

The Village Crier



fermi national accelerator laboratory

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COMPUTING DEPARTMENT INCREASES CAPACITY

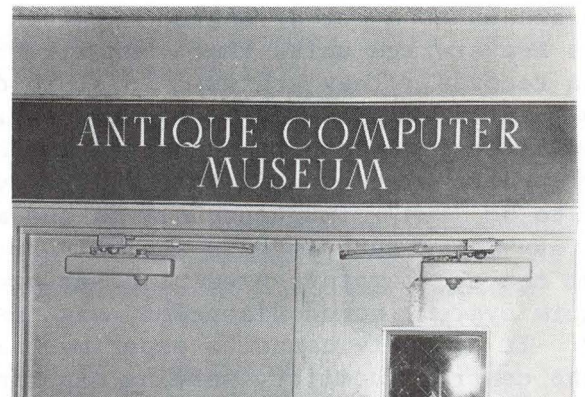
A Fermilab visitor to the Central Laboratory/ seventh floor west, after stepping off the elevator and walking straight ahead through a work area, encounters this tastefully lettered sign: "ANTIQUÉ COMPUTER MUSEUM." Al Brenner, computing department head, admits the sign isn't literally true but indicates the general vintage of the Laboratory's general purpose computing facilities. The sign was designed and lettered by artist Angela Gonzales. If the visitor walks through the doors under the sign, he enters a batching area--a workroom for sorting computer printouts. Above an exit at the room's opposite end is another sample of Angela's handiwork. This sign reads: "Ye Olde Machine Shop." The machines are Fermilab's major computers. They include two Control Data Corporation 6600's and a newcomer, a CDC 6400. Recent computing facility improvements have been outlined for The Village Crier by the department head.

Not one to rest on his "antiques," Brenner plans to replace the obsolete computers with more modern hardware. Earmarked for that purpose is a \$12,000,000 budget request for fiscal year 1978 (starting October 1). Updated computer facilities are being sought. According to Brenner, the new hardware will increase Fermilab computer throughput to three to four times current levels while holding operating costs about the same. Congress must pass President Carter's proposed budget before Fermilab can begin the modernization process.

In the meantime, the Laboratory is making-do with interim measures. "New equipment is needed to relieve our totally saturated condition," Brenner said. "Laboratory computers operate 24 hours a day, seven days a week, except for preventive maintenance and repairs. Central computing facilities have operated at a saturated level for the past year. A major limitation on the quantity and quality of the physics studies conducted here is the capacity of computing facilities available. We presently have the capacity to analyze only about 10 to 20 per cent of experimental data generated here. That capacity is appreciably less than comparable laboratories with lower energy accelerators and smaller experimental programs," he said.



...J. Finstein and J. Brumfield, computer operators, at Fermilab's major computers...



...Sign on CL-7W designating on-site computing facilities...



...A. Brenner, computing department head, shows magnetic disc turned tabletop and new disc pack with 50 times more data capacity...

COMPUTING DEPARTMENT (Continued)

Providing some relief is the recently-acquired CDC 6400, dubbed machine C since it was installed in tandem with A and B, the veteran 6600 machines. C was purchased second-hand from the used computer marketplace. "A" was transferred to Fermilab in 1973, "affectionately," from Lawrence Berkeley (California) Laboratory according to a brass commemorative plaque on the computer. "B", also a pre-owned model, was discovered in an electronic flea market and put on stream in 1975. Computer "C's" distinction is that it serves as a "front end" -- coordinator for A and B. It provides input, output, and utility functions for her bigger, faster sisters. Other attributes of C are: 65,000 words of central memory; access to 500,000 word extended core storage memory; and a processor with about 40 per cent of the speed of the 6600's. (B machine, by the way, was improved by the addition of 65,000 words of memory capacity. The increase doubled its former capacity and brought B up to parity with machine A.)

