. Two years before that, in 1977, the Collider Detector Facility under **Alvin Tollestrup** assumed responsibility for designing and building a detector for studying proton/antiproton collisions at 2 TeV. Meanwhile, mass-production of the 1,200 superconducting magnets for the Energy Saver continued. Following more than six years of R&D and construction, the Main Ring transferred its first bunch of protons into the Energy Saver, the latter accelerating the bunch to 512 GeV on July 3, 1983. Speaking to an audience of about 300 people at the Energy Saver's dedication in April, 1984, Fermilab Director Leon Lederman explored the future of physics at Fermilab. Fixed target experiments will evolve in the next few years, Lederman predicted. Colliding beam physics creating 2 TeV proton/antiproton collisions will allow "exploration of a totally unknown domain of energies," he said. "Here the potential for dramatic discovery is very great."

Colliding beam physics could only be realized if the antiproton source designed and managed by **John Peoples** could accumulate enough of the elusive antiprotons to make collisions happen at a sufficient rate. During the same time about one-quarter of the way around the ring, **Dennis Theriot**, Alvin Tollestrup, Roy Schwitters and a cast of hundreds continued construction of the three-story tall monolithic CDF. The 4,500-ton detector needed to record the 100,000 collisions that occurred every second when protons met head-on with antiprotons in the Energy Saver.

In April of 1985, the antiproton source became opera-
Continued on page 3



Director R. R. Wilson serves Shigeki Mori at the celebration held in the Main Control Room after the accelerator reached its design energy of 200 billion electron volts on March 1, 1972.

Fifteen years later, the Tevatron reached the highest energy collision on record—1.8 trillion electron volts.

tional. In September of that year it accumulated its first batch of antiprotons. Working in conjunction with the Saver—by then operating as the Tevatron—and a partially-operational CDF, the upgraded accelerator complex collided 800 GeV protons with 800 GeV antiprotons in October. The test-run yielded 1.6 TeV center-of-mass collisions unrivaled by any other collider. Following ten months to complete CDF and to excavate DØ for another detector, the Tevatron I project came on line in January 1987.

When matter and antimatter traveling at nearly the speed of light collided head on January 3, 1987, the results were unprecedented. The protons and antiprotons zooming around in the Tevatron below the frozen Illinois prairie annihilated each other at 1.8 TeV—to date the highest energy collisions recorded. Collisions in March of 1987 detected the first “new world” W event at CDF. Later results would measure the mass of the Z-zero particle six times more precisely than previous measurements. The Tevatron was truly the champion of particle accelerators.

But dramatic discoveries still lurk somewhere on the fringe of yet-unexplored mass domains. On the eve of the 1992 collider run, the holdout top quark no doubt nervously awaits the showdown soon to take place in the Tevatron. The top, like those who seek it, isn’t alone in its anticipation. After all, trophies remain to be claimed.—*Brian Dick*

OSHA training status

Compliance with regulations is a major feature of DOE’s current emphasis on environment, safety and health (ES&H) matters. In response to this initiative, Fermilab has launched a program of training in Occupational Safety and Health Administration (OSHA) regulations including General Industry Standards (1910), Construction Industry Standards (1926), and techniques for conducting inspections. The 1910 and 1926 training is available in 10- and 30-hour versions. The 10-hour courses provide an overview and are directed toward managers. The 30-hour courses contain a more detailed review and are intended for employees who are expected to interpret regulations and implement compliant activities on a day-to-day basis. The half-day inspection class provides “how-to” guidance for conducting and documenting OSHA-type inspections. It is primarily meant for building managers and other personnel involved in the Lab’s ES&H Self-Assessment Program (SAP). All of this OSHA training is being conducted by consultants.

Training in the 1910 standards has been in progress since May of last year. There have been seven sessions each of the 10- and 30-hour versions with attendance totals of 199 and 214, respectively. Another seven or eight sessions of 10-hour and four sessions of 30-hour are scheduled for early 1992. This will bring the total number of 1910-trained employees to around 750. Labwide training in the 1926 standards is scheduled for spring. One session of 10-hour and one session of 30-hour, each having 30-40 students, is planned. Technical Support Section has already had this material presented to its building managers. Training in OSHA inspection techniques is also planned for spring. A total of 150 students are expected in six to ten sessions. Approximately one-third of this training will involve actual practice in conducting inspections.

