February 18, 1982
FERMI NATIONAL ACCELERATOR LABORATORY

FermiNews

FERMILAB CELEBRATES TEN YEAR ANNIVERSARY

200 BeV

1:08 P. M.-WEDNESDAY, MARCH 1, 1972

SCIENTISTS RELIVE THE DAYS OF THE FINAL DRIVE TO 200 BeV!!!

DETAILS INSIDE

...Confidence and calm pervade the Control Room after ten years (front row, L to R) Bob Mau, Frank Cole, Quentin Kerns; (back row, L to R) Jim Griffin, Curt Owen, Helen Edwards, Don Edwards. The Control Room has been completely rebuilt since 1972 using more modern control computers...

...200-BeV victory remembered in the Fermilab Control Room (seated, L to R) Frank Cole, Bob Goodwin, K. C. Cahill; (second row, L to R) Don Edwards, Jim Hogan, Don Young, Ryuji Yamada, Hal Satter, Chuck Schmidt; (back row, L to R) Lin Winterowd, John Reid, and Curt Owen...

NAL ACCELERATOR REACHES DESIGN ENERGY TEN YEARS AGO

At 1:08 p.m. on March 1, 1972, Fermilab accelerated a beam of protons to 200 billion electron volts (GeV), achieving the accelerator's original design energy ahead of schedule. This issue of **Ferminews** celebrates that exciting occasion ten years ago. The March 9, 1972 issue of **The Village Crier**, the Laboratory's weekly newspaper in 1972, is reprinted as an insert in commemoration of that feat and of the myriad of individuals who fought many obstacles to achieve it.

A rising line on an oscilloscope screen told the story March 1 that culminated a series of energy milestones that had been achieved since January of that year. Ryuji Yamada and Frank Cole who worked in the Control Room at the time reminisce about that nearly missed triumph (see page 2). February 11, 1972 at 9:23 p.m. the proton beam was accelerated to 100 GeV. The beam at that time was "stable and exhibited practically no loss or decay after transition energy," according to an Accelerator Section Information Report. There were severe losses (90% or more of the beam) at injection and these losses took more than a year of hard work to bring down to reasonable levels. On that date the accelerator became the most powerful in the world, surpassing the Soviet accelerator at Serpukhov that had accelerated particles to 76 GeV.

At 4 a.m. on February 12, data collection using the internal beam began for the first experiment of the research program. An accompanying article by Dino Goulianos, one of the experimenters from Rockefeller University, recalls an early anecdote. *(cont. on pg. 4)*

PHYSICISTS RECOUNT CONTROL ROOM EXCITEMENT

by Ryuji Yamada

March 1, 1972, was one of the best days in my life. And I think it was one of the best days for all the people at NAL. Five years was a rather short construction period, but the one year we spent for beam tuning was rather long psychologically. Arriving at 200 GeV was achieved by the combined efforts of all the individuals at NAL under the leadership of the greatest accelerator builder in the world, Bob Wilson. He not only planned, built, and directed the accelerator, but he would come to the Control Room every chance he got to tune the beam himself. We all got a tremendous amount of help from him.

On that morning (March 1, 1972) when we took over the operation shift, we had a hunch that "we will get 200 GeV today," and we prayed that no magnet would short. We had 100-GeV beam 20 days ago, and we expected we could get 200 GeV anytime. Around noon everything was stable and all the components of the main accelerator were set to optimum values. The beam pulse signals on the oscilloscope were getting longer and longer with adjustment of the rf cavities. We notified Bob Wilson and Ned Goldwasser (Deputy Director), who were having a conference in the next room, that we would get 200 GeV soon.

Everybody was watching the scope with great expectations. Some signals were disgustingly short and some were getting longer. "We need just a little longer signal." The tension mounted. Finally the beam pulse signal got longer and hit 200 GeV! We watched and made sure another pulse went to 200 GeV.

