The Village Crier

fermi national accelerator laboratory

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ENERGY DOUBLER EMERGES FROM DRAWING BOARDS (PART ONE OF TWO PARTS)

Ten years ago, it was just a fond hope in the long range planning of the physics community. Today, Fermilab's Energy Doubler/Saver project is working on a schedule calling for completion by June 30, 1978. Innovating with one hand and building with the other, Fermilab crews are either developing components, designing prototypes, or building the final equipment for another accelerator.

"It's a new technology," Director Robert Wilson says of the project, "in which imaginative people are doing impossible things," as each new technical phase moves from impossible to operational.

The Energy Doubler project, briefly, is a plan to add a ring of superconducting magnets and an acceleration system to the present tunnel that contains the Fermilab Main Ring. Protons injected into the new ring from the present accelerator at 200-500 BeV could be accelerated to 1,000 BeV in the "Doubler." A substantial savings over the present operating cost of the accelerator, through the use of the superconducting magnets, is an important bonus of the plan and for this reason the project is sometimes called the "Energy Doubler/Saver."

The whole concept depends on advances in the field of superconductivity -- the principal that electrical current moving in a conductor kept at -450° F flows without resistance, or is "superconducted" and is therefore much more efficient because it does not suffer the losses that occur flowing through copper or aluminum cable. An accelerator of 1,000 BeV built with existing, conventional technology would be very expensive and emormous in size. Fermilab will be the first accelerator to use the superconducting technique to such a large extent.

The cost of the new installation is estimated to be $50 million based on a three-year schedule taking advantage of the existing facilities at Fermilab. To build such a machine at another location might cost as much as $400-$500 million.

The technical successes of the doubler components are now to be matched by the administrative planning involved in moving a complete liquid

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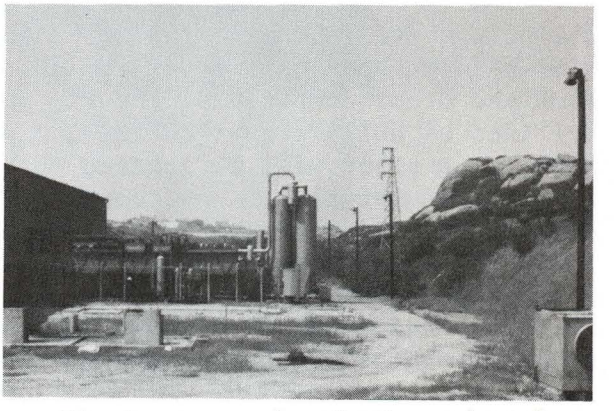
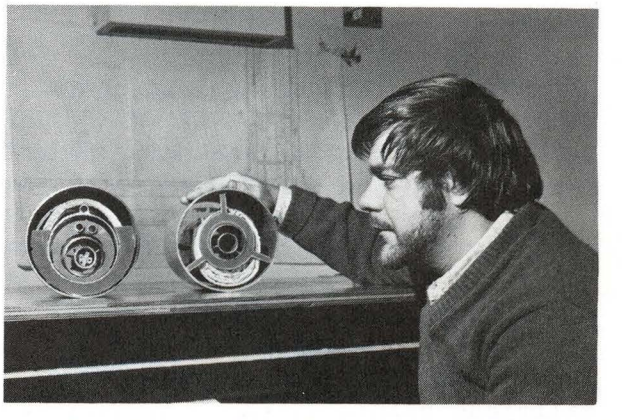


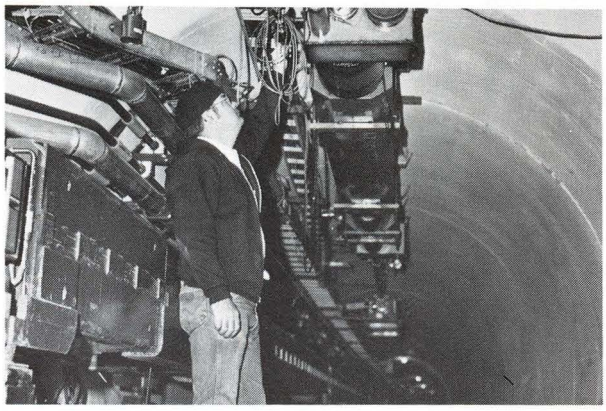
...Giant cryogenic plant coming from California to Fermilab...