Attendance for OSHA training is coordinated through division/section offices. Most slots have already been reserved for remaining 1910/1926 sessions. Although assignments for the inspection course have not yet been made, most openings will be allotted to building managers, supervisors and ES&H personnel. Contact your division/section office or ES&H organization for further information.—*Tim Miller*

Pool and ping pong matches

Just what you’ve been waiting for—pool and ping pong tournaments at the User’s Center beginning February 17.

There will be 8-ball and straight pool tournaments held on Tuesdays and Wednesdays with time slots available from 5:30 to 8:30 p.m.

Singles ping pong will be held on Mondays and Fridays with time slots available from 5:30 to 8:30 p.m.

Sign-up sheets are located on the bulletin board at the Users Center. You must sign-up prior to the deadline of February 3.

Aside from the chance to meet new people and the thrill of competition, TROPHIES will be presented to the champions!

For further information contact Jean Guyer at x3126 or x4544.

Harper’s index

Number of the 10 NFL teams whose helmet logos include lettering that have won the Super Bowl: 9.

Number of the 18 teams whose helmet logos do not include lettering that have won the Super Bowl: 3.

A destructive habit: Repetitive behavior pattern in which immediate gratification is followed by delayed negative consequences.

Examples: Smoking, compulsive shopping, drug abuse.

The process of breaking a habit—learning to behave in a new way—is the same for the alcoholic trying to stay sober, for the cardiac patient trying to change his life-style, for the binge eater trying to stick to his diet.

How to break bad habits

Many of us have tried to break an unwanted habit, only to lapse back into our old behavior patterns.

Following a lapse, we may conclude that we are “stuck” with our habits and are unable to change. *Solution:* Understanding relapses helps prevent them.

About 80% of attempts to break addictions end in relapse. The relapse pattern is the same for *all* addictions, from cigarettes to alcohol to heroin. This does *not* mean that 80% of people are never successful in breaking their addictions. But only 20% of people are able to kick their unwanted habits on the first try. Most people need several attempts to break a habit before they are successful, *regardless* of the habit *or* the method they use. *Prime reason:* It takes several tries for people to learn the skills they need to prevent relapses.

Key: Learn to *avoid* situations that may precede a “slip” or “lapse.” Learn to *use* a slip, should one occur, as an opportunity to reinforce the commitment to quitting, rather than continuing to a full-blown relapse.

The quitting cycles

People pass through several stages in breaking addictions or destructive habits:

- **Pre-contemplation stage:** The problem may be identified by others (the family, a doctor) while the addict remains in denial.
- **Contemplation/motivation stage:** The person recognizes the problem and begins to think and talk about quitting. This stage is characterized by conflict, both inner (fear of change, fear of failure) and outer (as doctor, employer or family members may push for the behavior change before the person is fully motivated).
- **Commitment to action stage:** The person decides to quit and takes action to do so. The action can range from making a personal resolution to joining a support group to entering a hospital for treatment. Often the person is inspired to action by a critical event: A

doctor’s diagnosis, an employer’s ultimatum, a spouse’s departure.

- **Maintenance stage:** The process of remaining free of the unwanted habit. *Crucial:* Changing life-style to fit the new, habit-free person. People trying to change their behavior find the first three months the most difficult...the risk of relapse is highest for the first 90 days.

Strategies for successful habit-breaking

Learn the techniques for reinforcement at *each* stage. A shaky motivation or incomplete commitment increases the risk of relapse.

- **Strengthen motivation:** Your motivation for quitting should be well-reasoned. But fear of the discomfort of changing can seem overwhelming, even though the discomfort is temporary and the benefits are long-range. *Helpful:* List the immediate consequences, positive and negative, of quitting vs. not quitting. Next, list the long-term benefits and drawbacks. Note that while your concerns are likely to be short-term, the benefits (pride, health, improved friendships, money saved) are lasting.

Your motivation must be heartfelt and sincere. It is rarely enough to want to change just to satisfy an employer or to please a spouse.

- **Affirm and deepen commitment:** Prepare yourself. People who quit a habit on impulse generally have the most difficulty. *Reason:* Lack of preparation.

A model: Setting out for a journey. First you learn about the terrain you’ll be visiting. You try to anticipate difficulties, and pack accordingly. Your day of departure is equivalent to the commitment stage. But the maintenance stage is the journey itself. If you are well-prepared, you need not slip at all. Your tires will stand up to rugged terrain. But in the event of a slip—a flat tire—you’ll be prepared to repair the damage en route and keep going, rather than starting the journey again from scratch.