C is also able to do non-setup compilations and execute small programs. Should failure or maintenance shut down one or two of the trio, the survivor computers can pick up some of the load to allow production to continue on a reduced scale. All three machines have access to a set of shared magnetic storage discs. Discs are storage units that look like big phonograph records. They are used to store data collected from magnetic tapes used by experimenters and other information read into or generated by the computer. Multi-programming capability permits several computer jobs to be "run" simultaneously in one machine. High priority jobs--such as data analysis for experiments using the accelerator--preempt other projects. A network system, named Bison-Net, was installed last year. It directly connects experimental computers to the central facility, serving experimenters whose magnitude of computing needs exceed the capacity of local on-line computers.

Other new equipment includes six CDC model 844-41 high-speed disc drives. These machines read the data stored on magnetic discs. This is the first set of disc drives to be installed at Fermilab. With the new drives, disc storage capacity was dramatically increased. New tape drives were also added to the system, giving extra capacity for tape reel storage access. Last summer, the system for allocating and accounting for user computer service was instituted. Users, numbering from about 150 year-round to as many as 300 during summer months, are charged for computer services provided. Users are billed \$200 per hour for computer time, an average charge covering operation and maintenance.

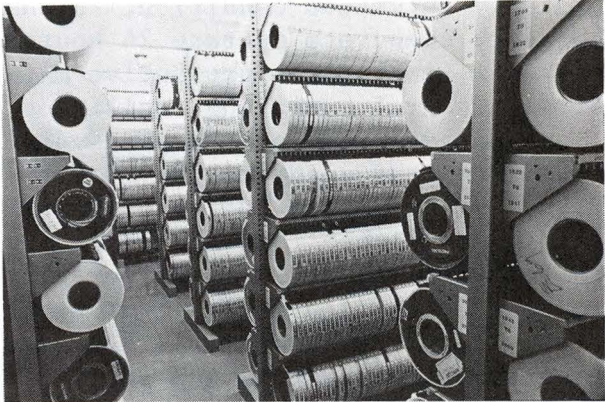
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...Key punching in CL-7W users' room are (L-R, foreground) H. Kobrak, U of Calif.-San Diego and Gordon Thompson, U. of Wis...



...R. Lipton, E. Bleser and D. Chaney confer in a users' work area on CL-7W...



...One of three environmentally-controlled magnetic tape vaults, each with capacity for about 10,000 reels..

DR. JIM CRONIN: PROFILE OF A MAN IN MOTION

Dr. Jim Cronin put in a full day on Friday, January 14. He spent the morning in Washington, D.C. at the ceremony at which the Energy Research and Development Administration awarded its 1976 E. O. Lawrence awards "to men and women who are not more than 45 years old...and who have made especially meritorious contributions to the development, use or control of atomic energy in all relevant sciences..."

By early afternoon he had returned to Illinois to attend an open meeting at Fermilab on the new colliding beam group which he will head, on a part-time basis. He will also continue to work as an experimenter in the Proton Area, commuting from the University of Chicago where he is a professor of physics.

Dr. Cronin was born in Chicago, Illinois. He did his undergraduate study at Southern Methodist University, then attended the University of Chicago as a National Science Foundation fellow, receiving his M.S. in 1953 and a Ph.D. in 1955. He has served on the staffs of the Brookhaven National Laboratory, Princeton University, and the University of Chicago. His major research has been in the area of high energy physics where he has played a major role in exploring the basic symmetries of nature.

In 1964, Cronin, in collaboration with James Christenson, Val Fitch and Rene Turley, conducted an experiment at the Brookhaven National Laboratory in New York which contradicted the almost universally-held belief of physicists that natural laws of physics remain unaltered in an anti-matter universe where everything is mirror-reflected and electrical charge is reversed. The experimenters' findings are considered a landmark in the study of the forces at work in the sub-atomic world of matter and anti-matter.

Since the early beginnings of the Fermilab accelerator, Cronin, with collaborators from the University of Chicago and Princeton University, have been measuring the production of particles at very high energies and large angles in Proton east. These large transverse momentum (violent) collisions are presumed to be sensitive to the internal structure of the proton. It is our hope to demonstrate that the knowledge of the proton structure, so beautifully evidenced by electron and muon scattering experiments at SLAC and FNAL can lead to understanding of the more complicated collision of one proton with another.

