FERMINEWS

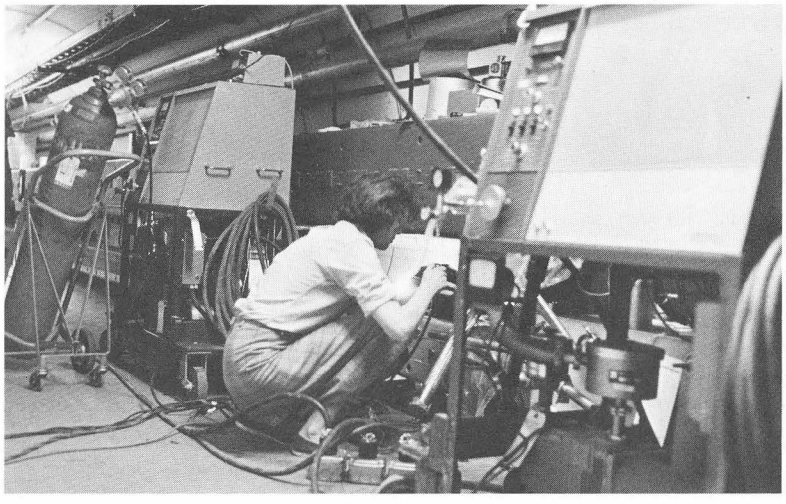
Fermi National Accelerator Laboratory

September 3, 1981

Main Ring Tunnel Entering New Era

The appearance of the Main Ring tunnel is rapidly changing, a prelude to an exciting new dimension in high energy physics.

On Aug. 4, the 100th dipole superconducting magnet was installed in the Main Ring, this one in the E-2 sector. Through Aug. 31, 160 dipole magnets had been installed in the Energy Saver. This is about 21 percent of the 774 dipole superconducting magnets that eventually will make up the superconducting accelerator. For each four dipole magnets, there also will be one superconducting quadrupole magnet and one spool piece.



Helen Edwards carefully checks the installation of a magnet's systems.

But this article is about the creation of those dipole magnets. They are assembled at the Magnet Facility in the Industrial Area. The facility has assembled more than 320 of these magnets to date, providing a reserve of magnets for the various installation teams. Each magnet, before it leaves the Industrial Area, is rigorously tested and measured at the Magnet Test Facility, also in the Industrial Area. After it has cleared this procedure, it still must undergo additional tests before it is accepted by the crew that eventually will install it in the Main Ring.

Each magnet must meet rigorous specifications and criteria. The Calculations Group carefully evaluates the data characteristics of each magnet to determine the best placement within the Main Ring. This procedure ultimately will provide maximum performance from the superconducting accelerator. After the installation crew has accepted a magnet,

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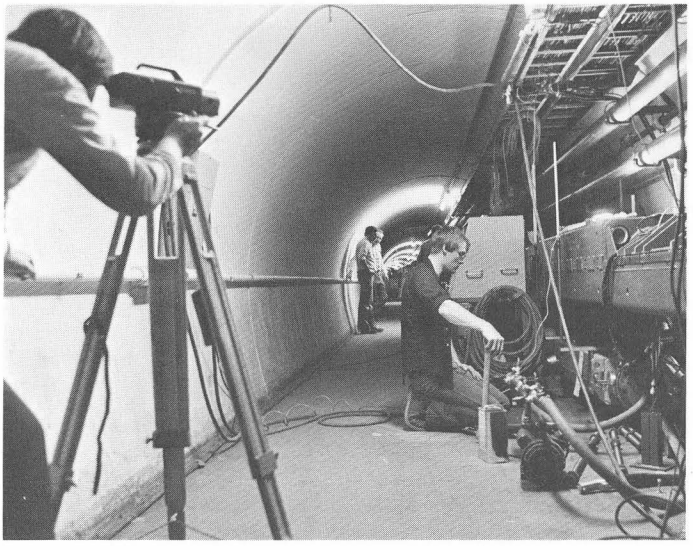
(From left) Tom Lassiter, Joe Lazzara and Kerry Mellot install a magnet into the superconducting accelerator by gently sliding it into place. When the accelerator is completed, it will have 774 of these dipole magnets along the four-mile circumference of the Main Ring.