Maintenance techniques: Learn to read the danger signs. Anticipate situations associated with relapse. **Highest risk: Be wary of negative emotional states:** Anger, boredom, anxiety, depression. You have probably been using your habit as an aid in controlling

mood. Be prepared for these feelings to be *stronger* during the maintenance stage. This can be scary.

Avoid negative social pressure: Drinking buddies, peers on cigarette breaks. *Useful:* As part of your preparation for quitting, let your family, friends and business associates know *beforehand*. If necessary, realign yourself for social support.

Don't test personal control. "I've been good, and I'm feeling great. I'll bet I can have just one drink/cupcake/cigarette." *To cope:* To borrow a phrase from Alcoholics Anonymous, "Think through the drink (cupcake, cigarette)." Imagine what will happen next, how difficult it has been to get where you are and what it would feel like to have to start again.

- **Substitute alternate activities.** Analyze what attracted you most to your habit. If you formerly used tobacco or alcohol for reducing tension, try meditation. If you loved the thrill of illegal drug use, see a thrilling movie or play a challenging sport. Exercise helps successful avoidance of relapses.
- **Enlist support.** Evidence shows that social support is a predictor of long-term success. Let your loved ones know how they can help. Join a support group such as Overeaters Anonymous. Find friends to talk to who have quit before you.

Coping with urges

Physical withdrawal symptoms generally do not last very long, but they can be intense. They are not predictable. We call these urges the PIG—the "Problem of Immediate Gratification."

What should you do when the urge to smoke/binge/drink strikes: Change your situation or ask for help.

Studies on coping and relapse show that what you do matters less than doing something: Take a walk, exercise, go to a movie or a meeting, call your sponsor or a friend, or take a shower.

Choose something that is gratifying. Recognize an urge as a wave that will pass and ride it out. We call this "urge-surfing."

What to do if you slip

- Treat the slip as an emergency. Ask for help immediately.

- Recognize that a slip means you have made an error in learning to quit smoking...lose weight, etc. It does not doom you to a full-blown relapse.
- Examine the events that led to the lapse. "I've noticed that if I drink, I am tempted to smoke."
- Review all your reasons for quitting, renew your resolve, and discuss with your supporters your plans to get right back on track.

Treatment recommendations

Ninety percent of smokers have been able to quit on their own. Eighty percent, however, require several tries. *Unknown:* How many drug addicts, alcoholics, people with eating disorders, etc. have quit on their own—without medical treatment.

Hospital-treatment programs can be costly, and the rate of relapse is high. Therefore, long-term hospital stays should be seen as a last resort for critical cases. *Best:* A step-by-step system of care.

Some people will be able to change their behavior on their own. Support groups such as Alcoholics Anonymous are free, and are highly recommended. Many community-based self-help programs are low-cost, and can be combined with outpatient care or therapy. In-hospital treatment should be followed up with any and all available support.

Source: *Privileged Information* interview with Dr. G. Alan Marlatt, professor of psychology and director of the Addictive Behaviors Research Center at the University of Washington in Seattle. Dr. Marlatt is the co-author of *Relapse Prevention*, published by Guilford Press, New York.

DOE Health Bulletins available

Periodically the US Department of Energy Office of Epidemiology and Health Surveillance issues a *Health Bulletin*. These are routine publications designed to share throughout the DOE complex data from health studies. The ES&H Section maintains a file of all the *Health Bulletins* received by the Laboratory. Employees, contractors, users and visitors may visit the ES&H Section Office, WH7E, to read or obtain copies of any of the *Health Bulletins*.

Letter to the editor

On-site furnace checks

The December 20, 1991 issue of *Ferminews* featured two articles on the dangers of furnace-borne carbon monoxide. In response to these articles, I would like to inform the *Ferminews* readers about the precautions taken by the ES&H Section to insure the proper functioning of on-site furnaces.

The ES&H Section annually performs a furnace-carbon monoxide survey of on-site housing. These surveys, which started in the early 1980s, are done each fall when furnaces first ignite for the colder weather. In this way, furnaces broken by summer disuse are noted and quickly repaired before severe cold weather hits. Furnace emission levels are checked at the vents and in the furnace room and are flagged for repair if carbon monoxide concentrations exceed the 9 ppm (parts per million) US EPA limit. (To compare, the Occupational Safety and Health Administration's limit is 50 ppm, while health effects are first noted at ~ 150 ppm.) The surveys usually reveal one or two defective furnaces each year.—Joe Kenny

If you have questions about the surveys or particular furnaces on site, please call the Safety & Health Group of the ES&H Section, x3810.

