

# FERMINES

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## MULTI/DA GAINS WIDE USE

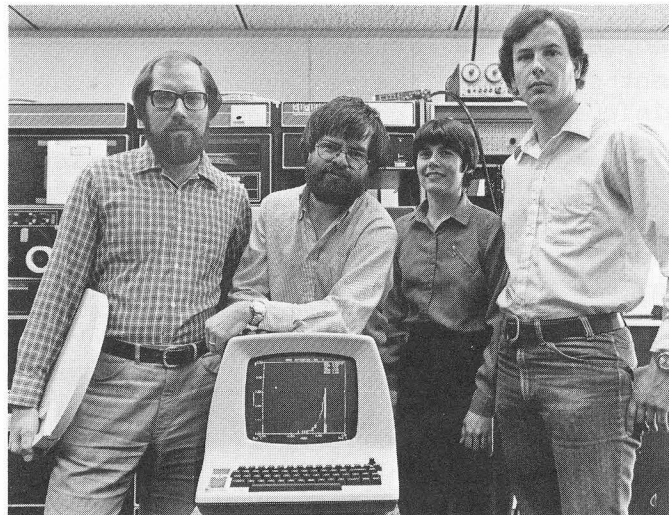
One of the most important but least visible parts of the high energy physics experiments at the Laboratory is the computer program (called software) which allows the experimenter to record data for later analysis. The purpose of this program is to give the experimenter access to the data and to manage the flow of data from the detectors through the minicomputer onto the magnetic tape for later analysis.

In the early days of the Laboratory, Al Brenner, head of the Computing Department, mandated a basic on-line computer hardware package. As a result, there are a large number of experiments using the same type of computer equipment. This approach was pioneered here at Fermilab and has allowed the development of a universal on-line software package for Fermilab experiments.

At the beginning, every experiment had its own specific data acquisition and analysis minicomputer software. One of these, developed by Fritz Bartlett (then at Caltech) and called MULTI, gained popularity, and was adopted by the Computer Department as a standard system. Principally, a data analysis and experimental control system, MULTI, has been expanded, documented and packaged for distribution by the Computing Department.

In addition, a standardized data acquisition package also has been developed, thereby creating the current total MULTI/DA software. These efforts were spearheaded in the Computing Department by Joe Biel, Dan Curtis, Bob Dosen, Terry Lagerlund, Liz Quigg, Dave Ritchie and Lou Taff. With this package, it is now possible to start up an experiment's on-line computer system in a matter of hours--even for a group who has no previous experience with this software or the Fermilab-supplied hardware.

As new software within the framework is developed by the Computing Department or by university user groups, it can be incorporated in the package and distributed



(L-R) Joe Biel, Dave Ritchie, Liz Quigg and Bob Dosen show a typical physics display generated by their MULTI/DA software.

for more general use. In addition, when new hardware which improves experimental capabilities becomes available, it can also be adopted in a most straightforward manner.

The success of this approach to data acquisition and analysis software is witnessed by its adoption by more than two-thirds of the experiments now running at Fermilab. This is the result of the ability of each experiment to quickly tailor the software to its own needs and to the ease with which the experimenter can learn how to use the system. (See companion story on page 2.)

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A SPECIAL MESSAGE FROM THE  
DIRECTOR ABOUT AUSTERITY IS  
ON PAGE 3 OF THIS ISSUE.

## NEW HARDWARE ENHANCES DATA ACQUISITION RATES

The size and complexity of the detectors used in Fermilab experiments have been growing rapidly. This growth has, in turn, placed increasing demands on the data-acquisition minicomputers--the devices that acquire the data from the experiment's detector and monitor the quality of the data. Two new kinds of hardware have been adopted by the Fermilab Computing Department to enhance the performance of these minicomputers.

The first new kind of hardware is a more flexible additional memory device called a "bank-switchable bulk memory." The bulk memory is organized in banks, any one of which can be switched into the computer for the temporary storage of data during the time beam reaches the experiment. By switching from bank to bank, it is possible to record more data than could be handled by the original minicomputer. Besides allowing for the storage of more data, the bulk memory allows data to be acquired at a higher rate. The first experiment to use this new hardware (E-516) achieved a data rate double that possible with their previous computer system.

