fermilab report

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THE COVER: Users Executive Committee (left to right) Jim Walker, Ernie Malamud, Gaurang Yodh, Mike Shaevitz, Frank Taylor, Bill Carithers, Maris Abolins (seated, chairman) Dick Gustafson (outgoing chairman), Jeff Appel, Jerry Rosen, Lee Holloway, and Joe Lannutti. Also on the committee but not pictured is Stu Loken. See article on page 1.
(Photograph by Fermilab Photo Unit)

USERS EXECUTIVE COMMITTEE ELECTS NEW CHAIRMAN

Phyllis Hale

Maris A. Abolins, Michigan State University, was elected chairman of the Fermilab Users Executive Committee at its August 11 meeting. He succeeded Richard Gustafson, University of Michigan. Jeff Appel, Fermilab, will continue as secretary of the committee for the 1982-83 season.

The committee consists of 13 members, 12 of whom are elected by the over 1,000 members of the Fermilab Users Organization for two-year terms. Six members were recently elected, and six members are serving their second year. The outgoing chairman serves an additional year as the 13th member.

This year's newly elected UEC members are William Carithers, Lawrence Berkeley Laboratory; Lee Holloway, University of Illinois; Joseph Lannutti, Florida State University; Stewart Loken, Lawrence Berkeley Laboratory; Ernest Malamud, Fermilab; and Frank Taylor, Northern Illinois University.

Other members of the committee are Jerome Rosen, Northwestern University; Michael Shaevitz, Columbia University; James Walker, Fermilab; and Gaurang Yodh, University of Maryland.

PAN AMERICAN PHYSICS

Russ Huson and Leon Lederman

Introduction

An "Office of Pan American Collaboration" (OPAC) was proposed earlier this year by Leon Lederman at a Latin American symposium in Mexico attended by ten Latin American countries. The goals of this proposed collaboration would be to explore the possibilities of increased cooperation with the United States in the form of providing assistance to groups interested in becoming users of high-energy physics facilities and to provide a stimulus to scientists in any field of physics who would benefit from exposure to advanced technology associated with accelerator building and high-energy laboratories. Implicit in these objectives was the assumption that a strong physics capability is a necessary component in the potential for technological development. At the present time, Latin America has approximately 2000 Ph.D. physicists for a population of 350 million. Based on U. S. statistics (25,000 for 200 million), one might expect 30,000 Latin American physicists.

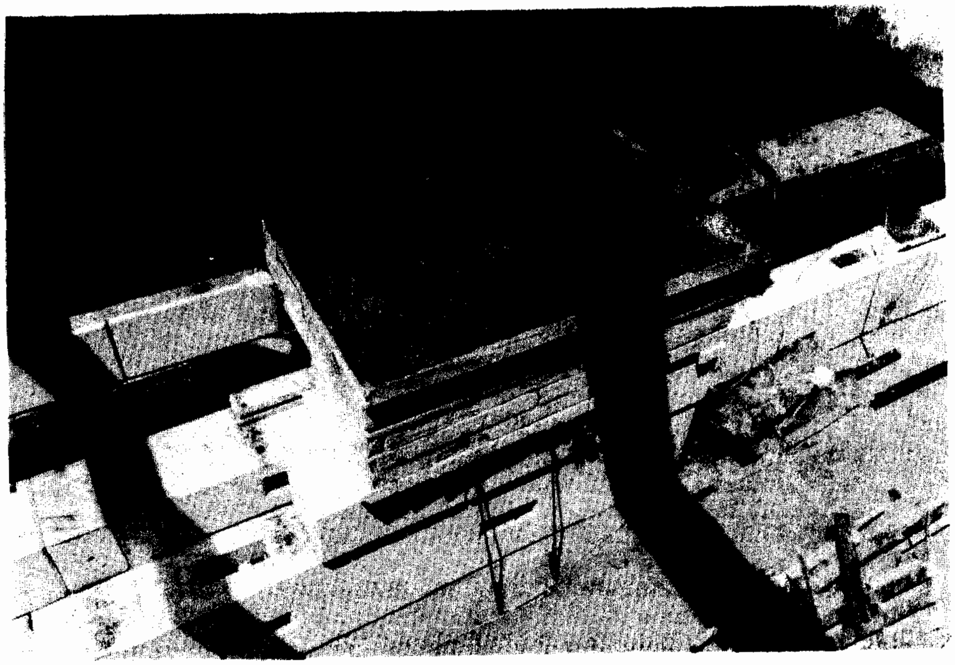
Progress

Progress has been made as evidenced by the various meetings and the above-mentioned symposium that took place in Cocoyoc, Mexico, on January 5-7, 1982. This symposium demonstrated that there was a viable Pan American community of high-energy physicists. In addition to the symposium, a fast electronics laboratory has been started at the National University of Mexico, and Mexico is currently collaborating on high-energy physics experiments at Fermilab and Brookhaven National Laboratory. There is also a small collaboration between Mexico and Fermilab on an accelerator project. Fermilab is also collaborating with the University of Honduras on setting up a physics laboratory for small experiments. Back issues of **Physical Review** and **Physical Review Letters** have been sent to the libraries at various Latin American institutions, and we hve established a mechanism for assisting Latin American institutions in the purchasing of scientific equipment (Colombia and Peru). Several Latin American theorists have come to Fermilab for short stays, and Fermilab is anxious to receive both physicists and engineers when these visits would benefit the sending institution. Fermilab is presently seeking modest foundation and international agency support to provide help to visiting Latin American Scientists. Meanwhile, discussions are taking place relative to the continuation of the communications via a second Inter-American Symposium in Brazil in July of 1983.

How to Help

The Director's Office will assist anyone willing to donate good physics textbooks to libraries in Latin America. Additional ways to participate include collaborating on small projects or on high-energy physics experiments with Latin America, giving seminars at Latin American institutes, and sending old but good laboratory equipment that could be used in undergraduate or graduate laboratories. Again, the Director's Office can help with procedures, etc. University users can take sabbaticals or go on lecture tours. If there is interest, contact Leon Lederman.