Inspector general's hotline

The Department of Energy Office of the Inspector General has established a hotline. Any DOE or DOE contractor employee who has information about alleged criminal violations relating to DOE programs, operations or funds should report such information to the Office of Assistant Inspector General for Investigations. The Office of Investigations operates a toll-free hotline 24 hours a day, seven days a week. The DOE IG hotline numbers are: 1-800-541-1625 or FTS 896-4073.

Hotlines have demonstrated their ability to save programs and the American taxpayer from fraud, waste and abuse which otherwise may not have been detected until the problems had become major ones.

Motor pool vehicles transferred

Effective January 2, 1992, the Wilson Hall Motor Pool vehicles were transferred to the motor pool fleet located at Vehicle Maintenance Site 38.

This move was due to the need to effectively increase the utilization of these vehicles.—Ron Haynes

Fermilab lecture series presents: *A Physicist Looks at the Violin*

Dr. Jack Fry, Professor, Physics, University of Wisconsin

Friday, January 31, 1992 at 8:00 p.m.

Musicians and scientists alike have wondered for centuries how the great violin maker, Antonio Stradivari, produced the violins that set a standard that has remained unmatched since the great master's death in 1737. Dr. Jack Fry will explore the scientific aspects of violin making in his lecture, *A Physicist Looks at the Violin*, on Friday, January 31, 1992 at 8:00 p.m. in Ramsey Auditorium.

The violin evolved from the vielle or Fiedel, the principal bowed instrument of medieval times. The thirteenth century vielle had five strings, one of them usually a drone. By the sixteenth century the viol had evolved, a six-stringed instrument with a fretted neck. During the early Baroque period, the violin began to replace the viol in Italy, and by the beginning of the seventeenth century the violin as we know it was firmly established as the stringed instrument of choice. Dr. Fry will look at the development of the violin in terms of the physics of the instrument, taking into account such factors as shape, wood structure and varnish. As the acoustics of the violin are quite complicated, a simplified model of its acoustical motion will be given.

Dr. Fry is a Professor of Physics at the University of Wisconsin. His interest in the violin has been cultivated over many years, from his undergraduate degree as a double major in Violin and Electrical Engineering. He has been researching the violin since 1964, applying his findings to the violins he makes. He hosted a PBS special titled *The Great Violin Mystery*. As a physicist, Dr. Fry has taken part in high energy physics experiments at Fermilab. His current research interest is x-ray astrophysics.

Admission to Dr. Fry's lecture is \$3. Tickets are not refundable. For further information or telephone reservations, call 708-840-ARTS weekdays between 9:00 a.m. and 4:00 p.m.

Is it a bird? Is it a plane? It's a radiosonde!

A weather balloon landed at Fermilab in a field east of Lab G behind PB East on January 2. Ed Hartouni (E690, University of Massachusetts) spotted the balloon and retrieved it from the field located near his portacamp. "I wasn't sure what it was when I first saw it from the window," said Hartouni. "So I went out to take a look."

The weather instrument, known as a radiosonde, had early that morning been released from a National Weather Service Station in Peoria, Illinois. A radiosonde is used to measure the temperature, pressure, humidity and winds at various heights above the ground. Located on the outside of the radiosonde found at Fermilab was a plastic mailing bag and return mail instructions. According to the Department of Commerce, the return of the instrumentation allows the National Oceanic and Atmospheric Administration-National Weather Service to reuse the radiosonde, thus saving a considerable amount of the cost of obtaining upper air information needed for making weather forecasts and preparing storm warnings. In the photo below, members of the E690 collaboration observe while Hartouni removes the radiosonde from the balloon for return to the US Department of Commerce.



Pictured above are: l to r Brian Derro (Columbia University), Kyriacos Markianos, Ed Hartouni, and Shuyu Lee (University of Massachusetts) and Gerardo Moreno (University of Guanajuato). The photo was courtesy of E690.

Real-life math

Members of the Fermilab Education Office had an opportunity to meet celebrated mathematics teacher Jaime Escalante at the 1991 Science Education Directors meeting held in Washington D.C. December 8-11, 1991.

Escalante, whose success with East Los Angeles students was depicted in the 1988 film *Stand and Deliver*, is the host of *FUTURES*, an award-winning instructional TV series currently airing nationwide on PBS stations.

