

The Village Crier

 national accelerator laboratory

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SURVEY CREWS MEASURING MAGNET POSITIONS

When the NAL accelerators were recently shut down for maintenance, repair, and modification, at the head of the line waiting to gain access to the Main Ring tunnel was the survey crew. Bent on a mission of determining the exact positions of the 240 quadrupole magnets in the Main Ring, the alignment crew was reinforced by Beam Transfer and Experimental Area surveyors and by the Cryogenic group from the Experimental Support section. Since the quadrupole magnets focus the proton beam as it travels around the ring 70,000 times in 1.6 seconds, within the vacuum chamber that is only 2 inches x 5 inches, the alignment of the "quads" is vital to attaining as smooth an orbit as possible so that the beam can travel at its intended speed unimpeded or delayed by any "kinks" or "bumps" in its path.

The vertical positions of the quadrupole magnets are determined by conventional surveying instruments such as the N-3 level. Two hundred and ten survey targets or "wall points" are mounted on the tunnel walls at 100-foot intervals around the four-mile circumference of the ring. Two separate groups of men each make a complete circuit of the ring, measuring the elevation of each wall point with respect to those on each side of it. Their findings are logged at each stop and by adding up the individual steps, the elevation of any part of the tunnel can be determined. These survey targets have been measured approximately once a month since the Main Ring tunnel was completed in December of 1970.

The horizontal positions of the magnets are measured by laser beam equipment which is rolled through the tunnel by another crew. Data are registered as the laser beam is made to penetrate a special instrument which has been mounted on a magnet itself, also at about 100-ft. intervals, by a crew member.

The precision needed is far greater than is normally called for in survey work. The skill and care exercised by the NAL surveyors is demonstrated by the fact that after measuring over a distance of four miles, the results of the crews, working independently of each other, agree to about 1/32 of an inch.

Survey data are presently being analyzed on the NAL PDP-10 computer. Initial results indicate that in the month of February, 1971, the tunnel was undergoing twists and contortions, as the ground under the tunnel "settled," or compressed, at the rate of 0.1 inches per month. This motion, termed "violent," by NAL experts, has now died away. Large sections of the tunnel are now settling smoothly at about 0.03 inches per month. This slow, uniform settlement represents no great problem for operation of the accelerator, so

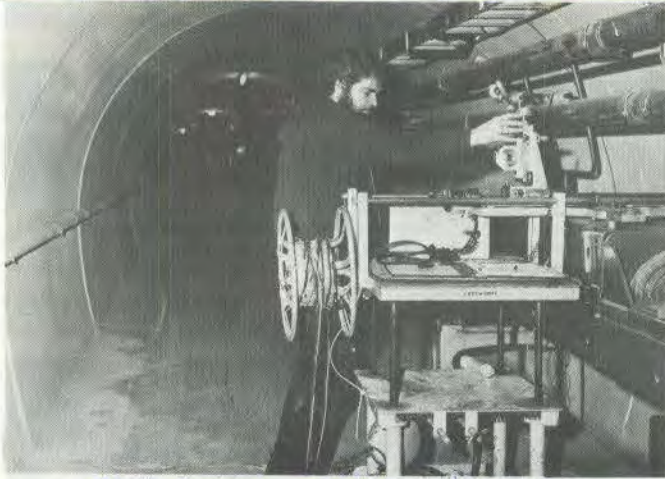


...Two members of the survey crew now measuring magnets of the Main Ring are (L to R) Frank Juravic and Ron Currier...

Photo by Tim Fielding, NAL

(Continued on Page 2)

SURVEY CREWS MEASURING MAGNET POSITIONS (Continued from Page 1)



...Jack Jagger operating laser beam measuring equipment...



...Checking a magnet level is Don Benedict.

Photos by Tim Fielding, NAL

that the time is now ripe for precision alignment of the magnets.

When the survey crews complete one measurement and have the results of their calculations to work with, they will reposition the magnets by adjusting small jacks at the corner of each magnet. Then they will begin the whole surveying process again, striving for still greater precision. Ultimately each magnet must be located relative to its neighbors to an accuracy of 0.0005 inches, or about 1/10 of the width of a human hair.