Latin American theoretical physicists (left to right) William A. Ponce, Director of the Physics Graduate Program at the Universidad de Antioquia, Medellin, Colombia; Rodrigo Huerta from Centro de Investigacion y de Estudios Avanzados del Instituto Politecnico Nacional, Mexico; and Arnulfo Zepeda, Director of the Physics Graduate Program at Centro de Investigacion y de Estudios Avanzados del Instituto Politecnico Nacional, Mexico.



An exposed beam line in the Proton Area.
(Photograph by Fermilab Photo Unit)

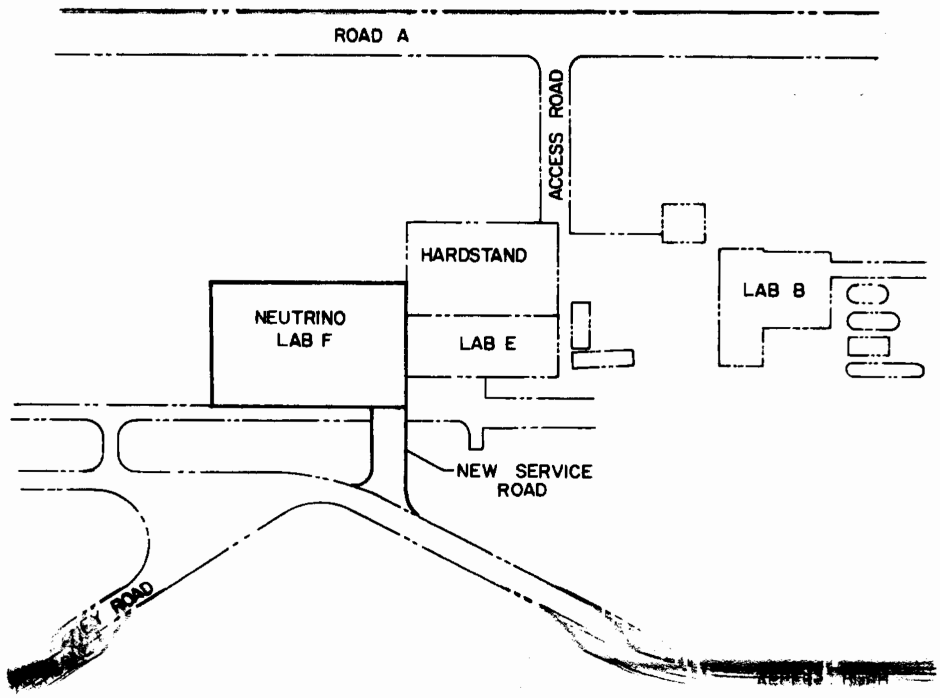
NEW EXPERIMENTAL AREA PLANS

Since Peter Koehler and Tom Kirk described the plans for upgrading the experimental areas at the last Annual Users Meeting, some of those plans have been modified. Generally speaking, all of the facilities described then (see also T. Kirk, **Fermilab Report**, July 1982) are still to be provided. The way in which those facilities are to be implemented has in some cases been altered. This article will describe these changes.

N3 Upgrade

R. Stefanski

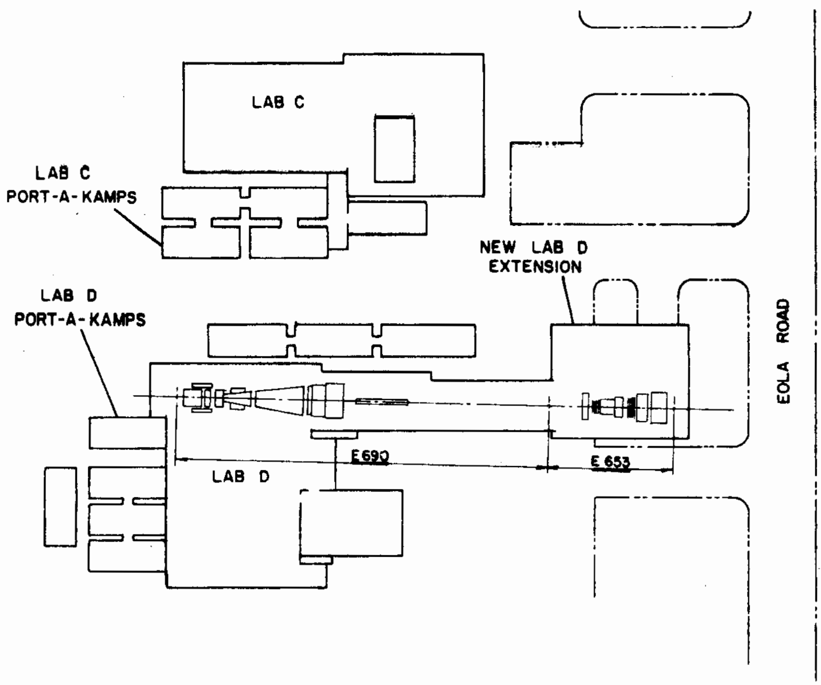
The 30-in. bubble chamber has been housed at Lab D in the Neutrino Area since the early days of Fermilab. It completed its last set of runs during the 1982 running period, and the chamber itself has now been retired. The 30-in. magnet steel will be modified and moved to the new Lab F (see the plan below) where it



Lab F

will be used with the new Tohoku bubble chamber for a prompt-neutrino experiment. The magnet is also being converted to superconducting coils by the Research Services Department.

