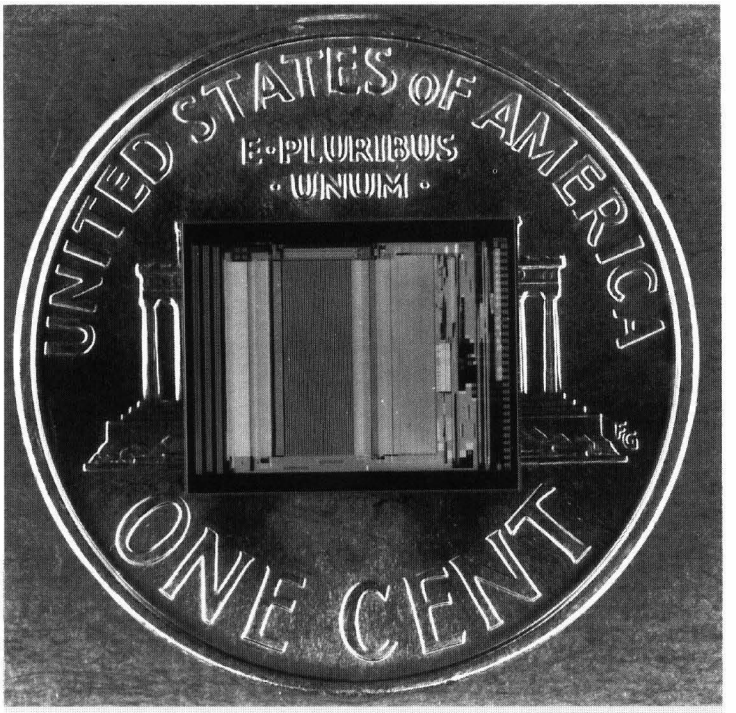
FermiNews

The Newsletter of the Fermi National Accelerator Laboratory

GOOD THINGS COME IN SMALL PACKAGES

The old adage is true. Good things do come in small packages. Just ask a group of researchers from Fermilab and Lawrence Berkeley Laboratory.

For the last two years, seven researchers have been working on a device so small it is dwarfed by the size of a U.S. penny, but so intricate it holds 128 channels of electronics and 85,000 transistors.



A mock-up of a U.S. penny shows the small scale of the SVXII silicon readout chip.

The device, called the SVXII silicon readout chip, is a full custom integrated circuit roughly 6.3 millimeters by 9 millimeters. Once it is fully developed and tested, thousands will be produced and installed in the silicon detectors at CDF and DØ by 1999. The chips will read out and process information from the detectors' silicon strip detectors so that experimenters can reconstruct collision events.

For the last two years, seven researchers have been working on a device so small it is dwarfed by the size of a U.S. penny, but so intricate it holds 128 channels of electronics and 85,000 transistors.

The SVXII chip concept is based on the SVX chip which was produced at LBL and is currently being used at Fermilab.

"Here at Fermilab, important and significant things are often done on a very large scale," said RAY YAREMA (RD), one of the engineers of the chip. "You see these huge enclosures and magnets. This is almost the opposite. What we've done is to engineer something that is very, very tiny. That, in some sense, is what is special and unique."

Ray is working with Fermilab employees TOM ZIMMERMAN (RD) and MAHER SARRAJ (RD) and LBL researchers Oren Milgrome, Lei Luo, Stuart Kleinfelder and Issy Kipnis on the development of the SVXII.

"We have designed many new ideas into this integrated circuit," said Ray.

continued to page three

FermiNews

Friday, December 16, 1994 • Volume 17, Number 22

KTeV Seeing First Signs of Success ..... page two

Lab Achieves Staffing Goal for FY1995 ..... page three

FESS Begins Study of Wilson Hall Structure ..... page four

People & Events ..... pages six through seven

KTEV SEEING FIRST SIGNS OF SUCCESS

In the last issue of *FermiNews* readers were presented with the science behind KTeV, one of the largest fixed-target experiments to be built at Fermilab in over a decade. As work proceeds, nearly 70 scientists from 10 U.S. institutions and Osaka University in Japan are anxious to finish the detector and begin data collection in the upcoming fixed-target run in the spring of 1996.