This 12-part visually fast-paced series links classroom mathematics to exciting and rewarding careers. Viewers are taken behind the scenes at industries from optics and space flight to sports and fashion where professionals use math everyday. The program includes guest appearances from a variety of celebrities including actors Jimmy Smits and Arnold Schwarzenegger, model Cindy Crawford, astronaut Bonnie Dunbar, basketball star Kareem Abdul-Jabbar and Top Gun pilot Lt. Commander Donnie Cochran.

Prior to the airing of the series, a workshop for area teachers on how *FUTURES* fits into the 6-12 curriculum for junior high and high school students was sponsored by the Education Offices of Fermilab and Argonne and the Teachers Academy for Mathematics and Science in Chicago.

Robin Dombeck (LS/Education Office) was the coordinator of the workshop held at the Illinois Institute of Technology. Included in the day's activities was an opportunity for the educators to meet informally during lunch with local mathematics leaders and area scientists and engineers. "The teachers were able to talk with math and science professionals about ways to motivate students to pursue careers that require mathematical backgrounds," said Dombeck. Participating in this part of the workshop were **Tom LeCompte** (E705), **Ray Hall** (DØ) and **Ted Williams** (AD/Operations). Director Emeritus **Leon Lederman** was the luncheon keynote speaker. His presentation dealt with the importance of getting children interested in mathematics at an early age.

The *FUTURES* series began on October 7 and concludes February 3, 1992. WTTW/Channel 11 will rebroadcast the programs on Tuesdays at 11:15 a.m. beginning February 18. Each segment is fifteen minutes in length.

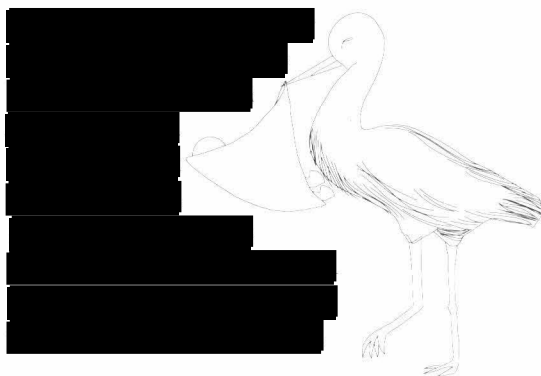
The *FUTURES* series and workshop is made possible by grants from the US Department of Energy, ARCO and IBM.

According to Secretary of Energy James Watkins, "Our mission is to ensure that the history books of the 21st Century will not tell of a once-great nation that declined and fell because it lost its passion for science and mathematics."



Robin Dombeck, Education Office Outreach Coordinator, talks with renowned mathematics educator, Jaime Escalante. "I have found that *humor carries ideas much better than a grave monotone because it makes its recipients far more willing to receive what the teacher has to say. In fact, I have heard that some students enroll in my program just because they heard it was fun, despite having little initial interest in mathematics. That doesn't bother me, however—usually, the interest will follow,*" said Escalante.

Congratulations to:



Quality corner

Quality management is needed because nothing is simple anymore, if indeed it ever was.—Philip B. Crosby, Quality is Free

As we begin a new year, the Publications Office invites comments from readers regarding how we can improve *Ferminews*. As we strive to better serve our readers, your input is important. Please send your comments to *Ferminews*, Publications Office, MS 107 or FNAL:: TECHPUBS.

We would like to know what you like to read, what you don't like to read, your ideas for future articles, suggestions on how we can keep you better informed, etc. The results of your comments will be published in the *Quality corner* section of *Ferminews*. Thanks for your assistance.

The Quality Assurance and Value Engineering Office appreciates contributions to the *Quality corner* column in *Ferminews*. If you have a suggestion on how to improve the quality, efficiency, reliability or effectiveness of a Laboratory service or operation, please send it to Mark Bodnarczuk, MS200 or FNAL:: Bodnarczuk.

Nalrec committee elected

The annual election and Christmas Party for the Nalrec committee was held on December 11, 1991 at the Kuhn Barn. **Glen Lee** did not seek re-election as 2nd Vice President. **George Davidson** was elected as 2nd Vice President and **Dominick Carullo** was re-elected as 3rd Vice President. **John Kowalski** was re-elected as Treasurer.

