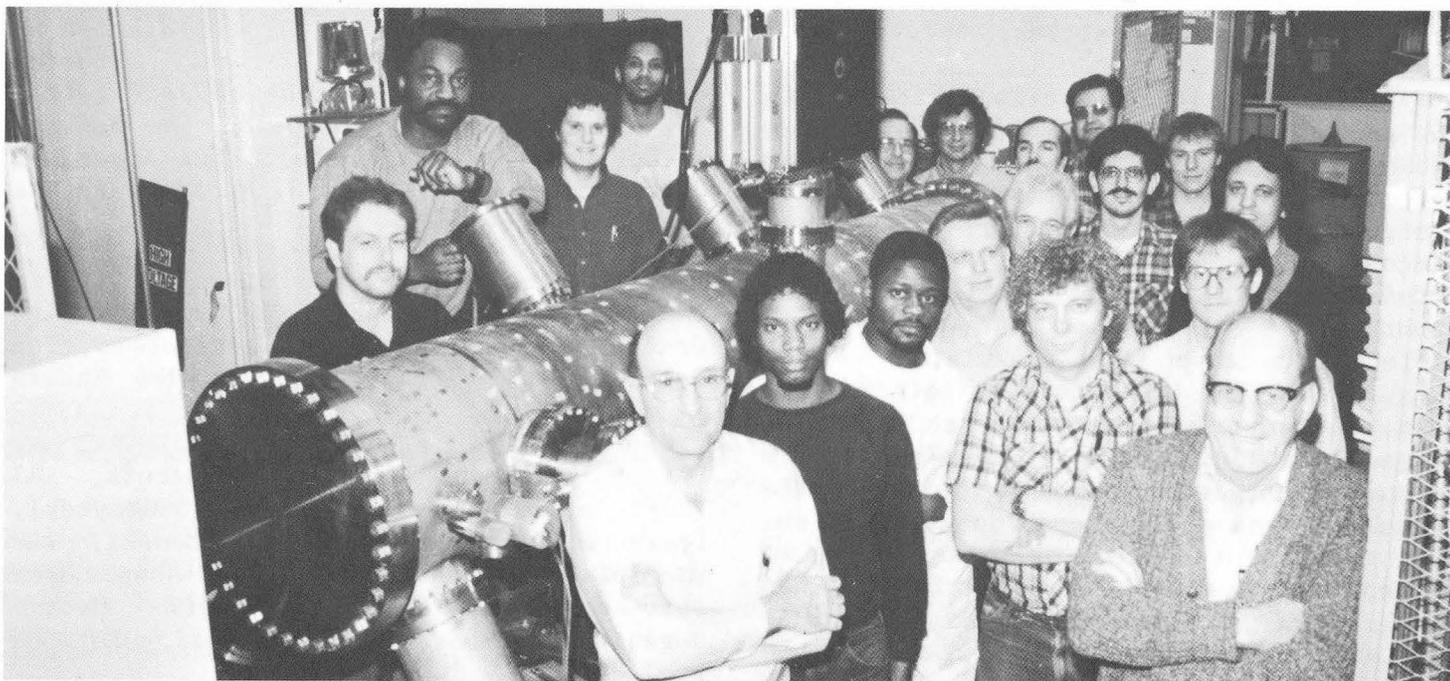


March 21, 1985

FERMI NATIONAL ACCELERATOR LABORATORY

FermiNews

KICKER MAGNETS READIED FOR \bar{p} SOURCE



Shown above are E. Tilles, C. Foster, M. G. Riddick, A. Beutler, G. Termansen, J. Petter, V. Szarzynski, M. Tarkowski, L. Bartoszek, J. Leopold, G. Braun, T. Castellano, L. Chiplis, T. Schmitz, A. Peters, P. Adderley, M. Kvcera, L. Brown, A. Vizgirda, not pictured is B. Gatfield.

by Larry Bartoszek and Tim Castellano

One of the first things a visitor to Fermilab might notice, besides the striking beauty of the site and its buildings, is the extreme complexity of the machines housed in those buildings. The language one hears spoken also seems foreign and incomprehensible. Words like quark, neutrino, calorimetry, paint-can, septum, and kicker are bandied about casually. This is the arcane language of high energy physics and accelerators. It is understood in relatively few places in the world and can be intimidating to the uninitiated. An example of a word that causes such confusion is the term 'kicker'. The Antiproton Source needs two different types of kickers. One type is part of the stochastic cooling system, which 'cools' or compresses a 'hot' beam of antiprotons to allow more particles to be squeezed into a smaller cross-section to meet the TeV 1 design luminosity. The second type is a pulsed magnet or 'fast kicker' used to inject or extract beam from an accelerator ring. The second type, or fast kicker, is the subject of this article.