GREG BOCK (RD), acting project head for the experiment, is very pleased with the progress of KTeV thus far. "It's really an exciting time now. We've been working and struggling for a couple of years with the planning of a new effort in the fixed-target area. This is a major 'ground-up' civil construction project and the only one (of its size) that has happened in the last 10 years. After much preparation, we are finally seeing detectors on the floor."

BEGINNINGS

KTeV grew out of several past neutral *K* meson experiments (E731, E799 and E773) recently completed at the Tevatron. At the end of the last fixed-target run the capabilities of the old detector and beamline, which had served fixed-target experimenters for over the last decade, were fairly exhausted. In order to further the aim of these experiments, the KTeV project was proposed in 1990. KTeV is a combination of two experiments, E832, a search for direct *CP* violation and the second phase of E799, a continuation of the search for rare processes in neutral *K* meson decays.

With the construction of a new beamline and detectors, it will be possible for KTeV scientists to probe several fundamental questions of *CP* violation and other rare or forbidden processes of the Standard Model with an accuracy of seven to 10 times that of today.

CONSTRUCTION

Work on the project is focused on three fronts: civil construction of a new experimental hall, a new beam line and assembly of a new detector. The civil construction work on the new detector hall is being done near the upstream part of the New Muon beam line. It is expected to be completed in late spring of 1995.

The New Muon beam line is being reconfigured to suit KTeV's needs. According to Greg, the work is going well. "The designs and many pieces of equipment are done. And once it is completed, we will have a beam that has a higher intensity and less background than previous neutral kaon beams."

Researchers in Lab 6 work on construction of one of KTeV's veto counters.

Work on the new detectors for the experiment is also going well, added Greg. "A small piece of the calorimeter for the detector was recently tested at CERN. The test, run by University of Chicago, Fermilab and Osaka collaborators, revealed some very exciting results that gave us confidence that we are going to be able to this."

WORKING TOGETHER

As with any new experiment, KTeV's development depends on the people involved. Currently, there are 67 experimenters guiding KTeV's development, with Fermilab's Research Division and Physics Section providing major support. Researchers at Rice University are installing wires in the drift chambers; collaborators at the University of Colorado are working on the detector veto counters and the trigger; and researchers at Rutgers University are preparing electronics for the drift chambers. The University of Chicago

continued to page four

How to Make a Kaon Beam

Start with a beam of protons from the world's highest-energy particle accelerator. Direct the proton beam to a fixed beryllium target, to produce a second beam containing as many secondary particles as possible, among them neutral kaons. Use a magnet to sweep away the charged particles in the beam. Pass the beam through a blob of beryllium to increase the proportion of kaons to unwanted neutrons in the beam, and then send it through a lead brick to convert the neutral photons to charged electrons. Sweep those away with magnets. Result: a high-intensity, high-purity beam of kaons, ready for experiment.
—*Judy Jackson*

LAB ACHIEVES STAFFING GOAL FOR FY1995

Fermilab has achieved staffing goals for the fiscal year, bringing overall employment to the level required by the FY1995 budget, according to Personnel Department statistics. By October 1, the Laboratory had reduced staff by 123 from the level of the previous year, through a combination of attrition, voluntary termination and layoffs. Fermilab does not anticipate the need for further staff cuts in FY1995.

"We have achieved the reduction in force that was necessary in response to our Laboratory's reduced operating funding for FY1995," said CHUCK MAROFSKE, Laboratory Services Section head. "Roughly 60 percent of the reduction came from the 75 people who accepted the Laboratory's voluntary severance package. Some of these volunteers moved into new careers, others went back to school, relocated or retired. The number of volunteers reduced to 20 the number of employees we were forced to lay off."

Fermilab has since recalled two of those laid off to regular employment and hopes to be able to place more laid-off workers in the future. As the year progresses, the Laboratory may need to hire more staff to meet demands of the scientific program. However, Chuck said he expects no significant change in total employment during the course of the fiscal year. He points out that those on layoff status have recall rights.

"While we continue to experience turnover, it does not automatically generate new job openings," Chuck said. "All divisions and sections will continue to monitor staffing commitments."