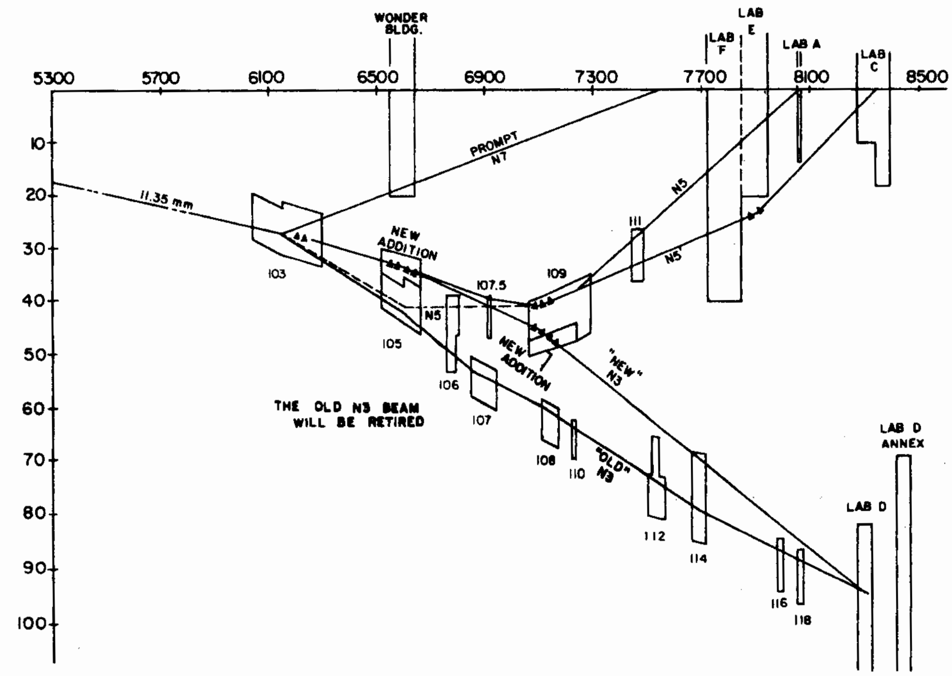
As the 30-in. bubble chamber equipment moves out of Lab D, a new set of experiments will be set up there. Experiment #690 (Knapp) will use a spectrometer system to study the decay of charm and bottom particles. This experiment uses two large spectrometer magnets -- the "Jolly Green Giant," formerly used at CEA and now at BNL and a new large aperture magnet that will be built at Fermilab. The apparatus shown in the following design occupies all of Lab D and extends into the blockhouse that exists behind Lab D.



E-690/653 in Lab D

Experiment #653 (Reay) will also be housed in this area in a new building behind Lab D. This experiment will study the details of charm and bottom production with nuclear emulsion. The experiment uses much of the same apparatus as the neutrino-emulsion experiment (E-531) that was carried out in the Wonder Building, but it is modified to use a hadron beam.

The N3 beam line itself will be modified and moved. It will be designed to transport machine energy protons to Lab D with intensities that can vary from 10^5 to 10^8 ppp. The new beam line is shown below.



N3 beam line

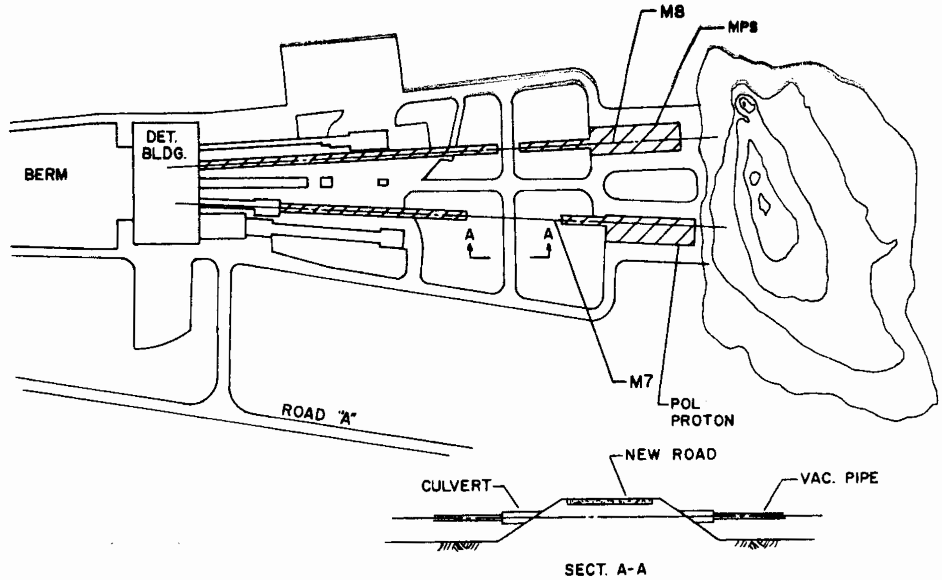
Replacement for M6

H. Haggerty

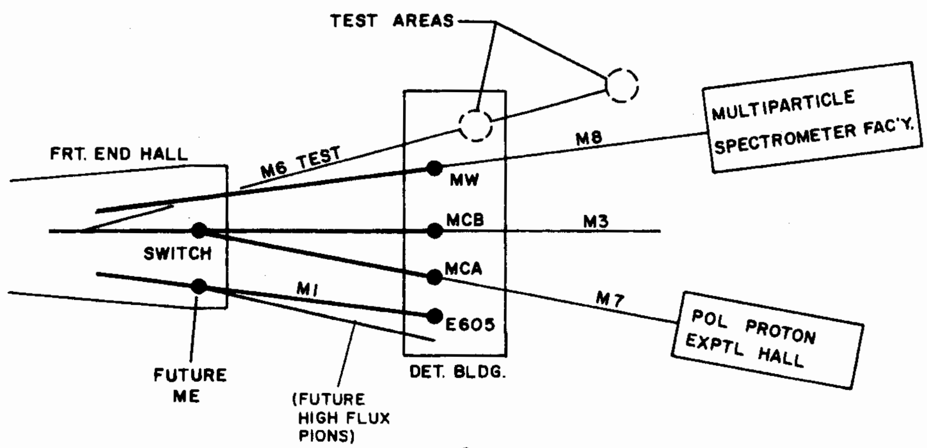
To avoid confusion between existing and future beam lines, some beams in the Meson Area have been relabeled as shown in the figure at the top of the next page.