Everyone in the Control Room exploded with joy. "Hey, we did it! We did it!" We had achieved our goal-getting 200-GeV beam. I had never experienced such a sensation before, a mixture of joy and satisfaction. We were happy not only to have achieved our goal but to have overcome real hardships. We had struggled for almost a year with injection and acceleration studies. During that time we had more downs than ups, but we had faith that we **would** eventually have beam and we were happy to get it so soon.

by Frank Cole

We all had been working night and day. Helen and Don Edwards were the perpetual owl shift and Shigeki Mori was on the evening. When I came at 7:30 in the morning, they always had 8-GeV beam circulating and were doing studies. By 8 o'clock, the lobby of the Control Room always was packed with people wanting to go down to the tunnel to work on installation. When Helen and Don finished, we opened the tunnel and let in the hordes. The evening shift usually was left with getting the hordes out and closing up.

As February ground on, we did less and less tunnel work and more beam studies. When beam was accelerated to 100 GeV late in the evening of February 11, Bob Wilson called me at home to tell me; I was too exhausted to come in for the celebration.

Ryuji Yamada, John Clarke, Jeff Gannon, Ed Gray, and I worked the day shift toward the end. Dick Cassel and Howie Pfeffer, the only ones who understood the power-supply program they had developed, were behind us. Quentin Kerns, Jim Griffin, Stan Tawzer, and others were at the RF Building, and Jim and I talked on the telephone or the intercom.

All through the morning of March 1, we struggled with tuning, trying not to lose the 8-GeV beam Helen and Don had left us and trying to pick it up to accelerate it. The aperture was so small, because of misalignments, remanent fields, and power-supply glitches, that it was like threading a needle to keep beam going around. Then too, we didn't have the water system going and we were running a series of 30-GeV ramps with only an occasional 200-GeV one. The beam stayed longer and longer and the excitement mounted through the morning. By 1 o'clock, we were famished, but the Control Room filled up so much, it was hard to get out and besides, if I left, I'd lose the best seat in the house and would never get it back!

At 1:08 we got our act together for three pulses. Most of the beam was lost at injection, but a small amount negotiated