The Antiproton Source has two rings sharing a common tunnel. Antiprotons produced in the Target Hall are injected into the debuncher, where they are 'debunched' and cooled slightly before being injected into the accumulator. The accumulator further cools the antiprotons and stores them for several hours. The \bar{p} 's are then extracted from the accumulator and sent to the Main Ring and Tevatron for acceleration and collision with protons. A string of injection/extraction devices is needed between every different machine, and kickers can generally be found at both ends of those strings.

There are five kickers in the debuncher and accumulator altogether. One each for debuncher injection and extraction and similarly for accumulator injection and extraction. There is an additional kicker in the debuncher for injecting 8 GeV protons directly from the booster for tuning and commissioning studies.

(cont'd on next page) →

The kickers are pulsed magnets which deflect the beam a small amount with relatively low strength but very fast magnetic fields. (Larger bend angles are accomplished with slower, higher field devices like Lambertsons and pulsed septa.) The kicker's field must be precisely timed and rise very quickly, or it will miss the stream of injected particles.

The injection/extraction kickers in the debuncher look very different from those in the accumulator. The debuncher kickers are a very standard Fermilab design, transmission-line type (seen many places in the Main Ring) while the accumulator kickers are unique to the Laboratory. The accumulator kickers are different because the accumulator is the only ring at the Laboratory where particles must be injected on top of other particles already stored in the machine. The kickers in the accumulator must not disturb the 'stacked' beam of very precious antiprotons during either injection or extraction. To prevent the stacked beam from feeling the kicker magnetic field, there is a mechanical shutter which is placed between the stacked beam and the magnet. The entire magnet resides in the vacuum chamber and must hold off 40,000 volts during a pulse without arcing. The magnet is made up of plates of stainless steel, ceramic, and ferrite, and held together with gold-plated stainless screws.

All the magnets are powered by high voltage 'pulsers' which send a few thousand amps to the magnet at the appropriate instant. The power supplies and their associated cabling require roughly five miles of high voltage cable, a thousand gallons of transformer oil, and an appreciable fraction of the floor space in the service buildings. A lot of equipment for a pulse that only lasts a millionth of a second!

All of the magnets and power supplies are complete or very near completion. The debuncher magnets are installed in the tunnel. One accumulator kicker is assembled and is being tested now. The power supplies are being installed in the service buildings. Electricians are busy pulling cables between the tunnel and service buildings.

In any project of this size, a large number of people become involved over the

course of design, construction, and installation. Our thanks go to all of them and we hope we don't leave anyone out.

Kicker magnets were designed by Jack McCarthy, Jeff Petter, and Ed Tilles, with George Termansen drafting. The shutter was designed by Larry Bartoszek (with guidance from Alain Poncet of CERN), and drafted by Larry Sobocki and Art Peters. Shutter electronics design courtesy of Jeff Petter and assembled by John Leopold. Lee Brown's kicker group of Al Beutler, Phil Adderley, Cliff Foster, and Martin G. Riddick did the magnet assembly.

Power supplies were designed by Tim Castellano and Larry Bartoszek with drafting by Peggy Crayton, Art Peters, Tom Schmitz, and Larry Sobocki. Mike Kucera led the group of technicians that assembled the power supplies including Bernie Wisner, Loretta McMath, Rich Meadowcroft, Al Vizgirda, and Greg Braun. Don Szarzynski, Larry Chiplis, and Mitch Tarkowski, IAM machinists in the WHGF TeV 1 shop, made sure that parts went together. George Jugenitz handled all the expediting for the project.

*In Memoriam
Stephen Gannon
1957-1985*

Stephen E. Gannon, a member of the Computing Department's Data Acquisition Software Group, died February 27, at Mitchell Hospital in Chicago. Steve started at Fermilab as a summer employee in June of 1982. He then joined the Laboratory full-time on August 22, 1983.