A second experiment (E-537) is now preparing to use the bulk memory with its data acquisition minicomputer.

The second new kind of hardware is a high-density magnetic tape drive. Previous tape drives in operation at the Laboratory were capable of recording data at a density of 800 or 1600 bpi (bytes of data per inch of magnetic tape). The new tape drive records data at the much higher density of 6250 bpi. Tape drives are used by the data-acquisition minicomputers to make a copy of the experimental data for future analysis. Once the data has been copied to tape, the space that the data occupied in the minicomputer's memory can be filled with new data from the detector. By recording information at higher density, the new tape drives make it possible to copy the data onto tape at greater speed, allowing more data to be taken.

In order to incorporate these two new pieces of hardware, it has been necessary to update the software that makes use of them. This task was the work of Joe Biel and Bob Dosen. In addition, the hardware itself has required a significant amount of hardware development and testing. This was done in cooperation with the commercial



*Ignacia Cuevas and Jim Meadows prepare to test one of the new 6250 bpi tape drives before delivery to a data acquisition computer for one of the high energy physics experiments.*

vendors involved. The Fermilab portion of the hardware effort was carried out by the Computing Department Hardware Group under the direction of Rich Knowles and benefitted especially from the work of Jim Meadows.

Dick Adamo, Ignacia Cuevas, Bob Robinson, Larry Tate and Virgil West have all helped to keep the equipment operational for the individual experiments.

The hardware discussed here is most directly related to improving the quantity of data taken in the high energy physics experiments at the Laboratory. However, by freeing up memory in the minicomputer, these hardware devices also increase the ability of the computer to monitor the data. Thus, the new hardware helps the experimenter to see that the data is of the highest quality as well.

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### COMING IN FUTURE ISSUES

Articles about locks, the new folk showcase, new exhibit on scientific illustrations, Fermilab's forest of baby trees and many others will appear.

## COMMUNICATION FROM THE DIRECTOR: AUSTERITY

I have notified Division and Section Heads about our current year financial crisis but sometimes, communication is slow and so I will use FERMINews to tell you the story.

Each year since I've had anything to do with our budget (79-80-81) we have had this kind of crisis in which, by April or May we project a serious shortage of funds to keep us going until the end of the fiscal year, September 30. Each year, with depressing regularity and with obvious penalties of waste and inefficiency, we declare an austerity period. Overtime is severely restricted, ditto stockroom withdrawals, a hiring freeze is declared, orders are cancelled and new orders carefully screened. All non-essential activities grind down while we continue the Energy SAVER and what is left of the 400 GeV program. Most of these steps show up the following year as required tasks at much higher costs.

Now I confess that the need for austerity periods is evidence for poor planning and hence lousy directorship. But I would like to explain the problem to the staff in the hopes that better understanding will lead to more complete cooperation and a more successful (more austere!) austerity.

The basic problem is that the Energy SAVER project requires a large component of operating, equipment and R&D funds. By a process not understood in Illinois, Washington has decided that these funds must come from normal Laboratory budgets and these have not been supplemented. Electrical power, stainless steels and many other costs have risen far faster than the inflation increases we have received. Also the SAVER is more complex than a Post Office - it is probably the most complex accelerator ever built. At every turn, the SAVER people find unexpected problems usually requiring more money to fix. This year we have had to order parts for spare magnets or else face a large cost penalty next year after vendor assembly lines have been discontinued.

We did take reasonable precautions. By March we had eliminated or postponed virtually all accelerator improvement plans and many Research Division activities

designed to prepare for Tevatron. We have mothballed the 15' bubble chamber. In all these steps we have drafted manpower to do SAVER tasks so as to avoid adding new people. Nevertheless, inflation, spares and new costs conspired to make this austerity period necessary. Most of you know numerous ways to reduce waste and improve efficiency. We need your cooperation and suggestions. Many of you have been or will be asked to leave your familiar tasks and groups to help in SAVER work. We need you to face this task with skill and enthusiasm.