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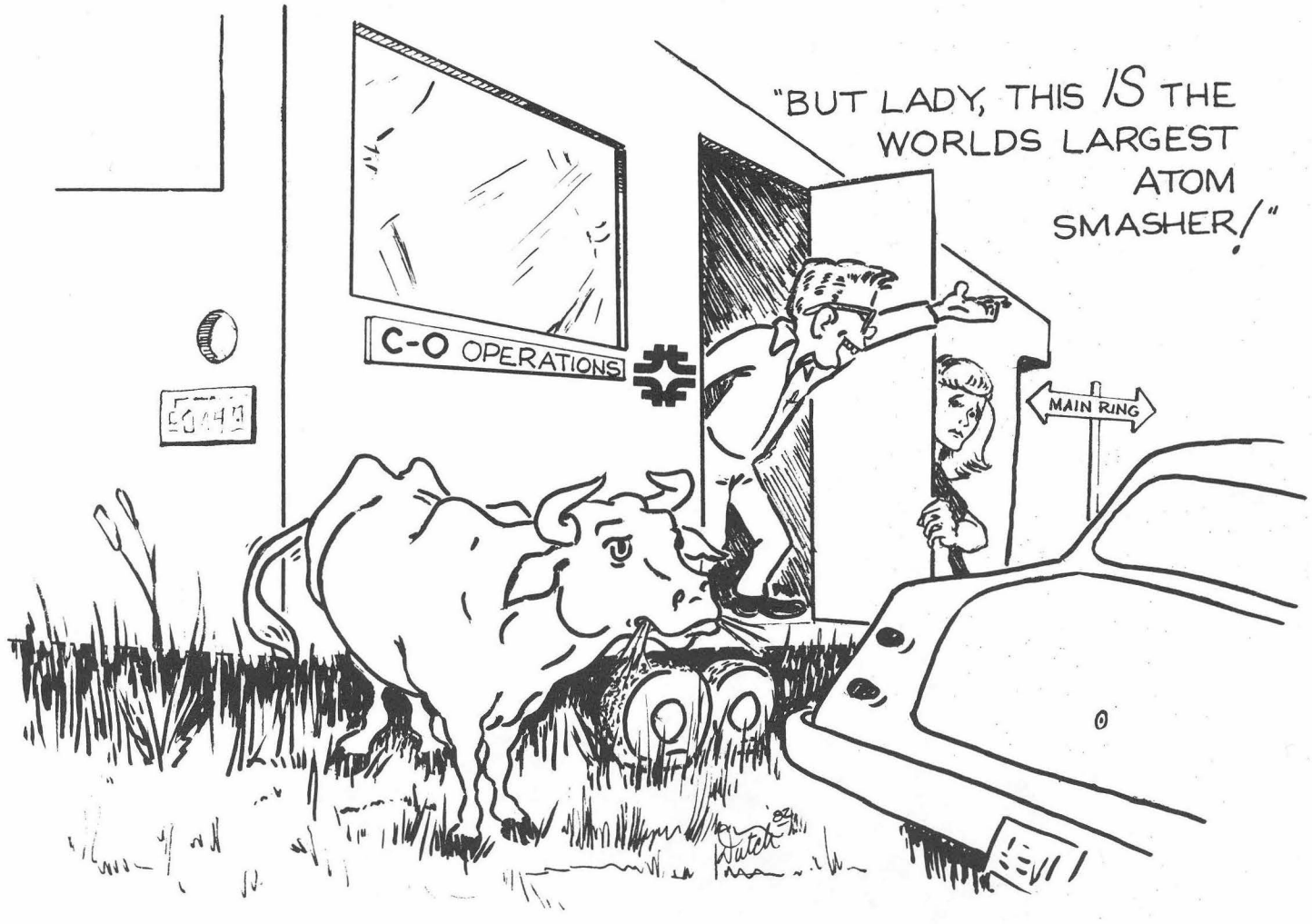
CLOSE ENCOUNTERS OF THE FERMIKIND



by Dino Goulianos

As the Main Ring was being prepared to accelerate its first 100-GeV protons, Experiment 36 was getting ready to use them. For about the previous seven months, a trailer stood outside service building CO on the northwest side of the Main Ring. Like a life line, a bundle of cables connected the trailer to the CO building which, at that time, was unfinished and empty. Following the cables would lead one to the Main-Ring tunnel and into a large box which was attached to the Main-Ring vacuum pipe. Inside the box, an array of solid-state detectors was ready for action. Their mission was to detect and measure the angles of the protons that would recoil from a very thin polyethylene target that would intercept the circulating beam as soon as it appeared. From this information, physicists in the trailer would use their computer to determine the size of the impinging high-energy protons. There was talk among theorists that the size of the protons would increase as their energy increased, and the experimenters of E-36 were standing by ready to find out. It is history that the protons were found to be larger at high energies, but not as large as the theorists expected them to be.

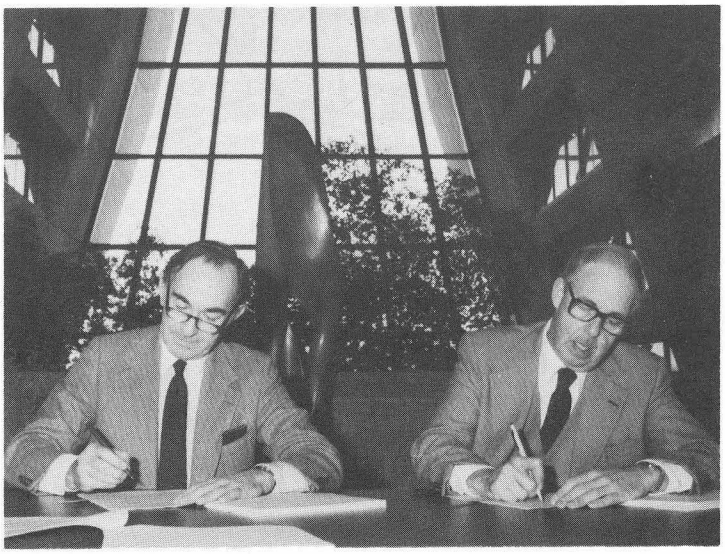
Without Wilson Hall, Fermilab at that time was very unassuming. A visitor would find it hard to believe that this trailer in the middle of the cornfields and next to a cow herd was there for such a purpose. One day, I-Hung Chiang, a physicist from Rochester, answered the door responding to a persistent knocking on the trailer. A woman, standing in front of a big car, said in a clearly frustrated but polite manner, "Excuse me, sir. I have been on this road (the Ring Road) for some time now and I passed by your house three times already. How do I get out of here?" I-Hung pointed the captured woman to her way out of the