Using survey techniques, a magnet is installed in exactly the right place--to within a few thousandths of an inch. Members of the survey crew are Richard Smith (left) and Jim Dahlberg (kneeling). Standing in the background are Larry Sauer (left) and Hans Jostlein.

MAIN RING TUNNEL

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the complicated task of inserting it into its proper location begins. This process includes attaching it to five systems and then leak testing the results. The magnets are positioned using survey techniques to within a few thousandths of an inch because they are coupled and tied together much more tightly and less flexibly than a string of conventional magnets.

The five systems that must be coupled together are:

1--The beam tube. The beam of protons moves through this stainless steel tube at speeds approaching that of light. A high vacuum is maintained in the tube so that the protons will not collide with unwanted particles.

2--The single phase helium circuit. Liquid helium at minus 450°F bathes the superconducting coils in the magnet. For a magnet to become superconducting, it has to be kept at this ultra-low temperature.

3--The two-phase mixture of liquid and gas helium. This two-phase mix also is used to cool the magnet, but it does not circulate directly on the coils as does the single-phase liquid helium.

4--Liquid nitrogen. At minus 320°F, liquid nitrogen is another agent that is used to keep the magnets cold. It circulates through the cryostat, but does not come in contact with the superconducting coils.

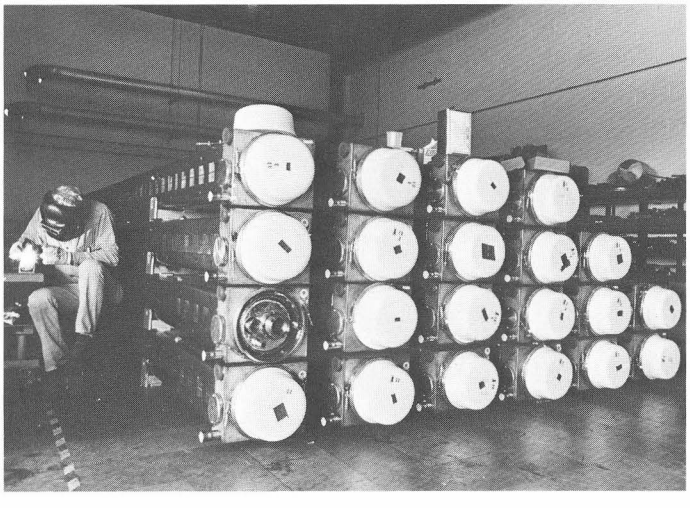
5--The cryostat. This is a multi-layer vacuum container through which the various cooling liquids and gases circulate. A cryostat consists of five tubes, concentrically spaced, one inside another.

Dave Musser (left) and Rodney Shores test a magnet's systems for leaks.