The Tevatron replacement for M6 will be called M8. As can be seen in the figure at the bottom of the next page, the length of both M8 and M7 (the polarized proton beam) is about 1000 ft.

The proposed plan is to build two new experimental halls, each roughly 1000 ft north of the existing Meson Detector Building. These buildings will match closely the present and future needs of the experimental programs in the M7 and M8 lines as well as provide sufficient work space for the assembly and development of the experiments.



Schematic Meson Area



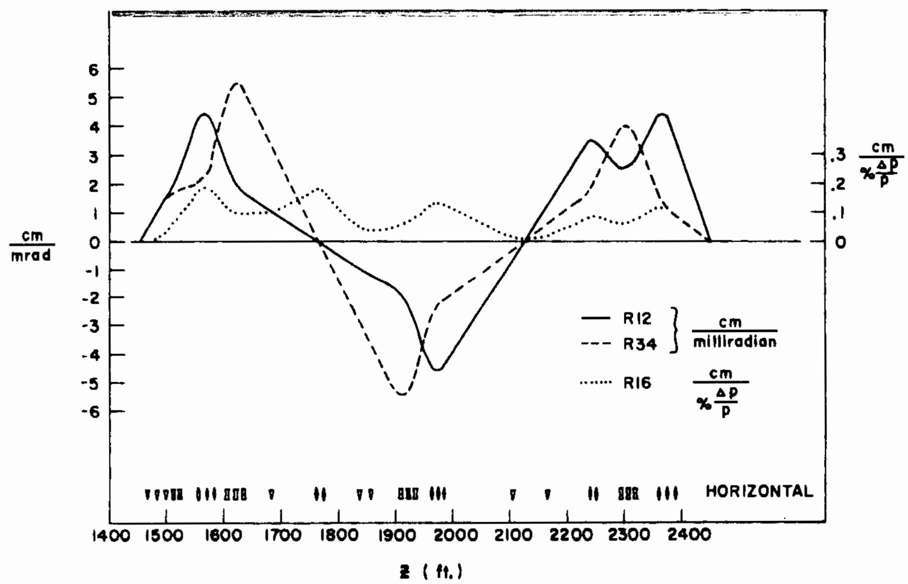
Meson Layout

One of the motivations for transporting the MW primary beam to the Detector Building is to provide a source for a tagged secondary beam which will be totally unconstrained by the tunnels and berms of the 200-GeV Meson Area. The design goal for M8 of a 600-GeV π/K line with large acceptance can be met in a 700-ft lattice consisting of sixteen 3Q120's and four B2 dipoles. Continuing work on muon spoiling and cleanup indicates that the first hundred feet are tightly filled with active components. Further, the momentum-dispersed envelope of a two-stage beam is not totally recombined until the second focus at 700 ft. In order to incorporate the capability for particle velocity tagging, as described below, a third stage will be necessary.

The design criteria for M8 are summarized below:

1. Maximum Energy: 1000 GeV in proton mode, 600 GeV in pion mode.
2. Flux: The goal is 3×10^{-4} π/interacting proton @ 600 GeV. To achieve 10^8/10 sec spill and require 7×10^{11} incident protons (1000 GeV) or 2×10^{12} incident protons (800 GeV).
3. Muon Halo: $<$ 7% in a square 10 ft×10 ft. In a 10-sec spill this is 0.7 MHz. With $\Delta\tau$ = 50 nsec in a veto wall, this gives 3.5% dead time.
4. Spot Size: 1 cm diameter contains 90% of the hadrons.
5. $p^{\pm}/K^{\pm}/\pi^{\pm}$ identification using a combined TRD/Cherenkov system over the momentum range $200 < p < 600$ GeV/c.
6. Calibration/Test mode. p_{min} = 20 GeV. π's and e's.

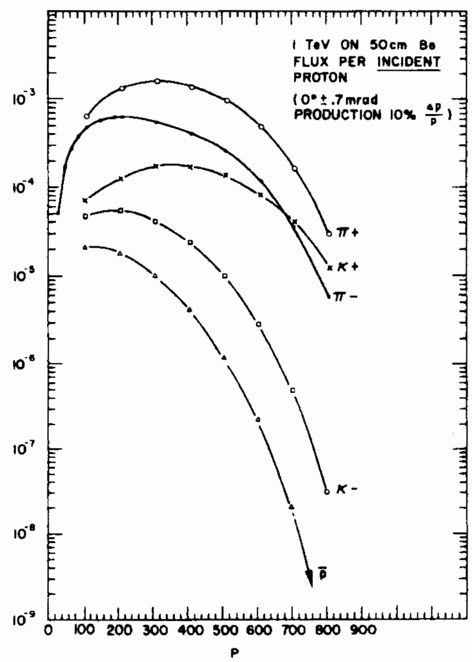
The drawing below shows a layout of the beam elements and gives some trajectories. The final stage, like the first two,



M8 Layout

can be either a distributed lattice or lumped components. The choice of transporting technique will depend ultimately on the design of the tagging apparatus and on power supply and utility considerations. More work will be done to insure that this new beam line will be cleaner than its much longer predecessors. The option described here is for a three-stage lumped component beam with tagging capability. This 1000 ft beam has acceptance of $\Delta\theta = \pm 0.6$ mrad, $\Delta\phi = \pm 0.6$ mrad and uses the following magnets: 24 3Q's, 5B2's, and 3 6.0-1.25-150's.

The graph below shows the expected fluxes. They are computed from thick target particle production rates for a 50 cm Be target. The yield is at the target and normalized to incident proton intensity.



M8 Fluxes

Particle Identification in the New M8 Beam

Historically, the M6 beam line has had full incident particle tagging. The M8 beam is the successor to M6 and a strong effort will be made to retain this capability.

