The Village Crier

fermi national accelerator laboratory

Operated by Universities Research Association Inc.
Under Contract with the United States Atomic Energy Commission

Vol. 6 No. 34 September 5, 1974

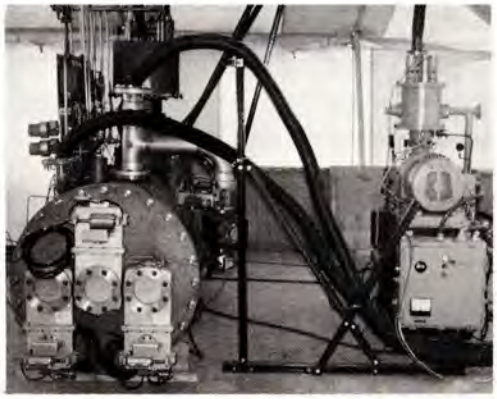
LIQUID HYDROGEN TARGETS VITAL TO FERMILAB EXPERIMENTS

More than half of the experiments in the Fermilab experimental areas use liquid hydrogen as a target. Hydrogen's simple atomic structure, consisting of one electron and one proton, makes it easy to interpret interactions occurring when it is used as a target in an experiment. Data are collected from the collisions that occur after a beam of protons from the accelerator, or of secondary particles produced at the metal production targets at the start of the experimental lines, pass through the hydrogen.

Providing the liquid hydrogen targets for the experiments is the work of the Cryogenics Group in the Research Services Department of the Research Division. Each of the target flasks is designed for a particular experiment; some flasks and vacuum jackets are fabricated at other laboratories or universities.

In a laboratory that has seen many firsts in its seven-year history, the Cryogenics Group has compiled its own impressive record, expanding and advancing cryogenic technology with each new target application. "Longest," "largest," and "first" are descriptions that recur frequently in the work of the Fermilab Cryogenics group. Twelve hydrogen targets are operating now; twelve more are in various stages of design and construction.

Liquid hydrogen is a clear liquid with a boiling point of -423 degrees F or only the equivalent of thirty six Fahrenheit degrees above absolute zero. A liquid hydrogen vessel must be carefully insulated from room temperatures, frequently by surrounding the target with a jacket of liquid nitrogen, with a boiling point more than three times higher than liquid hydrogen but still very cold. Flasks containing liquid hydrogen are made of plastic or metal with plastic ends, designed and built to suit the geometry of each experiment. An experimenter who will use a hydrogen target at the Fermilab discusses the design of the experimental equipment with the Cryogenics group. The specialized knowledge the group offers is then brought to bear on the plans. The completed target system is tested in the Research Services laboratory before it is installed in the experiment and elaborate safety measures are taken as essential part of the work.



...300 liter target for E-104 in test position...

...(L) Ed Norton, Don Connor check control panel for E-104...

...E-51 ready for test by (L) Bob Jensen, Meson, Joe Davids...

In the Meson experimental area, the total cross section experiment, #E-104, uses three horizontal flasks, each ten feet long, housed in a common cryostat. The flasks move by remote mechanical control into the beam line as required by the experimenters. With a

(Continued on Page 2)

volume of 300 liters, about the same volume as the 30" bubble chamber, it is the world's largest refrigerated target. The target is surrounded by an enclosure filled with nitrogen gas, twelve feet by sixteen feet, which, with the other safety systems, gives additional protection for safety.

Besides designing, building, testing, and installing the target, the Cryogenics group works round the clock with the experimenters, keeping the target running smoothly 24 hours a day when data are being collected.

An application devised by the Cryogenics group in Experiment #7 in the Meson Area provides the first interface with the Meson Area's control computer. The experiment now utilizes the first computer-monitored target. Other targets presently installed and operating in the Meson area are E-51, E-12, and E-69.

The world's longest deuterium system is the neutron filter built by the Cryogenics Group for the broad-band photon facility of the Proton Area and used by E-87. Installed in the P-east experimental hall, a 34½ ft. section has been operational for some time; the remaining 66 ft. section of the target has recently been installed and is now operating. It is computer-operated; experimenters can fill or empty the target by typing a message into the computer. Status monitoring is also a part of the computer readings.