SVXII SILICON CHIP

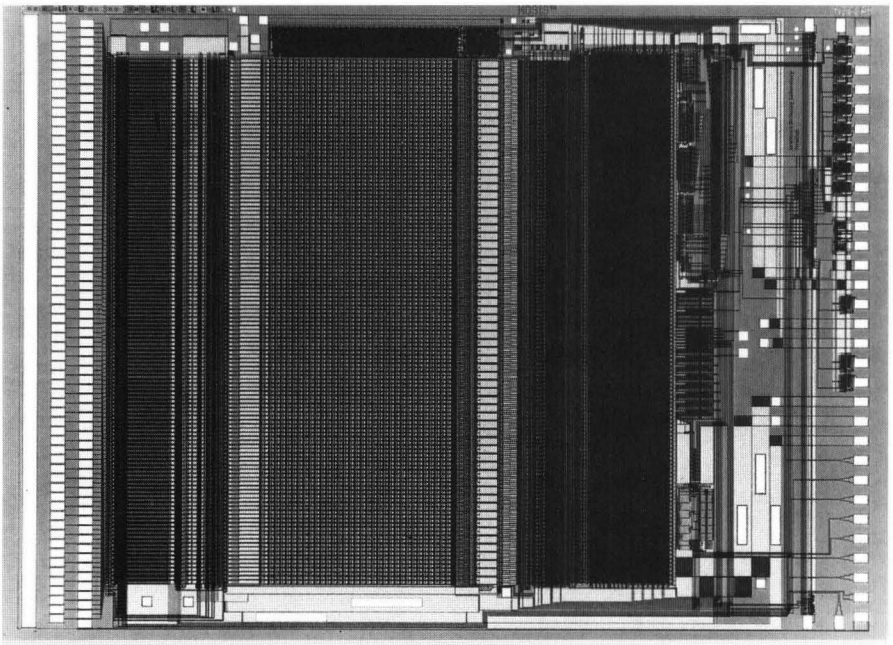
continued from page one

"The engineering that went into it, as well as the short time scale it took to build it, is very impressive. The whole device is a few millimeters by a few millimeters and is loaded with many special features, hundreds of channels of electronics and thousands of transistors, but if you dropped it on the floor you could lose it."

The group has received and tested a small number of chips and is pleased with the performance. The next step is to produce a larger quantity of the devices. The collaborators have submitted an order for a large quantity that will allow various experimenters to put them in their own test setups to see how they perform. Ray said they need that sort of feedback before they go into large-scale production.

As the need for integrated circuit design continues to become more important to the high-energy physics community, Ray said he expects to see more collaborations developing among major high-energy physics labs. He also expects to see the Fermilab-LBL collaboration to continue on other designs.

"In both the CDF and DØ silicon detectors there are over one million channels of electronics. That's a very impressive, staggering number. If we did not have a device like this, it would be next to impossible to install all the channels. It would require too much space and the cost would be too great. We are forced to go to this type of technology. It is a sign of things to come." ■



A close-up of the SVXII silicon readout chip.

FESS BEGINS STUDY OF WILSON HALL STRUCTURE

Diapers for Wilson Hall? Absolutely not! Well, not exactly. Okay, yes. The cloth strips seen on some joints at the upper floors are there to capture evidence of the natural movements of the building.

Essential to the original design of the building is the ability of the twin towers to move independently of each other as seasonal temperatures and sun cause differential expansion and contraction throughout the structure.

To accommodate these movements, the joints where "crossover" floors tie into the west tower were designed to allow horizontal slippage. Nothing being perfect, there is sometimes binding between the concrete surfaces. When this happens, the concrete can crack causing a slow but continuous deterioration of the joint.

TOM LACKOWSKI of the FESS Engineering group is leading a study to understand just how the Wilson Hall structure responds to environmental changes and what the effects are on these slip joints. A cooperative study has been proposed with Cornell University using their technology to x-ray and map the present condition of each of these joints. An independent program will be undertaken to carefully measure and plot the actual movements that occur. With this information in hand, a computer model of the structure will be created and tested against the field-collected information. From this will come a program to correct any serious deficiencies that might be identified.