Much of what we have learned concerning the production of high transverse momentum hadrons and muons, and high transverse momentum pairs can be understood in terms of the proton structure. These experiments and others at FNAL are beginning to answer another question, namely; what are the forces and interactions between the constituents of the proton?

The Colliding Beams Experiments Department has been set up within the Fermilab Research Division. Cronin will serve as Department Head with Dr. James Walker as Associate Head. The Department is to be a focus for a number of activities directed toward planning for the exploitation of proton and anti-proton colliding beams in the Main Ring tunnel. The Department will be responsible for establishing the scope of the Main Ring experimental enclosures, their design specifications, and construction of the experimental facilities.

"To me the creativity lies in the work of bringing about the collisions of the two beams. Once the colliding beams are achieved it is not so difficult to conceive of how to carry out the experiments. I have always carried out physics experiments in the neat situation where the particle beam is supplied. For once in my life I would like to have the pleasure of participating in and hopefully contributing to the achievement of the situation that makes the experiments possible. My job will be mostly organizational since all the resources and talent exist at Fermilab to carry out this work. I agree with Bob Wilson who says, "If we physicists are sufficiently clever and manage to implement the colliding beams, then the physics that will result just boggles the mind."



...Dr. Jim Cronin...

INTERNATIONAL FILM FEATURE FOR FEBRUARY

Shoot the Piano Player

Friday, February 11, 8 p.m.
Fermilab Auditorium
Adults \$1.50 - Children .75¢

One of Francois Truffaut's early (1960) films, Shoot the Piano Player focuses on a concert pianist who becomes involved in a crime.

The tragi-comic thriller stars Charles Aznavour who received excellent reviews for his portrayal of the piano player. Reviewer Pauline Kael referred to the French film as "homage to American gangster films."

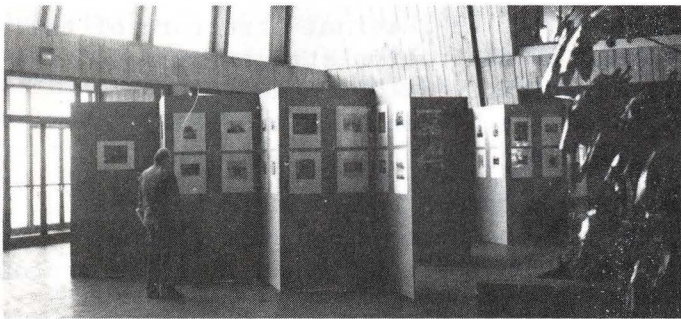
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International Folk Dancing - Friday, February 18, 8 p.m. at the Village Barn

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CREDIT UNION MEMO TO MEMBERS

Before your bills are 30 days old, pay them off with "ReadyCash" loan. This will reduce interest charges as much as 18% APR, to 12% APR and allows you to pay for purchases with the convenience of payroll deduction.



Fermilab's Photo Unit displayed their talent in an exhibit illustrating development of the laboratory from its construction to today. Tony Frelø and Rick Fenner, site lensmen, planned and produced the display. Included are 99 photos, 46 in color and 53 in black and white. Erected in conjunction with the 1977 URA Council of Presidents meeting here last weekend, the exhibit is destined to gain permanent status.

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LECTURE TAPE AVAILABLE

A cassette tape of the Sigma Xi lecture given January 25 by Dr. A. K. Mann -- "Exploring the Universe with a Neutrino Microscope" -- is in the Fermilab Library. Copies of Dr. Mann's accompanying illustrations are with the tape. See Roger Thompson, Librarian, to make use of these.

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SPORTS REPORT - Basketball - Stevens Cleaners 70, Fermi Hustlers 64 (January 30)
Issel Painting 67, Fermilab Visitors 54.

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