The wide use of refrigerated hydrogen targets has permitted the Fermilab craftsmen to develop modules to compose a target control system and the cryogenic hardware with a minimum of custom work. Another innovation allows Freon to replace water in cooling systems; water-cooled equipment can be used in areas where water is unavailable.

Ron Fast is the physicist in charge of the Cryogenics Group. Mike Otavka is the engineer on cryogenics; Jim Piefer, materials technical specialist, and Ray Carra, design draftsman. These men are responsible for the design, construction, installation and safety of all cryogenic targets at Fermilab. Other members of the group include Joe Davids, Gene Smith, John Norris, Clarence Rogers, Jim Seeman, Ed Norton, Don Connor, and Dave Austin. The Cryogenics Group's headquarters is at 35A Shabbona, in the Village; targets are designed and built at Lab #3 in the Village.

The design and construction of each target is reviewed by the Laboratory's Cryogenic Safety Subcommittee. The Committee checks the basic design, the surrounding equipment, the auxiliary enclosures, and the experimental area building in which the experiment is to be located. Points such as possible spark sources, building ventilation, emergency routes, and warning devices and signs, are critically checked for possible faults or hazards. All modifications required by the committee must be implemented before hydrogen is admitted into the area. A rotating flashing blue light is the visual warning of hydrogen being present. No smoking or open flames are allowed in the enclosed area.

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...John Norris taking log readings for E-98 target...

...Joe Davids assembling E-12 refrigerator, target flasks...

...(L-R) M. Otavka, R. Fast, J. Piefer, R. Carra at planning session for E-25...

...(L-R) E. Smith, C. Rodgers, R. Bailey, R. Shovan moving E-87 attenuator...

...A group of high school students from all over the nation who are winners of the AEC Special Award for projects in energy research, nuclear energy, and pollution control, visited Fermilab recently. The students' tour guides at Fermilab included Gene Fisk, Accelerator Division; Dick Carrigan, Director of Personnel Services, Chuck Boyer and Stephen Pordes, visiting experimenters; Charles Brown of the Meson Department, and John Stoffel, Neutrino Department. The students and their teachers are pictured here as they visited Experiment #98 in the Muon Area...

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(Photos by Fermilab Photographers)

NORMAN RAMSEY RETURNS TO URA PRESIDENCY

Norman Ramsey returned to the presidency of Universities Research Association on September 1 after a one year absence during which time he had an appointment as Eastman Visiting Professor at Oxford University. He returns also to his post as Higgins Professor of Physics at Harvard University. He will direct URA affairs in regular visits to URA headquarters in Washington, D.C. and to the Fermilab.

Dr. Ramsey served as URA's president from 1967 to 1973 during all of the initial planning and then during construction of the Fermilab.

N. Ramsey

R. Bacher

Robert Bacher, Professor of Physics at the California Institute of Technology, served as URA president in Dr. Ramsey's absence. His term of office included the dedication of the Laboratory and many major decisions on the future of high energy physics research to be done at Fermilab. Dr. Bacher continues to serve as a trustee of URA.

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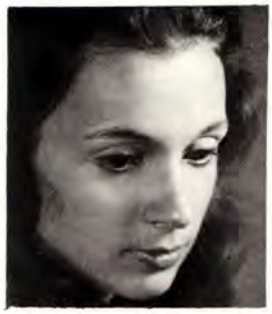
TURNBAUGH RECITAL SUNDAY, SEPTEMBER 8



...A. Turnbaugh...

...Anne Turnbaugh of Geneva, Illinois will present a piano recital on Sunday, September 8, at 3:30 p.m. in the Fermilab Auditorium. Miss Turnbaugh received her bachelor and master degrees in music from the University of Illinois and has studied at the Eastman School of Music. She will study in Munich, West Germany in the coming year. Last June, she was one of the young Americans to participate in the International Tschaichowsky Competition in Moscow.

Her program at the Fermilab will include selections by Bach, Schumann, Mozart, Chopin and Liszt.

All Fermilab people and the general public are invited to attend the recital; there is no admission charge...

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FERMILAB BULLETIN BOARD

GOLF - Fermilab Golf League is sponsoring the Second Annual 18-hole tournament on Saturday, September 14 at the Arrowhead Country Club. All employees of Fermilab, AEC, visiting experimenters are invited to participate. Entrance fee is $8.00 which covers greens fee and dinner. Call Bob Kocanda or Ellery Cook, Ext. 3734 before September 6 to make reservations.