In the meantime, we at FESS want to monitor the extent of concrete binding and cracking. And so we have attached cloth "diapers" along the joints and will, from time to time, open them up and search for the dreaded "evidence." It's not a pretty job, but someone has to do it.—*Ed Crumpley, FESS*

KTEV

continued from page two

also is working jointly with collaborators at Fermilab to build the transition radiation detector. Researchers and experimenters from UCLA, University of California San Diego, Elmhurst College, University of Wisconsin and the University of Virginia are also leading various aspects of the development.

In addition, employees with the Computing Division's DART project are working in a collaborative effort with experimenters from Osaka and Fermilab to develop the data acquisition system for KTeV.

THE FUTURE

Greg believes the group will be ready to begin operations with the next fixed-target run. "Civil construction is well underway, the beam line is under construction and the detector is really coming together. We are a good year and a half away (from finishing). We have an aggressive schedule and intend to be ready." ■

Weather Emergency Closing Information

As you are faced with inclement weather this winter and you want to make sure the Laboratory is open for business, there are two things you can do. You can tune into radio or television broadcasts or call the Emergency Closing Center Hotline.

The radio and television stations carrying closing information are:
WGN, 720 AM
WBBM, 780 AM
WMAQ 670 AM
WLS 890 AM
WLS 94.7 FM
WBBM 96.3 FM
WFLD-TV, Channel 32
WMAQ-TV, Channel 5
WGN-TV, Channel 9
CLTV-News, Cable

The Emergency Center Hotline number is 1-900-407-SNOW (1-900-407-7669). The hotline number costs 95 cents per minute and requires a touch-tone phone. To use the hotline dial the above 900 number and then Fermilab's main phone number, 708-840-3000. Note that the 900 exchange cannot be dialed from on-site Fermilab extensions. Information posters with detailed information are posted throughout the Laboratory.

Please use these services and avoid calling Fermilab's main phone number for Laboratory closing information.—*Bill Flaherty*

INVENTORS HONORED FOR PATENT ISSUES

Four Fermilab inventors, whose invention disclosures recently resulted in the issue of patents, were honored by Director JOHN PEOPLES at an award presentation on November 23 in the Second Floor Art Gallery.

Fermilab employees BILL BOROSKI (TS) and CARL LINDENMEYER (Physics) and former Fermilab employees John Gonczy and Ralph Niemann all received certificates and modest cash awards in recognition of their valuable technology contribution.

Bill, John and Ralph share U.S. Patent No. 5,224,832 as inventors of the "Method of Fabricating a Multilayer Insulation Blanket." This technology is a method of manufacturing cryogenic insulation. In the past, these blankets were made by stacking layers of insulation on a long flat table. This new invention employs a large-diameter winding mandrel that spiral wraps the required number of layers of insulation onto the mandrel to make the blanket.

Carl holds U.S. Patent No. 5,182,686 for inventing the "Apparatus and Method for Loading and Unloading Multiple Digital Tape Cassettes Utilizing a Removable Magazine." This invention came out of the need to improve upon the limitations of 8mm magnetic tape. Carl devised a system that groups 12 or more 8mm tape cartridges together in a magazine. This system automatically injects and ejects cartridges in any command order sequence and provides for greater recording capacity and convenience.

The award presentation was organized by PAT OLECK and JOHN VENARD of the Office of Research and Technology Application.

Attendees at the reception were, l-r: Director's Office representative Tom Nash, honorees Carl Lindenmeyer, Bill Boroski and Ralph Niemann, Director John Peoples, honoree John Gonczy and John Venard of ORTA.

SECURITY INSTITUTES NEW SERVICE

A new program was instituted by the Security Department December 1 to enhance the safety and comfort level of Fermilab employees and users. Under the program, employees who work past 6 p.m. on site can call Security Dispatch at x3414 to ask for a security patrol to provide a security presence at a parking area. (As the days lengthen, the time will change to reflect the hour when darkness falls.)

If you wish to use the service, contact Dispatch at least five minutes before leaving your work site.

When calling you should give the building/facility number where you work, when you will be departing and the parking lot or area where your vehicle is parked. Provide as specific a location of your vehicle as possible. A patrol vehicle will be dispatched to the parking lot to provide a visible presence until you have left the area.