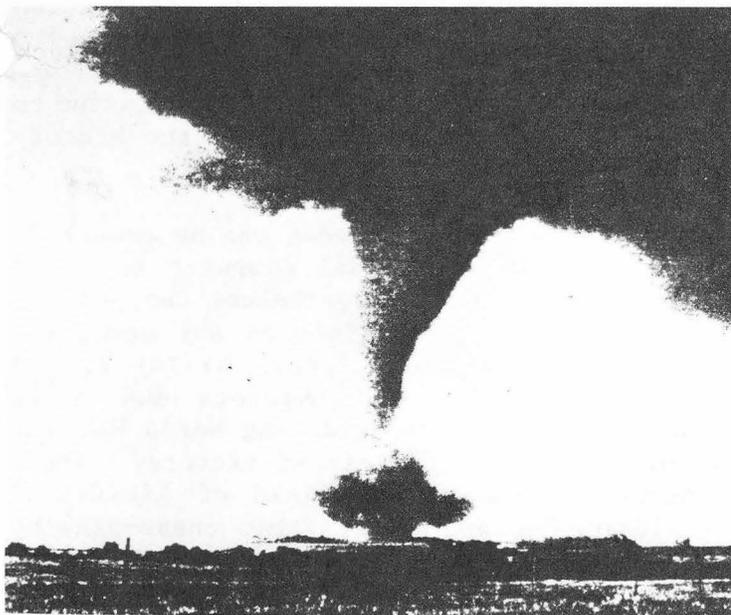


Dave Ritchie, Steve's supervisor, commented, "Steve was a very able and courageous individual. He worked very hard to get things exactly right. We will remember him well."

He held a Masters degree in computer science from IIT and was enrolled in a Doctoral program.

Steve is survived by his parents, maternal grandparents, six brothers and sisters, and his fiancée. Steve will be missed by his many friends and co-workers at Fermilab.

SKILLING TORNADO SEMINAR DATE SET FOR APRIL 9



A sure sign of the approach of tornado season is the appearance of WGN-TV weatherman Tom Skilling and his Tornado and Severe Weather Seminar at Ramsey Auditorium, Tuesday, April 9, at 7 p.m.

Joining Skilling will be Bill Hirt from the National Severe Storms Forecast

Center, and Brian Smith, a tornado expert from the University of Chicago. The Seminar will include films of tornados, tips on severe-storm spotting, a discussion of the use of Doppler radar, safety rules, and other pertinent information.

Rudy Dorner, Head of Emergency Services at Fermilab, urges all Fermilab personnel who are involved with the Emergency Preparedness Program (floor wardens, area emergency supervisors, emergency wardens, and Safety Office personnel) to attend, as well as any Laboratory employee with an interest in tornados and tornado safety.

However, be sure to make your plans early. "Last year," Dorner said, "we had a standing-room-only turnout. People came from as far away as Ames, Iowa. This year, we've already had calls from East Lansing, Michigan."

For more information on the Tornado and Severe Storm Seminar, contact the Geneva ESDA at (312) 232-9555, or the Information Desk in the Atrium of Wilson Hall, ext. 3353.

YOUNG SCHOLARS MEET AND COMPETE AT FERMILAB

On March 9, Fermilab hosted the regional competition of Illinois' largest and most comprehensive academic contest. The contest, known as TEAMS (Test of Engineering Aptitude, Mathematics, and Science) is sponsored by the Illinois Society of Professional Engineers and by the Junior Engineering Technical Society.

More than 5,000 students from over 400 Illinois high schools entered the competition for state and national championships in six subject areas: mathematics, physics, chemistry, English, biology, and engineering graphics. Regional winners advance to state finals scheduled for March 28 in Urbana. More than 150 students from thirty high schools in five community college districts competed at Fermilab.

Following a welcome by Director Leon Lederman, students competed in tests both as individuals and as members of high school teams. After lunch, the students attended an orientation in high energy

physics given by Drasko Jovanovic (Physics Department) followed by a walking tour. Tours were conducted by Drasko Jovanovic, Dan Kaplan (Research Division), George Biallas (Accelerator Division), and Richard Dease (Public Information Office). The final event of the day was the awards ceremony at which Margaret Pearson, Manager, Public Information Office, presented the winners with medallions and trophies.