Pictured are (left to right): **Trudy Kramer** (Director-



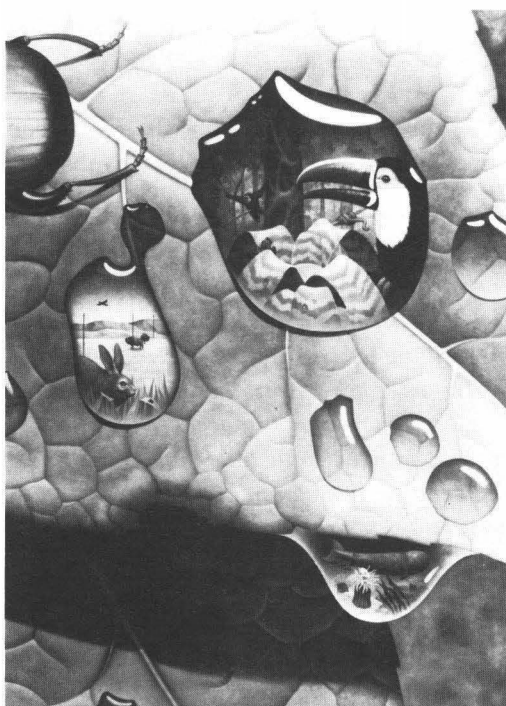
ate), Secretary; **John Kowalski** (RD/DØ, Constr Dept.), Treasurer; **George Davidson** (BS/Vehicle MTCE), 2nd Vice-President; **Rose Callaghan** (AD/EE Support), 1st Vice-President; **Glen Lee** (AD/Mech Support), outgoing 2nd Vice-President; **Dominick Carullo** (TS/Engineering), 3rd Vice-President; and **Jesse Guerra** (RD/EE Dept.), President.—*Alma Karas.*

Art gallery features poster display

One of the most important issues of this century is examined in the new Smithsonian Institution Traveling Exhibition Service (SITES) poster panel exhibition, *Diversity Endangered*, which opened at the Fermilab Second Floor Art Gallery on Monday, January 13.

Through color photographs, illustrations and informative text the 15 poster panels examine the worldwide deterioration and destruction of our planet's biological diversity.

Biological diversity is the scientific term for the study of the variety of life forms



An artist's depiction of the interrelated worlds of species and habitats which is the subject of the SITES poster panel show.

that inhabit the earth. A fragile and complex framework on which all life depends, biological diversity is being seriously threatened. Some experts predict that at the present rate of destruction almost one-third of the world's arable land and one-half if its tropical forests may be destroyed by the year 2000.

Diversity Endangered was produced by the SITES and was made possible by a grant from the National Science Foundation.

Classified ads

Automobiles

1986 Ford Tempo, GL Sport, 5 speed, aluminum wheels, air, AM/FM cassette, top condition, no rust. \$2,800. Call 708-232-6970.

1983 Olds Custom Cruiser Wagon, 78,000 miles fully loaded, excellent condition. \$2,200. Call 708-369-1834.

Miscellaneous.

Queen-size waterbed, wave control mattress. Used for one year, like new. Wooden frame with four drawers under bed (two on each side of bed), padded rails and heater pad. Two sets of water bed sheets and mattress pads included. Asking price \$350/obo. Call Suzanne at x3201.

Graphics terminal - Wyse 99GT, emulates VT52/100/220, Tex 4010/14, IBM Hercules, etc. \$150. Call Jeff at x2126 or 708-406-0395.

HP 17 BII Business Calculator in original box with manuals. \$50 (list \$110) call Bob at x3769.

Bogen 3025 pan-tilt tripod heads (2). Each \$10. Call Tom at x3145.

21" Television, one-year-old, \$150; **Sleeper sofa**, \$100; **Dining room table and six chairs**, \$120; and more. Call 708-369-1834.

Real estate

For sale by owner, **five bedroom house**, living room, dining room, parlor, full basement, new roof and furnace. 24' x 30' garage. 615 S. Lincoln, Aurora, 2 blks south of Copley Hospital. Priced to sell at \$69,900 was \$74,900.

Share House. Roommate wanted to share furnished house in Geneva. \$350 mo. plus share utilities. Convenient to Lab. Available mid-January. Call Sue at 708-231-0800 x32 or Chuck at x3202.

For rent - **Large 1 bedroom apartments**, 1st or 2nd floor, \$400/month, **Studio apartment**, 2nd floor - \$325/month. 1 block from downtown Aurora. Call Barbara at x3492 or 708-859-8699.