Management is committed to maintaining Fermilab as a safe and comfortable work environment.

The Security Department is interested in your comments and suggestions to enhance security. If you have any comments or suggestions please contact Security chief ROGER CLARK at x4949.

People & Events

FERMILAB ARTS SERIES

Still looking for holiday ideas? Give the gift of music, dance or drama with an Arts Series gift certificate. Certificates are available in any amount, and redeemable for any show or shows remaining in the 1995 Season. Options include:

Huun-Huur-Tu: The Throat Singers of Tuva, are musicians from the former USSR who have burst onto the world music scene. Employing a technique discussed by Richard Feynman's film footage about Tuva, these amazing performers are capable of producing two or three notes at the same time. They have received attention from ethnomusicologists, jammed with the late Frank Zappa and appeared on MTV's "John Stewart Show." Their Ramsey Auditorium performance is January 28.

The Amsterdam Loeki Stardust Quartet is a recorder consort of unparalleled virtuosity. This ensemble has been performing together since 1978. Their first two albums on the L'Oiseau Lyre label both received the Edison Award, Europe's most prestigious prize. They perform February 18.

Just added to the Arts Series, The Acting Company will perform the Shakespearean tragedy *Othello* on March 4. Founded by the late John Houseman, The Acting Company is the U.S. premiere touring repertory theater.

Two consummate actors, Roscoe Lee Browne and Anthony Zerbe, present *Behind the Broken Word,* on March 25.

Pilobolus, the ground breaking dance company, presents its rare blend of physicality and gymnastic ability on April 22.

Peter Schickele brings his show, *Schickele Mix* , to Fermilab on May 20. If you're not familiar with his work, you may be familiar with his alter ego, P.D.Q. Bach.

To purchase tickets or gift certificates for any Arts Series event, call xARTS.

The Throat Singers of Tuva

Congratulations

To Shawn and GAYLE STEPHENS (LS/Education) on the birth of their daughter Brianna Nicole Stephens. Brianna was born September 24, 1994 at 11:54 p.m. at Delnor Community Hospital in Geneva. She weighed six pounds, 11 ounces and was 19 inches long. Brianna is welcomed home by sister Samantha. • To HEATHER KENNEDY (LS/Education) and RAY HALL (DØ) on the birth of their daughter Kendall Paige Hall. Kendall was born November 22, 1994 at 7:20 p.m. at Delnor Community Hospital in Geneva. She weighed eight pounds, four ounces. She is welcomed home by brothers Maxwell, age four, and Marshall, age two. • To Kerry and CINDY KANE (LS/Children's Center) on the birth of their son Zachary Tyler Kane. Zachary was born November 2, 1994 at 4:05 a.m. at Mercy Hospital in Aurora. He weighed seven pounds, 12 ounces and was 19 inches long. This is the Kane's first child.

CREDIT UNION CLOSES FOR HOLIDAY

The Fermilab office of the Argonne Credit Union will be closed all day on Friday, December 23 and Monday, December 26, 1994. New Year's Eve hours will be from 8 a.m. until 12:30 p.m. The office will also be closed Monday, January 2, 1995.

BROWN BAG SEMINAR COMING

Do your conflict resolution skills need refining? Or are you a pro at dealing with sticky situations? No matter how you handle conflict, the Employee Assistance Program is giving you an opportunity to learn more on the subject. On Thursday, January 12 Donna Bellafiore of DRB Alternatives will present a brown-bag seminar on negotiation skills for conflict resolution. The talk will be held from noon to 1 p.m. in Curia II. For more information, call the Employee Assistance Program office at x3591. (Please note incorrect date on flyer.)

URA SCHOLARSHIP NOTICE

Candidates for Universities Research Association scholarships are reminded that applications are due March 1, 1995. Applications are available from and should be returned to Personnel, WH15SE, MS 124. Scholarships are awarded on the basis of Scholastic Aptitude Test (SAT) scores.

URA awards a number of scholarships to regular, full-time Fermilab employees' children who are currently high school seniors and who will begin a four-year college degree program next fall. The maximum amount of the scholarship is $3,000 for tuition and fees and is renewable for four years if the student progresses in good academic standing. Applicants will be notified regarding the scholarships in early April.