...Material Supply's Norm Hill (L), Al Lindner, Sherry Nila check excess list...

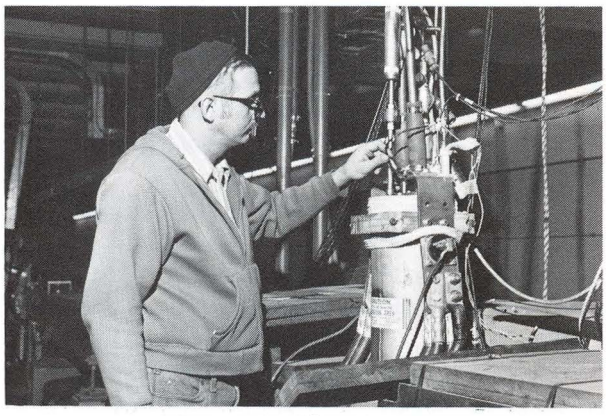


...Don Richied with cross sections of helium transfer line for doubler. Final version at left...

propellant plant from California to Fermilab. Spotted on the GSA excess property listing last May by Norm Hill's Material Supply group, this plant formerly supplied liquified oxygen/nitrogen to the missile program in Ventura County north of Los Angeles. Recognizing that such a plant could be adapted to liquify the helium gas that maintains the -450°F in the superconducting magnets, a task force from Fermilab visited the plant and a decision followed to move the major elements of the plant to Illinois. Even allowing for the refurbishing that will be necessary on some of the abandoned compressors and other components, the big move will save millions of dollars over building a new plant. The liquifying plant will be located west of the Magnet Facility at Fermilab. According to Jim Filliung of Architectural Services, foundation work will begin in the next few weeks and the dismantled main building of the plant will arrive about April 1, 1976 to be reconstructed at Fermilab. The entire plant would be completed by October of 1977.

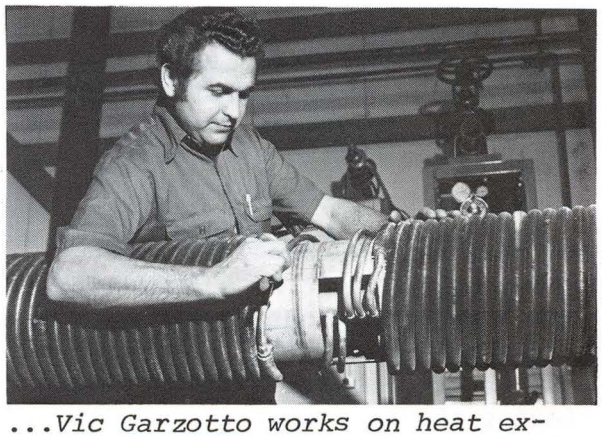


...Ron Norton at doubler prototype in Main Ring tunnel...



...Tony Rader at dipole magnet which studies beam effects on superconducting magnets...

Each of the 24 service buildings above ground and around the present Main Ring will contain a special "satellite" refrigeration system for the new accelerator, connecting to the new magnets in the tunnel some 25 feet below. Between last May and October a mini-version of this system, consisting of the refrigerator, the helium transfer lines and two superconducting magnets, was installed and tested at the B-12 service building. Don Richied, one of the Doubler's cryogenic specialists comments, "To develop the Energy Doubler, we have had to improve the state of the art in cryogenics. We had to prove that liquid helium can be pumped like water and can be used like the conventional water system of conventional magnets to cool the superconducting magnets. We did this for the first time a year ago and it has been completely successful." The first of these prototypes was built in the "proto-main," the prototype of the main accelerator built in the Village several years ago.