AMERICAN VACUUM SOCIETY MEETS NOVEMBER 11

An invitation has been extended to interested persons to attend the next meeting of the Metropolitan Chicago Chapter of the American Vacuum Society. The group will hold its meeting at 8:00 p.m. on Thursday, November 11th at the Howard Johnson Motor Lodge, 8201 Higgins Road, Chicago.

Two papers will be presented: "Mechanical Forepump - Vacuum System Interactions" by Mr. I. E. McCaffery (I.E.M. & Associates); "Typical Bell Jar Contamination by an Untrapped Mechanical Forepump" by Mr. Gordon Osterstrom (Sargent-Welch Scientific).

A.V.S. members as well as non-members, interested in Vacuum Science and Technology are invited to attend the meeting.

Cocktails and dinner will be available at the Red Coach Grill. A \$1.00 donation will be collected to defray other expenses.



...NAL employees abandoned their everyday look on Saturday, October 23, for the Halloween costume dance. Prize winners of the evening were Norma and Gene Stark (at far left, front and back rows) as Raggedy Ann and Andy, best couple; "Old Man" Sharon Nila (center, front row) most original; and Carol Weissert and Jack Jagger, (center and right, back row) portraying "The Pope and the Pill," best male and female...

FIND YOUR OWN THING....

NALREC has planned something for everyone in the next two months. Check for your own favorite activity or fasten this sheet to your calendar, and be there:

THURSDAY, NOVEMBER 18 - FAMILY SWIM NIGHT

7-9 p.m. At Marmion Academy on Butterfield Road, near North Aurora. No admission charge. Girls wear caps. For further information, call George Nosal, Ext. 781.

SUNDAY, NOVEMBER 28 - HOCKEY GAME TRIP

Chicago Blackhawks vs. Toronto Maple Leafs. Busses will leave Shakey's Pizza Parlor, 110 N. Lake St., Aurora, at 6 p.m. Pizza will be served from 4:30 to 5:30 p.m. Ticket price of \$12.50 per person includes one pizza, soft drinks and beer on the bus, hockey game ticket, and transportation. Only 50 tickets available. Call Peaches, Ext. 470 or 479 for further information.

TUESDAY, DECEMBER 7 - GYM NIGHT

6:30 - 9:30 p.m. At West Chicago Junior High School, Hazel & Joliet Streets, West Chicago. No admission charge.

Equipment available will be: volleyball net and ball, basketballs, parallel bars, and mats for tumbling and wrestling.

For further information call Eric Jarzab, Ext. 396. Gym nights will also be held on the first Tuesdays of January, February and March.

SUNDAY, DECEMBER 12 - CHILDREN'S CHRISTMAS PARTY

In the afternoon. Village Barn. No admission charge. Fill out the form sent out this week indicating name, age, and sex of children and return to Liz Foster, Director's Ofc.

FRIDAY, DECEMBER 17 - CHRISTMAS DANCE

7:00 p.m.- 12:00 - Villa Olivia Country Club, Elgin.

Tickets at \$7.00 per person include buffet supper. Open Bar. Two bands for dancing. Buy tickets from your NALREC representative. Call Helen Ecker, Ext. 391 for information.

SATURDAY EVENING, FEBRUARY 12, 1972 - THEATRE PARTY

Candlelight Dinner Playhouse. "Fiddler on the Roof." (Long advance notice necessary to reserve block of tickets.)

The \$11.00 per person ticket includes a complete dinner (with choice of main course, but excluding cocktails) and bus transportation from the NAL Village and back, the show itself, dancing after the show, and gratuities. Seats will be assigned on a first-come first-served basis. The play is viewed from the dining area.

The "Fiddler" has received many awards as a musical. Starring in the Candlelight production are many performers from highly successful Candlelight shows such as "Man of La Mancha" which ran 54 weeks. The plot concerns a Jewish family in Czarist Russia and the problems that arise when each of three daughters marries outside of family tradition.