TRD systems have been shown to be an attractive and inexpensive complement to Cherenkov counters. In the present design, 1500 foils of 0.001 in. lithium are placed immediately upstream of a 3 mrad dipole at the second focus. After a 40 ft drift space, a multi-segment scintillation hodoscope will detect the radiated X-ray. The position of the X-ray when correlated with the beam particle trajectory will further enhance the identification efficiency. Two such TRD systems will tag π's with a high probability. The TR foil assemblies will be modular to facilitate easy installation and removal. The stacks of foil will attenuate the beam intensity by ~5-10% with the scattered particles being swept from the beam by the dipole immediately downstream of each TRD.

In order to relieve the halo sensitivity of the future TR system, a multi-plane MWPC with halo cancelling electronics is being considered. The scheme is based on the very large difference in ionization density of converted gammas compared to charged particles. The detector consists of a stack of 20 argon-CO_2 filled MWPC planes, each with 64 wires of 1 mm spacing, with four adjacent wires ganged into one amplifier unit. The stack would be located 40 feet downstream of a 3.5 mr bend. At this distance the maximum π/K circles would be ~0.5 in./1.5 in. diameter for 600 GeV. Since halo particles leave an ionization trail in many planes (whereas converted low energy X-rays leave ionization in a small fraction of a cell gap) adjacent planes will have opposite polarity amplifiers. Pairs of amplifiers will be summed, giving an output equal to the difference in signal magnitudes. The summed plane pair signals will then be rectified and summed again in groups of ten planes and fed to an ADC. Halo particles will create only very small sum signals determined by dE/dx differences in neighboring planes. The number of planes in gangs is so large (~80 bins for π generated γ's) the probability of two gammas converting in adjacent summed gangs is small. A total of 32 ACD's will give the total TR energy and spatial distribution.

In conjunction with the TRD's the long empty sections of the beam can be used for threshold Cherenkov counters to tag π's and K's. Alternatively, a differential counter with or without chromaticity correction (DISC counter) can be used for positive tagging of minority particles. New techniques promise improvement in the capability of a modified 200-GeV DISC for use in the proposed 600-GeV line.

Particle identification at momenta up to 600 GeV/c and intensities up to 10^7/sec represents a difficult challenge. The various ideas discussed above will be pursued through the prototype stage before deciding on the final system.

M8 New Experimental Hall

The floor of the new spectrometer enclosure will be built 4 ft below grade level. This gives an 8 ft beam height and avoids the construction of special pits for large pieces of apparatus. A uniform floor elevation increases flexibility for future modifications. It also means that large, complex, heavy items can be assembled and tested in the same building and then rolled into place. This will save considerable expense and minimize risk of damage to equipment.

A single 20-ton crane will span the area. Roll-up doors and a loading area will provide access for large equipment. The counting rooms will have raised flooring to provide space for cable runs and ducting for cooling air. Movable partitions may be used to separate electronic and computer areas from workshop and office space.

M3 Options

R. Stefanski

The M3 beam line will be modified substantially from the configuration used in the last 400-GeV run. Commensurate with the philosophy used in the upgrade of the other Meson Area beam lines, the M3 target will be moved downstream about 1400 ft and will reside in the Meson Detector Building. An extension of E-617 (the current occupant of the M3 beam) is being developed that could improve the sensitivity of the experiment by a factor of ten. At this time this design work is very preliminary, but it should proceed toward full development later in the year. In general, however, M3 will be maintained as a facility for neutral beam experiments with the objective of extending the long history of important experiments carried out in this beam line into the Tevatron era.

Test Beams

D. Green

Past experience leads one to believe that two full-time test beams are sufficient to satisfy the needs of Fermilab users. During the next running period one high quality test beam will be provided by the N1 line.

The N1 line has three major bend points of about 27 mrad each which limit the maximum momentum to about 330 GeV/c. Particle identification is supplied by three threshold Cherenkov counters. The last bend point will be instrumented with a 1 mm PWC so as to supply momentum tagging of the beam, $(dp/p) \sim \pm 0.06\%$ at 300 GeV/c. This value is such as to not contribute to the resolution of the electromagnetic calorimeters. The N1 bend point at Enclosure 100 will be modified to sweep away charged particles, convert photons, and transport an enriched $e^{\pm}$ beam in a manner similar to that used in M4 during the 1982 running period. The N1 acceptance is $\sim 0.05 \mu sr\ \%$. For 1000 GeV/c protons incident at 2 mrad to the N1 line one expects, for 10^{10} interacting protons, either 2×10^4 $\pi^{\pm}$ (3×10^4) at 100 (200) GeV/c or

4×10^3 $e^{\pm}$ (1×10^3). The N1 line will thus provide a high quality test beam facility.

A low quality test line will be provided in the N7 line in a new laboratory called Lab F. This line will provide ~10^4 particles/spill without tagging and will be suitable for chamber testing.

Another test beam must still be provided. Since the MW primary beam will run at low intensity during the next running period, the test beam in M5 must be abandoned. Because ME, MW, and MC will ultimately be targeted in the Meson Detector Building, and because tunnels exist which view the old Meson Target Hall, the present design of this test beam envisions a thin transmission target placed in MC at the old Target Hall location.

During the interim run, this target will feed a suitably modified M4 line. The problem with the old M4 line was largely the 8.5 mrad viewing angle and the underground location. The former difficulty will be removed by placing a septum in M4 to decrease the production angle to ~2 mrad. The maximum momentum is 200 GeV/c, the $\pi^{\pm}$ yield is $\gtrsim 10^6$ for 10^{10} interacting protons. A purified $e^{\pm}$ beam will not be available in M4 although Cherenkov identification will be.

Hence, for the next (interim) running period two test beams will be available, N1 and M4. However, in the Tevatron era, M3 will extend over M4 and the underground location may become untenable due to mechanical loading and radiation safety constraints. For this reason, the MC transmission target will be viewed at ~2 mrad horizontally, and the old M6 beam line and spectrometer enclosure (MPS) will be utilized as a test beam.

The M6 maximum momentum will be ≈130 GeV/c and the acceptance will be ≈0.3 μsr %. For 10^{10} interacting protons in the MC transmission target, one expects ~7×10^5 $\pi^{\pm}$ at 10 GeV/c into the spectrometer enclosure. A test area could be set up in the Meson Detector Building. Alternatively, the MPS enclosure with pit and crane could be used.