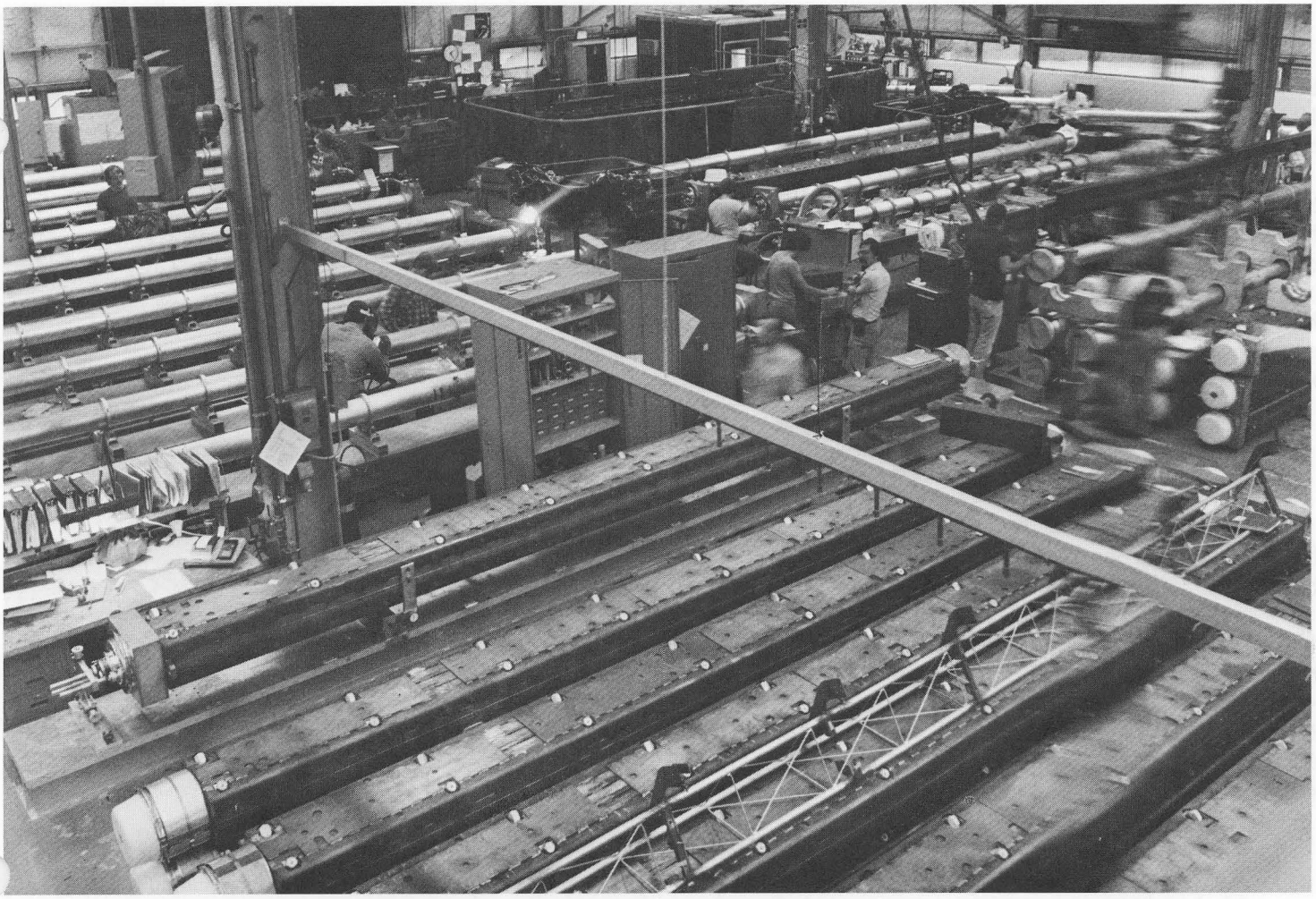
Main Ring sectors A-1, A-2 and A-3 now contain the prototype systems. Currently magnets are being installed in the E-sector, and the next sector will be F. This sequence was chosen to follow the path the protons will take as they circulate through the superconducting accelerator. When one-half of this accelerator is completed--sometime next year, scientists believe--an extensive half-ring test will be conducted, checking out all of the connected systems.

There are many other components that go into the new accelerator. Some of them are the feed cans, turn-around boxes, helium transfer line, three-inch high pressure helium gas line, heat exchangers and controls network. Those vitally important controls--which will give the staff in the Main Control Room in the Cross Gallery a comprehensive picture of what is happening at the moment--are being interconnected with long runs of cable and wires. Each sector will have about 1,000 control cables, many of them multi-wire cables. About 10,000 terminations have to be made in each sector, creating quite a complex controls system.