CANOE RACE - Saturday, September 28, is the date of the canoe race for employees and visiting experimenters at the Fermilab. Call Larry Allen, Ext. 3721, or Helen Ecker, Ext. 3393, before September 23, to register. The race will start at 11 a.m. in the A-1 sector pond, end in the F sector, 15 portages.

LECTURE - Thursday, September 26, 7:30 p.m., Fermilab Auditorium. Dr. Robert Betz and Ray Schulenberg, noted prairie authorities, will discuss prairie landscapes and describe in detail the Fermilab Prairie Restoration Project. All Fermilab people and the general public are invited to attend; there is no admission charge. Interested persons will register to participate in the seed harvest in October.

FERMILAB ARTS SERIES - Friday, September 20, 1974, Auditorium, 8:30 p.m., T. Daniel in "A World of Mime." Daniel draws on his background as a magician and as one of the first students of Marcel Marceau to present a lively, varied evening, in a unique form of theatrical experience. Tickets are $3.00 each, available from Marilyn Paul, Ext. 3027. All Fermilab people and the general public are invited to attend.

CLASSIFIED ADS

FOR SALE - 1973 VW Camper, 5,000 mi., warranty, radials, AM/FM, pop-top, perfect cond., $5200 FIRM. Fully equiped. Call John Lindsell, Ext. 3414 or 858-2139.

FOR SALE - F-78 x 14 studded snow tires on rims for Chevy Nova, etc. Balanced, 4 ply polyester, 1100 miles, $55. Call Robert McCracken, Ext. 4077

FOR SALE - 6 Cragar Mags, 2 shallows, 4-6 inch reverse, 14" rims, fits all GMs. Call Dave Hoovey, Ext. 3381 or 859-2448.

FOR SALE - Organic foods co-op getting together another order from wholesaler. Grains, flour, oils, garden vegetables & other staples. Call Judy Mueller, Ext. 3935 or 3205.

FOR SALE - HINES Farm, 1st farm south of Rt. 56 on Eola Rd., corn, 3 beans, fresh greens, squash, peppers, tomatoes soon. (357-3847)

FREE - 1 yr. old Collie & Terrier mixture dog to good home. Call L. Bartelson, Ext. 3701.

FOR SALE - Craftsman radial arm saw, $95; Grand Spinet Piano, excel cond., $425. Call Earl Bowker, Ext. 3711.

WANTED TO BUY - Used Music Stand. Call Marilyn Griffin, 584-2801 evenings.

FOR SALE - New fiberglass duck boat camouflaged-$100. Call John Bockmier, Ext. 3259/834-4593.

FOR SALE - 12'x15' gold wool rug-$170, gd. quality. Call Edward Bleser, Ext. 4059.

FOR SALE - Woman's golf set, new, alum. shaft, 3-9 irons, pitching wedge; MacGregor woods, 1-3 and 5 used but good cond. Negotiable. Call Louise Ext. 3734.

FOR SALE - Holton Cornet, new case & new valves-$100 or offer. Call Bettie Howe, Ext. 3492.

WANTED - Pocket dosimeters not in reg. use, esp. those marked "Tissue equivalent, fast neutron + Gamma" and "Neutron Insensitive Gamma Only." Please send via local mail to Radiation Physics, CL-7E. URGENTLY NEEDED.

FOR SALE - Motorola cabinet (contemporary style) stereo w/AM-FM radio-$250 or best offer; 1971 Chevy Caprice, 2-door hdtp., p/s/b, air cond., new tires-$2195 or offer. Call Sharon, Ext. 3395.

FOR SALE - 4 spacious bdrms., study on main fl., large panelled family rm., 2½ baths, full bsmt., 2-car garage, brk/alum. siding, cent. air + many extras, 1½ yrs. old, Naperville. Call S. Mori, Ext. 4003 or 357-3850.

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THE VILLAGE CRIER is published by the Public Information Office of the Fermi National Accelerator Laboratory, P. O. Box 500, Batavia, Illinois 60510. Margaret M.E. Pearson, Editor.