Thus in the Tevatron era, a high-quality test beam will be available in N1, a moderate-quality beam will be available in M6, and a low-quality test facility will be available in Lab F. This plan provides more and better test beams than were available to experimenters in the past.

SUPERFERRIC MAGNETS

With the Energy Saver well along in construction, some people are casting their thoughts on to the step beyond. Work is going on at a number of laboratories to develop the next generation of superconducting magnets. The goal is to reach 10 Tesla, more than twice the fields of the Energy Saver. But at the same time, there is also a move in the opposite direction, to consider a low-field, low-cost superconducting magnet for a multi-TeV hadron accelerator. There is new design work and new experimental work to report.

The superferric magnet has conventional iron poles to shape the field, but it is powered by superconducting coils. The iron is cold in order to minimize the magnet cross section and stored energy. The maximum field is 2 to 3 Tesla. At this level, the refrigeration requirements are modest and, of course, the actual magnet power is minute. A concept of a 20-TeV ring was developed at the recent DPF Summer Study in Snowmass by Robert Wilson.[1] It is clear that any multi-TeV device using superferric magnets will require a very large site; a 20-TeV ring with 2-Tesla magnets will have a diameter of approximately 50 miles. In Wilson's concept, the ring would be built in modular sections in a very small tunnel--almost a sewer pipe. The tunnel would be very close to the surface and access would be through periodic manholes. It is planned to make use of robots for installation, alignment, and minor repair; the tunnel would be too small for human beings, except at periodic access points. Major repairs would be accomplished by digging up the appropriate tunnel section and replacing it. Each dipole magnet might be 100 or more meters long (built of smaller sections) and each quadrupole might be 7 to 8 meters long. Straight bars of superconductor would be used for the coils. The tunnel might be used to return vented helium.

In addition to Wilson's technical considerations at the Snowmass meeting, Richard Lundy and Paul Mantsch[2] have made a scaling of cost from the Energy Saver experience. Their preliminary result is that a 20-TeV ring could be built for less than $1 billion, which appears to compare well with what a higher-field ring might cost. These results are all highly speculative, but they point to interesting directions for the future.

The superferric magnet is not a new concept. It was discussed by Gordon Danby in the 1960's, although mostly in the context of higher fields. The low-field, low-cost superferric magnet was discussed (and named) by Robert Wilson in 1967. At that time, superconducting magnets were in a primordial stage of development, but the 15 years since then have seen substantial advances in the art, and it is natural to consider superferric magnets as a possible design for the next generation of hadron accelerators.

As a first try at an experimental realization of a superferric magnet, a model 7 inches by 5.5 inches in cross section and 2 feet long was built[3] and tested[4] at Fermilab. The magnet reached its design field of 2 Tesla with no training and reached 3 Tesla with an acceptable amount of saturation. This saturation means that there will be a sextupole component and its magnitude has been calculated.[5] The presence of the iron gives the additional advantage that there the sextupole can be corrected in more-or-less traditional ways, such as, for example drilling cleverly placed holes in the iron. From this saturation, for example, by drilling holes in the poles. No actual measurements of field quality have been made at this writing, but they are now in progress. Less than a week was needed to carry out this construction and testing.

Thus an alternative superconducting ring design has now been advanced to the point where it must be considered seriously for the next generation of high-energy accelerators and storage rings.

References

1. Robert R. Wilson, Superferric Magnets for 20 TeV, in Proceedings of the 1982 DPF Summer Study (to be published).

2. R. Lundy and P. Mantsch, Cost Considerations for a 20 TeV 2 Tesla Superferric Magnet Ring, **ibid.**

3. J. R. Heim, H. Hinterberger, and J. Jagger, Construction of a Fermilab Superferric Magnet, Fermilab TM-1122, July 1982.

4. A. D. McInturff, Performance Testing of a Super Fe Magnet, Fermilab M-1121, July 1982.

5. K. Ishibashi, Calculation of Super "Fe" Magnet Parameters, Fermilab TM-1123, July 1982.

AN ADVANCE IN SPOOL PIECE CONSTRUCTION

Paul Mantsch

The Fermilab Energy Saver project has recently passed an important milestone in the remarkably successful operation of the superconducting magnet string in sector A of the Main-Ring tunnel. This experience has inspired confidence that a large superconducting accelerator can indeed be made to work.

Making and operating superconducting magnets has turned out to be much more difficult and complex than expected. Nevertheless, exploration of new technologies in both accelerators (and detectors) is vital in maintaining the pace of progress in high-energy physics we have enjoyed in the past decade.

The ultimate realization of the Tevatron, as well as future accelerators, requires the talents of many resourceful people. One obvious source of help for a wide range of technical problems is the community of university-based experimenters. Yet relatively few of these experimenters have been involved in accelerator-related problems at Fermilab. Those who have spent time working on accelerators, however, have made important contributions to the Tevatron project. One recent example is Prof. Laszlo Gutay of Purdue.

Some careful measurements were needed on the spool piece (a spool is associated with each quadrupole in the ring and contains the correction coils). It was necessary to understand the effects of vacuum loading on the cryostat containing the correction coils. Drawing on his knowledge of vacuum systems and optical measurements, as well as on analytical skills as an experimenter at the Internal Target, Gutay organized the investigation. He was provided with laboratory space and equipment, together with technicians and surveyers required to carry out the task. After a month of measurements and analysis, Gutay wrote a report on his findings. His work demonstrated that spools can be placed in the tunnel with confidence that cycling the insulating vacuum of the magnet string will have no significant effect on the alignment of the correction coils.

The separation of high-energy physics experiments into the particle source and the detector has developed as research accelerators have migrated to the laboratories. This dichotomy, however, has not existed historically. The continued involvement of experimenters in the development of new accelerators is important, not only to the quality of the machines, but in helping to shape the future of high-energy physics programs.