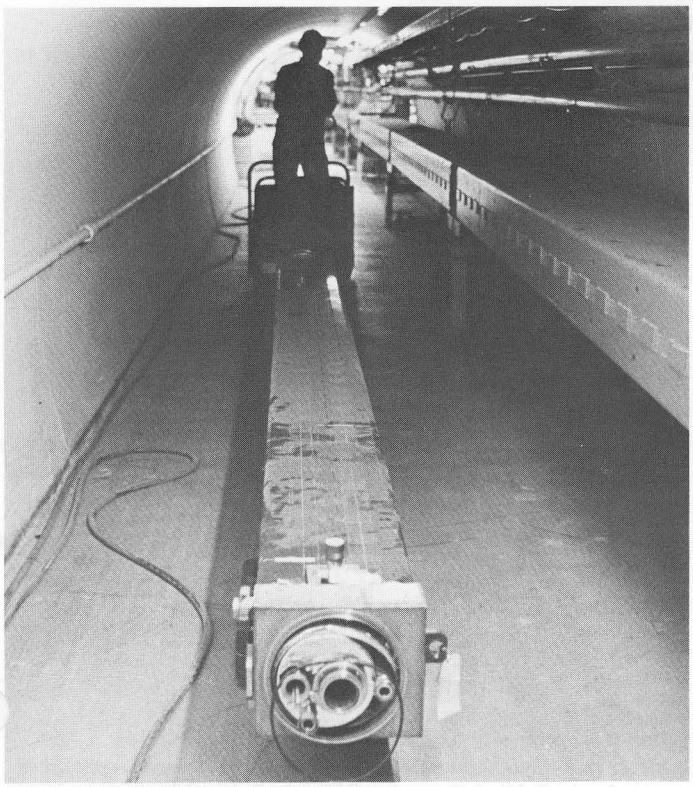
(See additional photographs on the next page.)



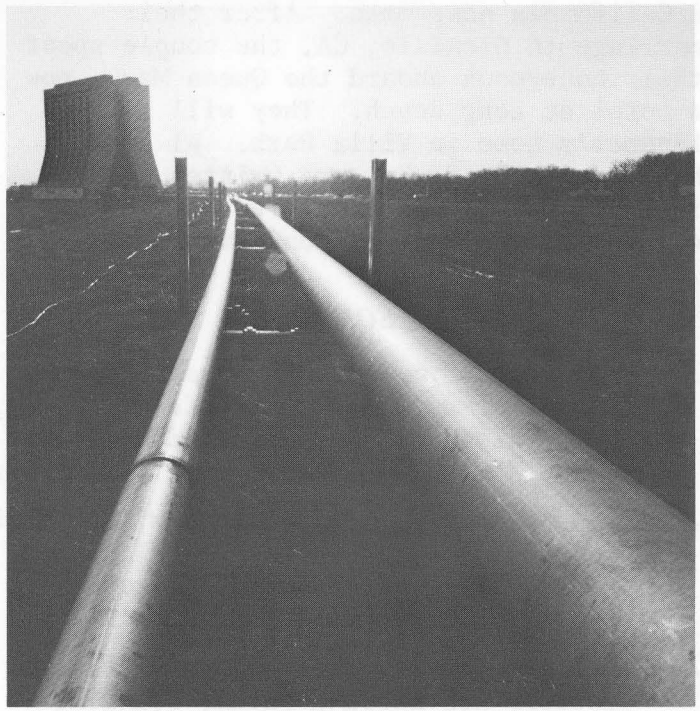
A welder works assiduously beside a stack of superconducting dipole magnets waiting to be lowered gently into the Main Ring for eventual installation into the Energy Saver. The photograph was taken in the AO Service Building.



A bird's eye view of the magnet assembly facility in the Industrial Area. In the foreground is a row of magnets waiting to go to the Magnet Test Facility for extensive testing and evaluation.



Tom Lassiter carefully moves a magnet to the location where it will be installed in the Main Ring.



Catching the sun's rays, the transfer line at the right carries liquid helium and liquid nitrogen from the Central Helium Liquefier Facility. The other smaller diameter pipe carries helium gas under high pressure to the facility.

SPECIAL NOTICE

Electrical power in Wilson Hall will be turned off on Sept. 12 for approximately 12 hours beginning at 6 a.m., Bud Stanley, buildings manager, announced.

A number of maintenance projects will be worked on during this time. Power will be cut to air conditioning, lighting, computers, water systems and the cafeteria. However, one elevator on each side of Wilson Hall will be operating. Telephone service and related communications systems will be on during this time.

NEXT MUSIC CLUB EVENT

The next Fermi Music Club event will be a double feature of "Movement of Sound" band and "The Music Man."

It will begin at 9 p.m. Sept. 19 at the Village Barn and end the next morning at 1 a.m. Admission is by advance ticket sale only. For tickets, contact Marilyn Bailey, ext. 3282, Ron Davis 3077, Johnny Geralds 3259, Theo Gordon 4455, Ed Justice 4284 or Larry Tate 3141.