...Vic Garzotto works on heat exchanger for satellite refrigeration system...

Using experience gained there in the last 18 months, the system at B-12 was designed and the helium transfer line and pump there will be incorporated into the final version of the Doubler design.

The mini-version at B-12 also initiated the first phase of the rail system that will carry the Doubler magnets into the tunnel. One of the most serious restraints in the Doubler plan has been finding a way to install the magnets for the new ring without interfering with the regular operating schedule of the present accelerator. This will be done by bringing the Doubler magnets into the tunnel in groups during accelerator operations at one of six different points in the four-mile Main Ring circle. During access times, the 3-ton magnets will be transported to their final location. Using the quick connectors of the Doubler design, they will move into place in the line at the top of the tunnel with a minimum number of junctions to be completed.

(Continued next week)

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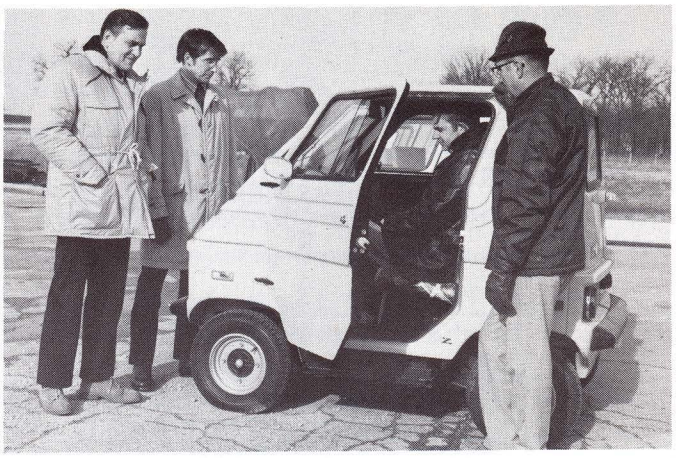
ABOUT THOSE NEW CARS ON SITE

...(L-R) John McCook, Don Beatty, Dick Lundy, Ed Tilles at Receiving...



...Dick Lundy demonstrates operation of new Elcar...

Fermilab received delivery this week of five electric passenger cars -- "Elcars," for on-site use by experimental area personnel. Gasoline saving and lower operating costs are the aim of this energy conservation move. The cars cost about $3,200 each and operate at about ½ cent per mile, running about 25 miles on each charge of the battery. The battery is replenished by plugging into a regular 110V outlet. Accessories include speedometer (normal speed is 25-35 mph), headlights, turn signals, windshield washer, seat belts. The cars are fitted with radial tires; bodies are built of fiberglass.

The vehicles will give a 50-75% immediate saving for this on-site transportation, according to John McCook, Associate Director for Administration. Two vehicles are assigned to the Proton and Neutrino departments, one to Meson. Dick Lundy, head of Neutrino, plans to alternate Elcars, using one while the other is charging. An ampmeter indicates the state of battery charge. Starting up, the driver uses the first position of speed selection, up to 25 KM (the speedometer is metric) or 15 mph, using 24 volts of power; then moves to full speed, using 48 volts. A booster power can be used after attaining speeds of 35-40 km.

Components of the Elcar are manufactured in Italy, assembled and distributed by Elcar Corporation, Elkhart, Indiana.

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BEN LEE TEACHES SPECIAL U/CHICAGO CLASS

Benjamin W. Lee, head of the Fermilab Theoretical Physics group, will teach a special course at the University of Chicago during the winter quarter from January 6 to March 22, on Thursdays from 1-2:20 p.m. The course is Physics 491-Gauge Theories. Registration as a student at large is possible. Call S. Krasner, University of Chicago, 753-8302 for further information.