There are many opportunities at Fermilab for experimenters to contribute, not only to the Tevatron as Laszlo Gutay has done, but to the design and development of future accelerators as well.

HIGH ENERGY PHYSICS ADVISORY PANEL MEMBERSHIP 1982

The High Energy Physics Advisory Panel membership was in error on page 15 of the June 1982 **Fermilab Report.** The correct membership is as follows:

J. Sandweiss, Chairman
C. Baltay, Nevis Laboratory
T. Collins, Fermilab
R. Dashen, Princeton
S. Drell, SLAC
D. Jackson, LBL
E. Knapp, LANL
R. Palmer, BNL
M. Perl, SLAC
L. Pondrom, Wisconsin
R. Schwitters, Harvard
R. Thun, Michigan
M. Tigner, Cornell
W. Weisskopf, MIT
H. Williams, Pennsylvania

NOTES AND ANNOUNCEMENTS

LUNDY HEADS TECHNICAL SUPPORT SECTION. . .

Richard Lundy has been appointed head of a new Technical Support Section, which has been created to give engineering, machine-shop fabrication, and assembly support to the efforts of the Energy Saver, Tevatron I, and Tevatron II.

WORKSHOP ON GAS SAMPLING CALORIMETRY. . .

A two-day workshop will be held at Fermilab on October 28 and 29, 1982, on gas sampling calorimetry. The workshop is planned to bring together some experimenters who are actively involved in this type of calorimetry and discuss the subject in detail. Those interested in participating are requested to contact Muzaffer Atac, ext. 3960, or mail station #223, at Fermilab.

MANUSCRIPTS, NOTES, LECTURES, AND COLLOQUIA PREPARED OR PRESENTED FROM JULY 20, 1982 TO SEPTEMBER 30, 1982

Copies of preprints with Fermilab publication numbers can be obtained from the Publications Office or Theoretical Physics Department, 3rd floor east, Central Laboratory. Copies of some articles listed are on the reference shelf in the Fermilab Library.

Experimental Physics

S. R. Stampke Experiment #110	Pion-Pion Decay Distributions for $\pi^- p \to \pi^+\pi^- n$ at 100 and 175 GeV/c (Ph.D. Thesis, California Institute of Technology, May 1982)
D. Brick et al. Experiment #'s 154 and 299	Comparison of 147 GeV/c $\pi^- p$ Low Transverse Momentum Hadron Production with Deep-Inelastic Leptoproduction
D. Brick et al. Experiment #'s 154 and 299	Multiple Correlations and High-Transverse-Momentum Jets in 147-GeV/c $\pi^- p$ Interactions (Submitted to Phys. Rev. D)
V. Kistiakowsky et al. Experiment #'s 154 and 299	Comparison of 147 GeV/c $\pi^- p$ Low Transverse Momentum Hadron Production with Deep-Inelastic Leptoproduction of Hadrons (Submitted to XII International Symposium on Multiparticle Dynamics, University of Notre Dame, June 21-26, 1981)
D. Brick et al. Experiment #299	Topological, Total and Elastic Cross Sections for K^+p, π^+p, and pp Interactions at 147 GeV/c [Phys. Rev. D25, 2794 (1982)]
D. H. Brick et al. Experiment #299	The Reactions $pp \to pp\pi^+\pi^-$, $K^+p \to K^+p\pi^+\pi^-$, $\pi^+p \to \pi^+p\pi^+\pi^-$ and $\pi^-p \to \pi^-p\pi^+\pi^-$ at 147 GeV/c (Submitted to Z. Phys.)
A. V. Barnes et al. Experiment #'s 350 and 383	An SU(3)-Based Comparison Between Inclusive Kaon and Pion Charge Exchange Scattering in the Triple Regge Region

A. V. Barnes et al. Experiment #'s 350 and 383	A Compilation of Cross Sections for Inclusive Kaon and Pion Charge Exchange
R. L. Cool et al. Experiment #396	Charged Multiplicities of High-Mass Diffractive $\pi^{\pm}$, $K^{\pm}$, and $p^{\pm}$ States [Phys. Rev. Lett. **48**, 1451 (1982)]
K. Goulianos et al. Experiment #396	Universality of Charged Multiplicity Distributions [Phys. Rev. Lett. **48** 1454 (1982)]
D. S. Barton et al. Experiment #451	Experimental Study of the A-Dependence of Inclusive Hadron Fragmentation (FERMILAB-Pub-82/64-EXP; submitted to Phys. Rev. D)
G. D. Cole et al. Experiment #466	Recoil Properties of Fragments Emitted in the Interaction of Complex Nuclei with Relativistic ^{12}C Ions and Protons (Submitted to Phys. Rev. C)
J. S. Stewart and N. T. Porile Experiment #466	Target-A Dependence of the Angular Distribution of Sc Fragmnts Emitted in 400 GeV Proton Interactions (Submitted to Phys. Rev. C)
T. Kafka et al. Experiment #545	Neutral - Current $\nu_\mu n$ and $\nu_\mu p$ Cross Sections from High-Energy Neutrino Interactions in Deuterium (Submitted to Phys. Rev. Lett.)
D. H. Brick et al. Experiment #'s 565 and 570	Measurement of the Multipliities in the Collision of Hadrons with Heavy Nuclei at 200 GeV/c [Nucl. Phys. **B201**, 189 (1982)]
A. M. Shapiro et al. Experiment #'s 565 and 570	The CRISIS Detector: Characteristics and Performance (Submitted to Rev. Sci. Instrum.)
J. A. Poirier Experiment #580	The Search for Resonant States from 1 to 5 GeV (Submitted to the XII International Symposium on Multiparticle Dynamics, Notre Dame, June 21-26, 1981)
D. Bogert et al. Experiment #594	Observation of $\nu_{\mu e}$ Elastic Scattering in a Fine Grain Calorimeter at FNAL (Presented at the XVII Rencontre de Moriond, Les Arcs, France)