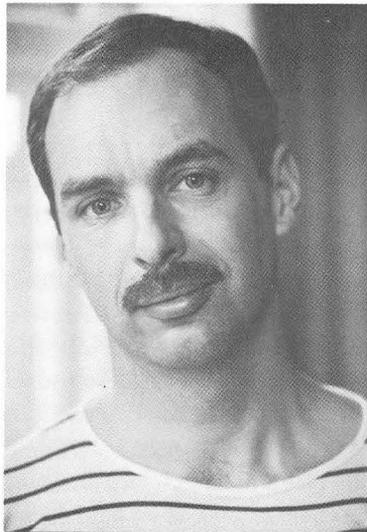
The task of scoring all tests was given to a select group of persons including the following from the Accelerator Division: Larry Bartoszek, James Fritz, Jeffery Hangst, Tony McKee, Fritz Lange, and Glen Lee. George Biallas was a member of the planning committee and acted as the emcee for the event.

Richard Dease was coordinator of the event which involved several months of planning and coordinating.

--Richard Dease

ALAN TURING MYSTERY UNRAVELED IN NEXT LECTURE

A prime contributor to the invention of the computer was Alan Turing, the British mathematician whose puzzling suicide in 1954 left behind a mystery not to be unraveled until the publication of Andrew Hodges' 1983 biography, **Alan Turing: The Enigma**. Dr. Hodges will appear on March 29, 1985, at 8 p.m. in Ramsey Auditorium to present the startling story of this seminal figure in the history of computers.



Andrew Hodges

Andrew Hodges is a British mathematician and physicist whose biography of Turing has been highly praised: "...as vivid a picture as one could hope for of a most complex and intriguing man." In fact, "an extraordinary thinker has found an ideal biographer."

Admission to this Fermilab Lecture Series presentation is \$2, \$1 for senior citizens, and tickets are available at the Information Desk in the Atrium of Wilson Hall, ext. 3353.

--Dan Kaplan

Congratulations To . . .

Melody (RD/Operations Department, Software Support Group) and Pete Moy on the birth of their first child, David Gahayn, on March 3, 1985, at Mercy Center Hospital. David weighed 7 lbs. 3 oz. Congratulations also to Melody's mother, Pat Smith (Accelerator Division), on her first grandchild.

GET READY FOR A TASTE OF RIO

On Saturday, March 23, at 8:30 p.m. in the Village Barn, the Brazilian community at Fermilab is hosting a Brazilian Carnival (Mardi Gras). Dance to the rhythm of a live band playing Brazilian sambas and enjoy traditional drinks and food prepared at give-away prices by Brazilian connoisseurs. Costumes welcome!

Tickets are \$5 and are available at the Information Desk in the Atrium of Wilson Hall, ext. 3353.

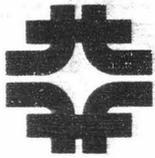
R. Fenner, editor; S. Winchester, ass't. editor

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SPRING KARATE CLASSES BEGIN

Enrollment is open for students in the karate classes held at the Fermilab Recreation Complex. Karate is a safe way to achieve both aerobic and physical fitness. In addition to building fitness, the class also offers a chance to learn martial arts skills in a safe, controlled environment: pads are worn and contact to vulnerable body areas is prohibited.

Classes meet on Monday, Wednesday, and Friday from 5 p.m. to 6 p.m. at the Recreation Complex beginning Monday, April 1. The cost for 10 weeks is \$36. Students must be members of the Recreation Complex to join the class. Loose fitting clothing is acceptable for the first two weeks, after which a uniform must be purchased. Uniform cost is between \$25 and \$50 depending on quality, style, etc. Tournament competition and promotional examinations for rank advancement will be offered in conjunction with Kim's Black Belt Academy in Geneva. The instructor, Mark Leininger, is a second degree black belt. To enroll, contact Mark at ext. 4776 days, (312) 695-3263 evenings, or MS #318.