(cont. at top of pg. 4)

(cont. from pg. 3)
Main-Ring orbit. Then the woman said, "I am very confused by this place. Can you tell me where I am?" "At the world's largest atom smasher," answered I-Hung in his heavily accented English. And the woman left in a hurry, either because she believed him or because she wondered about the strange things this unlikely occupant of the small trailer house in the prairie might still tell her.

This was the beginning of a great adventure in scientific research and international collaboration, the first joint Soviet-American experiment to be done at Fermilab.

URA-DOE EXTEND CONTRACT



Chairman of the URA Board of Trustees, Harry Woolf (left) signs a five year extension of its contract to operate Fermilab with DOE's Chicago Operations Manager, Robert H. Bauer

Universities Research Association Inc. (URA), a consortium of 53 American universities and 1 Canadian school, has signed a five-year extension of its contract with the Department of Energy to run Fermilab. URA signed the first contract to operate this facility in 1967.

Fermilab's annual budget is approximately $138 million for fiscal year 1982, about 13 percent above last year's total. Of this funding, operating funds will total $87 million, capital equipment about $18 million, and construction funds approximately $32 million. The largest portion of construction money will fund the continuation of the Energy Saver/Tevatron construction projects to increase the accelerator's current capacity to 1 TeV.

200 BeV TENTH ANNIVERSARY

(cont. from pg. 1)
It is now history that during construction of Fermilab's accelerator design changes were incorporated that allowed the Laboratory to achieve 500 GeV on May 14, 1976. About that same time Robert R. Wilson, Director Emeritus, began thinking about an Energy Doubler that would accelerate protons to 1000 GeV (1 TeV). As the Laboratory proceeds into the Tevatron era, 1 TeV (one trillion electron volts) becomes the next milestone in a series of record-breaking events.

CONTROL ROOM REJOICES!

(cont. from pg. 2)
the transition jump and inched to the top of the ramp. I was tuning, but it certainly wasn't anything I did that made it go.

Then there was bedlam. I turned to say something to Dick Cassel and was startled to see a whole set of new faces behind me. People from all over the Lab had come to see the great event.

It seemed that champagne arrived instantly and flowed forever. The Main Ring ran on unattended. The first 200-GeV beam was on a memory scope and there was more interest in getting souvenir pictures than in the beam. Finally, there was a ground fault and three dipoles shorted. It was several weeks before we had beam again.

TALKS SLATED IN AUDITORIUM

..."The Consequences of Large-Scale Nuclear War" can be heard February 18 in Ramsey Auditorium at 8:30 p.m. as the fifth lecture in Fermilab's series on Arms Control and International Security.

Dr. J. Carson Mark, Los Alamos Scientific Labortory will be the speaker. Mark has been an advisor to the federal government on nuclear weapons testing and reactor safeguards.

...Dr. Richard Briggs, Lawrence Berkeley National Laboratory, will present "High Intensity Electron Accelerators and Their Applications," at the Physics Colloquium March 3 at 4 p.m.

Fermilab is operated by Universities Research Association, Inc. under contract with the U. S. Department of Energy. Ferminews is published biweekly by the Publications Office, P. O. Box 500, Batavia, IL 60510, phone (312) 840-3278.