For tickets and information call Jim Snow, Chairman, or Barb Schluchter, both at Ext. 701.

THURSDAY EVENINGS - NAL PROTONS BASKETBALL GAMES

Usually at 6:30 p.m. Naperville Central High School, 440 W. Aurora Avenue, Naperville. League play has begun. This is a Y.M.C.A. coordinated industrial league.

Call Roy Justice, Ext. 447, for information. Spectators are welcome.

NALWINGS TO SPONSOR GROUND SCHOOL

On Thursday, November 11 at 5:30 p.m., NALWINGS, Flying Club for NAL employees, will meet in the Village Barn. They will discuss plans for a beginner's level Ground School which the group will sponsor. It is planned that the classes will meet for two hours, one night a week, for eleven weeks. The only charge for the instruction will be the cost of a one-year membership in NALWINGS, \$10. Classes will meet in the Village Barn.

This is an excellent opportunity for those who want to begin ground school and flight instruction. Membership in NALWINGS also allows flying time at reduced rates from Village Airways flying out of the Central DuPage Airport at St. Charles. Twenty-two employees have already become members. For further information, call Tony Frelo, Ext. 349.

AUSKALNIS AIDS CHILDREN'S FUND

If you happen to be driving through Glen Ellyn on Friday or Saturday, November 12 and 13, watch for Dick Auskalis, head of NAL's Purchasing and Contracts sections. Dick is an active member of Christ the King Council of the Knights of Columbus, which is sponsoring "Candy Day" to raise funds for support of programs to assist the mentally retarded children of DuPage County. Better yet, drive around until you find him, and give your support to his worthy cause!

URA SCHOLARSHIP NEEDS EARLY S.A.T. SCORES

Employees with children who are seniors in high school and who plan to apply for the U.R.A. scholarship for college expenses for the Fall of 1972, are asked by Charles Marofske, Personnel Manager, to take steps to have their child take the S.A.T. test at the earliest possible date. Even though the application deadline is March 1, Marofske points out that the final decision on applications has been held up in the past because applicants took their S.A.T. tests in the Spring, rather than the Fall and scores were reported late. The whole program will be greatly expedited, he says, if test scores can come in sooner.

For further information, call Mildred Meyer at Ext. 396.

CLASSIFIED ADS

WANTED-Recordings of John Charles Thomas. If you don't want to give up, can I tape them? Many I have, a few I don't. James Buffenmyer, Ext. 279.

FOR SALE-Champion Sired AKC Doberman pups. B. Murphy, 879-7562.

FOR SALE-'59 Volkswagon, \$175 or best offer. J. Houkal, Ext. 555 or Ext. 701.

FOR SALE-'63 Fal., 2dr.; As is, runs & starts well. Best offer. M. Morgan, Ext. 781 or 448-1838.

FOR SALE-'68 Mustang, 289 auto., new tires, A-1 cond., 26,000 mi., \$1,500. G. Davidson, Ext. 421.

FOR SALE-'58 Chev. Truck, 60-Series, 2-Ton; Complete rebuilt motor w/3 month guarantee; Tune-up, good rubber, 12 foot steel box. Must sell. \$850 or best offer. Jacob Zouganelis, Call Ext. 275, after 6:00 p.m. call 815-723-1797.

FOR SALE-'70 Chev. Wagon, Kingswood, 350 V8, 3 Seat, Factory Air., p.s., p.b., Best offer. B. Strauss, Ext. 701.

FOR SALE-'66 Cad. Very good cond. \$900. Sam, Ext. 560.

FOR SALE-'62 Chev. Wagon-6 cyl., snow tires, good cond. \$300. Call Tony Frelo, Ext. 349.

FOR SALE-'69 Jaguar, XKE Coupe, full accessories. Make offer. Bob McLin, Ext. 266.

FOR SALE-'70 Yamaha SS 433 Snowmobile. 200 actual miles. Like new. \$900. Doug Hartman, Ext. 555.

National Accelerator Laboratory
P.O. Box 500
Batavia, Illinois 60510

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