Fermilab

UPDATE ON ROAD CLOSING

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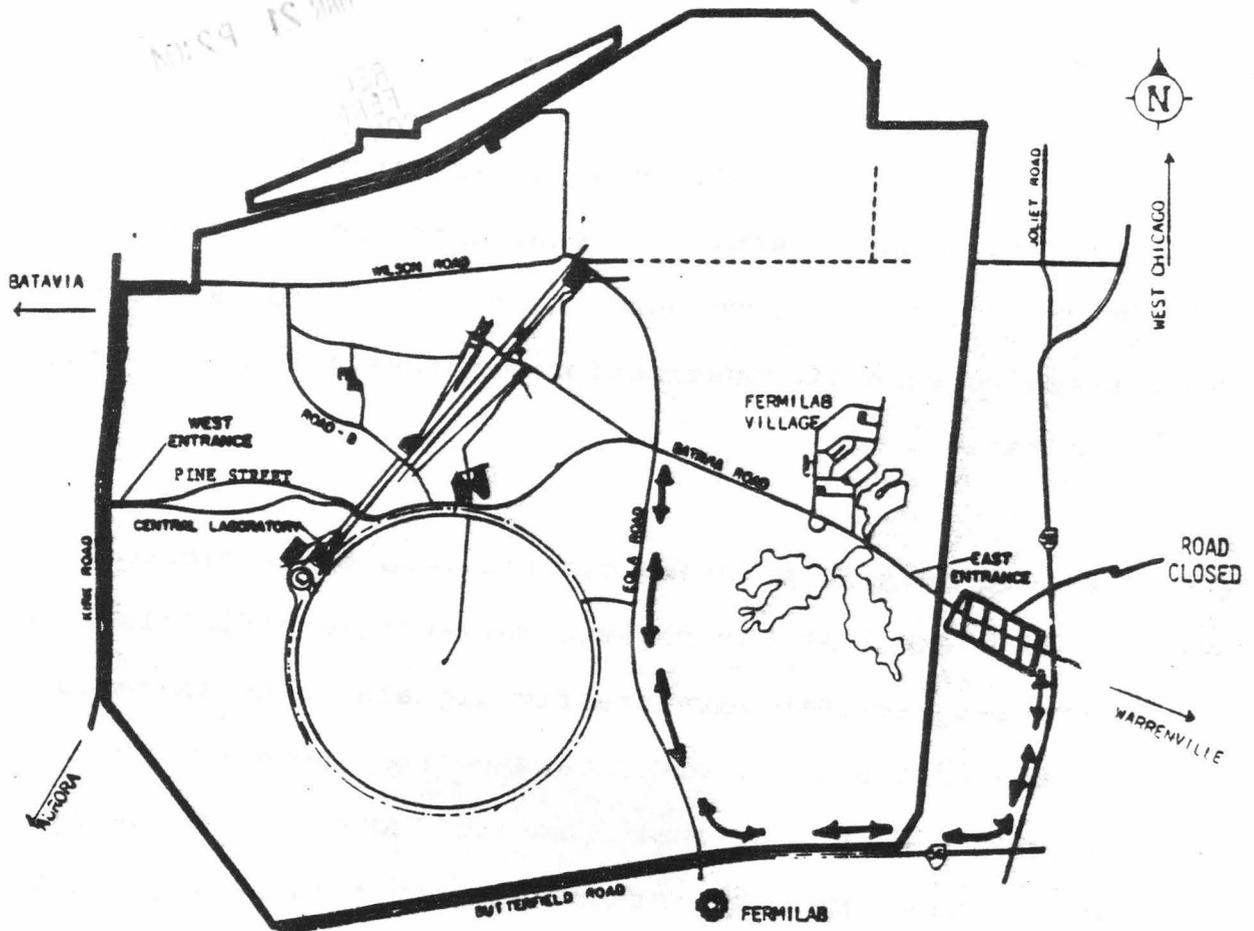
The City of Warrenville has closed Batavia Road to all traffic between Fermilab's east entrance and Route 59. This is a change from our earlier flyer and is necessitated because of construction progress and safety consideration.

We have been told to expect this road to be closed for 10-12 weeks. At our request Warrenville officials have arranged for temporary traffic signals to be installed at the Eola-Butterfield intersection. However, the signals will not be installed for another 10 to 14 days. In the meantime, the Warrenville mayor is trying to arrange for a traffic officer at the morning and afternoon rush periods.

This is a congested and very dangerous intersection. Even the temporary signals will not eliminate safety problems. You are urged to avoid using this intersection for your own safety. We recommend using Pine Street or Wilson Road entrances which have permanent traffic signals.

Rudy Dorner
Emergency Coordinator
Fermilab Emergency Services
Department

BATAVIA ROAD IS CLOSED FOR THE NEXT 10-12 WEEKS



PLEASE NOTE:

The map shows the State of Illinois approved detour route. We again strongly suggest you use Pine Street or Wilson Road to Kirk Road and then connect with an eastbound road such as Butterfield Road on the south or Fabyan Parkway on the north. These are much safer routings and may be much quicker and less congested.

MARCH 21, 1985