H. E. Fisk et al. Experiment #595	A Comparison of Hadronic Prompt Single Muon Data with Central and Diffractive Charm Production Models
A. Bodek et al. Experiment #595	Limits on D^0-$\overline{D^0}$ Mixing and Bottom Particle Production Cross Sections from Hadronically Produced Same Sign Dimuon Events
A. Bodek et al. Experiment #595	A Study of the Forward Production of Charm Particle Pairs in p-Fe and π^--Fe Interactions
T. J. Chapin et al. Experiment #612	Development and Performance of a High Pressure Hydrogen Time Projection Chamber [Nucl. Instrum. Methods 197, 305 (1982)]
K. Goulianos et al. Experiment #612	Diffraction Dissociation of Hadrons and Photons on Hydrogen (Presented at the XXI International Conf. on High Energy Physics, Paris, July 26-31, 1982
R. C. Ball et al. Experiment #613	Prompt Muon Neutrino Production by 400 GeV Protons: First Results from Fermilab E613
R. C. Ball et al. Experiment #613	Supersymmetry Mass and Lifetime Limits from a Proton Beam Dump Experiment (Submitted to the XXI International Conf. on High Energy Physics, Paris, July 26-31, 1982)
R. C. Ball et al. Experiment #613	Prompt Production of Neutrinos by 400 GeV Protons on Tungsten: Differential Cross Section Results from Charged and Neutral Current Interactions (Submitted to the XXI International Conf. on High Energy Physics, Paris, July 26-31, 1982)
R. C. Ball et al. Experiment #613	Prompt Production of Neutrinos by 400 GeV Protons on Tungsten: Total Charm Production Cross Sections from Charged Current Muon Neutrino Events (Submitted to the XXI International Conf. on High Energy Physics, Paris, July 26-31, 1982)

D. Edwards et al.
Experiment #616

Recent Results on Charged Current and Neutral Current Cross Sections by the CFRR Collaboration (Presented at the European Physical Society Conf., Lisbon, July 1981)

L. L. Deck
Experiment #620

The Polarization and Magnetic Moment of the Σ^- Hyperon (Ph.D. Thesis, Rutgers The State University of New Jersey, November 1981)

R. A. Rameika
Experiment #620

The Polarization and Magnetic Moment of the Ξ^- Hyperon (Ph.D. Thesis, Rutgers The State University of New Jersey, December 1981)

H. C. Fenker et al.
Experiment #623

The E623 $\phi\phi$ Trigger Processor (FERMILAB-Pub-82/62-EXP)

Theoretical Physics

J. D. Bjorken

QCD and the Space-Time Evolution of High Energy e^+e^-, $p\bar{p}$, and Heavy Ion Collisions (FERMILAB-Conf-82/42-THY; submitted to the 20th International Conf. on Physics in Collision: High Energy ee/ep/pp Interactions, Stockholm, June 2-4, 1982)

J. D. Bjorken

Highly Relativistic Nucleus-Nucleus Collisions: The Central Rapidity Region (FERMILAB-Pub-82/44-THY; submitted to Phys. Rev. D)

A. J. Buras et al.

Fermion Masses, Rare Processes, and CP Violation in a Class of Extended Technicolor Models (FERMILAB-Pub-82/45-THY; submitted to Phys. Rev. D)

A. Bang-Rong and
C. Chao-Hsi

Family Gauge Symmetry from a Composite Model (FERMILAB-Pub-82/46-THY; submitted to Phys. Lett.)

M. Gronau and S. Nussinov

Limits on Light Right-Handed Neutrinos (FERMILAB-Pub-82/52-THY; submitted to Phys. Rev. Lett.)

H. J. Lipkin and M. Peshkin	Angular Momentum Paradoxes with Solenoids and Monopoles (FERMILAB-Pub-82/53-THY; submitted to Phys. Rev. Lett.)
K. M. Bitar et al.	Renormalization of U(1) Lattice Gauge Actions (FERMILAB-Pub-82/56-THY; submitted to Phys Lett.)
G. Eilam	Production of a Single Heavy Quark in e^+e^- Collisions (FERMILAB-Pub-82/58-THY; submitted to Phys. Rev. D)

General

C. Hojvat and A. Van Ginneken	Calculation of Antiproton Yields for the Fermilab Antiproton Source (FERMILAB-Pub-82/43; submitted to Nucl. Instrum. Methods)

Physics Notes

J. A. MacLachlan	Current Carrying Targets and Multi-target Arrays for High Luminosity Secondary Beams (FN-334)
A. J. Malensek	Addendum to Empirical Formula for Thick Target Particle Production (FN-341-A)
L. C. Teng	A Fast-Cycling Synchrotron Kaon Factory Using TRIUMF as Injector (FN-366)
M. Atac et al.	Gas Sampling Calorimeter Studies in Proportional, Saturated Avalanche, and Streamer Modes (FN-371)

Colloquia, Lectures, and Seminars

C. Ankenbrandt	"Intensity Limitations in the Fermilab Booster" (Los Alamos National Laboratory, September 9, 1982)
R. Orr	"Accelerator Division Informations Meeting" (Fermilab, September 14, 1982)

F. Mills	"Beam Cooling Workshop at Madison" (Fermilab, September 21, 1982)
T. Taylor	"Supersymmetric Effective Lagrangians" (Fermilab, September 30, 1982)
A. Brenner, C. Brown, B. Cox, T. Kirk, L. Lederman, P. Limon, P. Malhotra, and J. Peoples	"The Paris Conference: A Panel Discussion" (Fermilab, October 1, 1982)

Construction progress at the Collider Detector Facility.
(Photograph by Fermilab Photo Unit)

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October 7 and 8, 1982	Drell-Yan Workshop, Fermilab. For more information contact Risto Orava, (312) 840-4093.
October 28-29, 1982	Workshop on Gas Sampling Calorimetry (see article on page 18)
November 11-13, 1982	Physics Advisory Committee Meeting.
November 19-20, 1982	Workshop to discuss physics opportunities in D0.
February 1, 1983	Deadline for new D0 proposals and other submissions for consideration of the Physics Advisory Committee.