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BLOOD DONORS NEEDED DECEMBER 23

The Aurora Blood Bank has asked for blood donors for the Fermilab replacement program on December 23, 1975. The need for blood over the holiday season is great and people are sometimes too busy to think of giving blood at this time of the year. As many donors as possible are needed on December 23. To make an appointment, call the Medical Office, Ext. 3232.

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RADIATION PHYSICS REMINDS YOU... that film badges should be exchanged on the first day of each month. Permanent badges can be exchanged at the permanent badge racks; temporary badges can be picked up at Radiation Physics, CK 7E or in the field at temporary badge boxes, leaving an old one when picking up a new one. For further information call Larry Coulson, Ext. 3023.

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THE HOLIDAY MONTH AT FERMILAB

Festivities will begin at Fermilab on Thursday, December 11 with a Buffet Dinner and Dancing at the Users Center. The dinner will be Fermi Fried Chicken, mashed potatoes with gravy, green beans, cole slaw, roll, butter and honey, all for $2.25 per person, and served from 5:30 to 7 p.m. A good country rock group will play from 6:30 to 9 p.m.

Sunday, December 14 is the Children's Christmas Party in the Central Lab from 1-4 p.m., for kids from 1-8 years of age. Cartoons will be shown in the Auditorium at 1 p.m., then punch and cookies will be served in the Cafeteria. Santa will have a gift for the children. Be sure to let Jean Sutcliffe, Ext. 3808, CL-5W, know how many children you will be bringing.

...NALREC committee (L-R) Dorothy Poll, Jean Sutcliffe, Sherry Nila, Bob Condon, & Eric Jarzab stuffing stockings for Children's Party...

On Friday, December 19 NALREC will hold its Dinner Dance at the St. Andrews Country Club, West Chicago, from 6:30 p.m. to 1 a.m. Tickets, at $7.00 per person, will include two free drinks, prime rib dinner, dancing and door prizes. For further information call Bob Kocanda, Ext. 3734, Helen Ecker, Ext. 3393 or Liz Foster, Ext. 4203.

Tuesday, December 23 will be the Holiday Happy Hour, from 5-7 p.m. in the Village Barn.

INTER/NATIONAL FILM SOCIETY
presents
THE PRODUCERS - 8 p.m. - Friday, December 12

An outrageous comedy about an inventive producer who develops a surefire way to make a fortune by writing a bad play.

THE PUBLIC INFORMATION OFFICE...will conduct a Family Day tour on December 29 at 1 p.m. for the benefit of holiday visitors. The tour is limited to 50 persons and will last about 90 minutes. Call Cheryl Stadtfeld, Ext. 3351 to make reservations. Everyone is welcome.

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A CHRISTMAS CARD TREE will be placed next to the bulletin board on the west side of the Cafeteria. Everyone is invited to place his card on the tree.

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RICHARD J. UNDERWOOD, who lectured at Fermilab December 5, will be heard in a taped interview on WKKD-FM96 at 10 p.m. and 11 p.m. on Fri., Dec. 12; 11 p.m. on Sat., Dec. 13; and 1 a.m. on Sun., December 14.

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CONGRATULATIONS...to Darrell and Shirley (Theoretical Physics) Rittierodt [redacted]

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THE ARGONNE CREDIT UNION reminds its members to stretch Christmas dollars by using the Ready Cash loan at the Credit Union (at 11% APR), instead of the 18% APR charged by many department store charge cards. Talk to June Olsen, Ext. 3293.

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CLASSIFIED ADS

CAR POOL - From Elk Grove to CL, Mon. thru Fri., 8:30-5. Call R. Gorge, Ext. 3986.

FOR SALE - Five 14"x6" steel backed mag wheels, five spoke for Chevy, dark centers. $75. Call A. J. Bianchi, Ext. 3701.

FOR SALE - Girl's 10 spd. bike - Sears Free Spirit, 21" w/lock and rear carrier rack, exc. cond. $50. Call Wayne Ganger, Ext. 3734 or 898-3031.

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