The SAVER is our key to a solid future. It is essential for both scientific and energy saving reasons. Note that in spite of the difficulties cited, we are not driven to more extreme measures as is happening at other laboratories. With the strength and good spirit that never ceases to evoke gratitude and wonder, I know we can count on your cooperation. All indications are that next year will, if anything, be worse. But 1983 is the light at the end of our tunnel!

Leon Lederman

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## GARDEN PUBLISHES ARTICLE BY DONALDSONS

The May-June issue of Garden has published an article by Anthony and Rene Donaldson of Fermilab.

The prestigious magazine is published bi-monthly by The Garden Society, a division of The New York Botanical Garden. The article by Tony, an engineer, and Rene, editor of Fermilab Report, is titled "Prairie, A Landscape Alternative." In it, they tell how it is possible to create a low-maintenance, natural-looking prairie in even a small yard. They use their own home yard as a model.

The comprehensive article also includes a list of prairie grasses, spring blooming wildflowers, early summer blooming wildflowers, summer blooming wildflowers, autumn blooming wildflowers and prairie shrubs. Filled with many tips, their article is a good starting point for the serious homeowner who is looking for an alternative to grass.

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## ICE CREAM SOCIAL TO HELP ERIK AUSTIN

Some time between 3 and 8:30 p.m. this Saturday, June 6, plan to attend the ice cream social the Batavia Congregational Church is sponsoring to help Erik Austin and his family.

Erik, 13, is the son of Dave and Sharon Austin. His dad works in safety with the Energy Saver Division. Since Erik was born, he has had kidney disease, until now he has less than 15 percent use of his left one--the right kidney has never worked.

But there's a glimmer of hope that the boy may yet lead a healthful and full life and not have to keep plugging himself into his intravenous apparatus for five hours each day. Physicians are hopeful that Erik may have a kidney transplant this summer.

And that's why the church is sponsoring the ice cream social and Erik Austin Day June 6 -- to help the family defray the cost of the expensive operation.

Tickets are \$2 each and may be obtained from Peter Koehler's office in the Research Division, WH2W. The church is at 21 S. Batavia Avenue.

Anyone who would like to make a contribution should contact Bob Ducar, mail station 307, or Marilyn Paul, mail station 342.

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## DOCTOR, HOW DID I RUN?

Ever wonder how you're running and how to answer that question?

Then plan to come out for the Fermilab Running Club's "Run With the Running Doctor" on June 10. It all begins at 11:30 a.m. at A0 on the Main Ring Road, when Dr. John Durkin, one of Chicagoland's top podiatrists and a highly regarded expert in running, will be there to take videotapes of the runners.

Afterwards, he will analyze the videotapes, comment on the running techniques he has recorded and answer questions.

All activities of the Fermilab Running Club are for the full spectrum of runners - from beginning to advanced.

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## SPECIAL NOTICE

Fermilab receives many requests from groups to use the Village picnic area. During the early years of the Laboratory's existence, some of these Fermilab was able to accommodate. However, the cleanup requirements became a burden on the Laboratory's maintenance staff, and as the size of Fermilab's own population grew, employee use increased.

In recent summer, visitors living on site normally fill the housing space to full occupancy and frequently use the park areas in the Village for recreation. Consequently, to keep the space available for guest residents and employees and their families and to maintain control of maintenance costs, the picnic grounds will not be available to outside organizations and groups during the summer months.

## CHEZ LEON MENUS

Wednesday, June 10 - 12:30 p.m. - \$6.00

Gnocchi a la Marinera  
Chicken breast stuffed w/prosciutto  
and Fontina  
Zucchini gratin  
Orange salad  
Poached apricots w/nut stuffing

Thursday, June 11 - 7:00 p.m. - \$10.00

Caponata  
Shrimp brochette  
Saffron rice  
Stuffed tomatoes  
Avocado salad  
Cream puffs filled w/fruit and  
Creme Chantilly

For reservations, call Ext. 3082.

## MARK YOUR CALENDARS

July 25--Saturday--an important date. That's when Fermilab will hold its annual family picnic in the Village on the grounds adjacent to the landmark Barn. So mark your calendars, adjust your vacation accordingly, and plan on having lots of fun that day with your family -- here at the picnic.