MARRIED

Al Lindner, property manager at Fermilab, last month (August) married his childhood sweetheart, Jeanette Briggs Mazurki, a California newswoman. After their marriage in Glendale, CA, the couple spent their honeymoon aboard the Queen Mary, now a hotel at Long Beach. They will live in Lindner's home in Villa Park. Al and his then bride-to-be were written about in Kup's Column that appeared in the Aug. 4 issue of the Chicago Sun-Times.

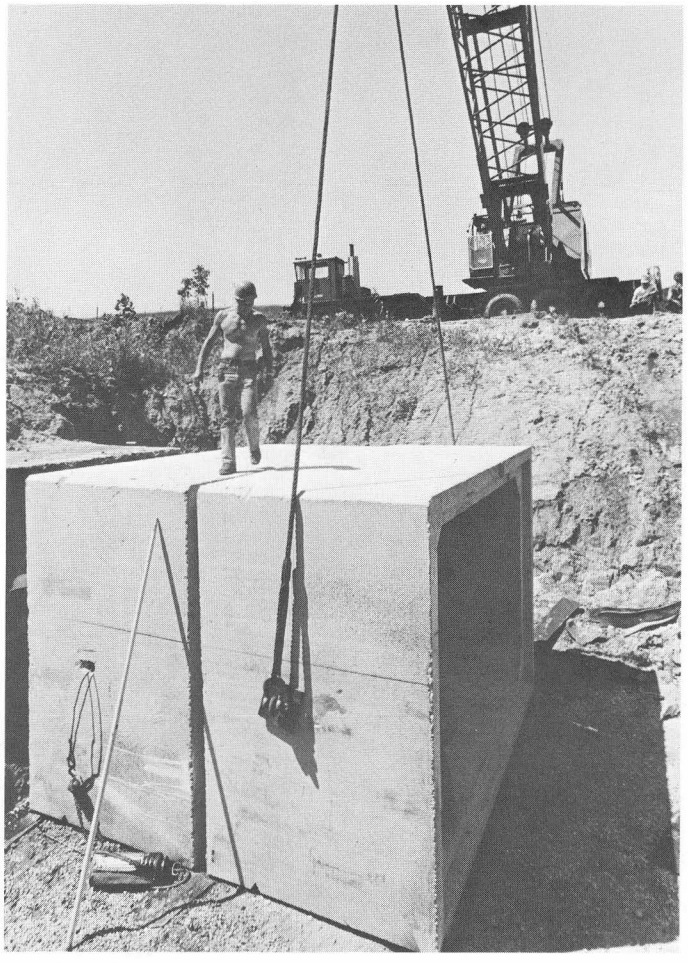
CHEZ LEON MENUS

Sept. 9, 12:30 p.m., $6--Tomatoes Stuffed with Crabmeat, Barbecue Chicken Kabobs, Rice Pilaf, Romaine Salad with Cashew Nuts, Almond Cheesecake with Kiwi Fruit.

Sept. 10, 7:00 p.m., $11--Mushroom Soup with Cognac and Brie Pastries, Red Snapper, Ratatouille, Green Salad, Homemade Peach Ice Cream with Macaroons.

Sept. 11, 7:00 p.m., $11--Oysters' Rockefeller, New England Salad, Standing Rib Roast (Carved Table Side), Oven Roasted Potato, Hampshire Green Beans, English Trifle.

For reservations, call ext. 3082.



Two precast concrete sections are lowered carefully into place at the north end of Enclosure H, which is adjacent to the Proton Service Building P-1. The enclosure is being lengthened at its north and south ends. Enclosure H is where the beam from the Main Ring is split into the beams that go to the proton-west, proton-center and proton-east experimental areas. This work is only part of a major upgrade project for the Proton Area that is now going on.

BIBLE GROUP BEGINS NEW STUDY

The Noon Hour Bible Study Group has begun a new study. It is called "Your Life in Christ" and is based on the first book in the "Design for Discipleship" series put out by Navigators. Jim Wendt will lead this new study.

Andy Anderson led the study of Genesis that just ended. These study sessions are open to everyone. The group meets in the Black Hole, WH2NW, Mondays and Fridays from noon to 12:30 p.m. For additional information, contact Jim at ext. 4441.

PUBLICATION DATA

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