NALWO

Don't forget the International Folk Dance party tonight, December 16, in Kuhn Barn featuring the lively music of Jutta and the Hi-Dukes. Dance from 7:30 p.m. until 11 p.m. for only $4.

A reminder: there will be Thursday evening folk dancing as usual on December 22, but not December 29. Dancing will resume on January 5, 1995.—*Sue Mendelsohn*

Harper's Index

Gallons of hamburger grease sold by McDonald's since 1955:
281,250,000

Estimated number of personal computers discarded last year worldwide:
5,000,000

MOVIE SCHEDULE

The Fermilab International Film Society presents movies from all over the world. Movies are shown at 8 p.m. Fridays in Ramsey Auditorium. All foreign films have English subtitles. Admission is $3 for adults, $.50 for children 12 and under. Coffee and cookies will be served on the second-floor mezzanine following each film.

■ December 16: *Brother's Keeper*, an illiterate dairy farmer is accused of murdering one of his three brothers. The small community, sensing a miscarriage of justice, rallies to his defense. Joe Berlinger and Bruce Sinofsky, directors, France, 1993, 104 minutes.

■ January 13: *El Mariachi*, the story of a traveling musician with guitar in tow. This received much acclaim and attention for having been filmed on a budget of $7,000. It's great! Robert Rodriguez, director, Mexico, 1993, 80 minutes.

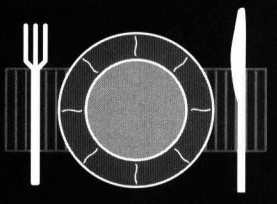
GET READY FOR THE BURN

Celebrate your thighs in 1995 with this muscle toning class by Bod Squad. You will work all major muscle groups without aerobics. Class will include warm up, stretching, upper body strengthening, floor exercises and cool down. Occasional circuit training may be inserted for variety.

In each class, special emphasis will be given to hips, abdomen, buttocks and thighs. Light hand weights and resistance bands may also be used. Keep your resolution of good health and join Bod Squad in the muscle toning class of 1995.

The class will be held Tuesdays and Thursdays January 10-March 9 from 5:30-6:30 p.m. at the Recreation Facility. The cost is $40. Contact Jean at x2548. Advanced registration and payment needed by January 2, 1995.

Chez Léon Menu



Lunch (Wed) $8.00 • Dinner (Thurs) $20.00
Reservations: x4512

Wednesday, December 21 • *Chestnut soup w/Cognac cream, orange game hen w/cumberland sauce, vegetable of the season, cherry brandy tarts*

Thursday, December 22 • *Christmas salad, lobster w/caviar Mousseline, vegetable of the season, Christmas pudding w/assortment of cookies*

Wednesday, January 4 • *Cheese fondue, marinated vegetable salad, mixed fruit compote w/ginger syrup*

Thursday, January 5 • *French onion soup, red snapper w/Pinot Noir sauce and winter vegetables, chocolate soufflé w/Frangelico cream*

CLASSIFIEDS

■ VEHICLES

1986 Chevy Nova CL, 4 dr., AC, auto, stereo, rear defogger, custom interior, tilt wheel, no rust, $3,000. Call Sue at x3762 or 708-377-2526.

1984 Chevy S10 4x4 extended cab pickup, V6, auto, AC, AM/FM/cass, alum. wheels, new P235 on/off tires, Tahoe package, no rust, tilt wheel, $4,600. Call Sue at x3762 or 708-377-2526.

1984 Mitsubishi Cordia-L, 3 door hatch back, new tires, new muffler & exhaust pipes, strong AC, AM/FM/cass., runs well, $800. Call x2125 leave message.

■ MISCELLANEOUS

Marcy reclining exercise bike, $35; Singer sewing machine, table & chair, $25 o.b.o. Call Merrill at x3011 or 708-668-3474.

Oak laminated entertainment shelves, $50; oak laminated hutch, $75. Call Greg at x3011 or 708-557-2523.

New, man's black leather jacket, size 42, $125; Kenmore sewing machine, 20 stitches, $75; Commodore SX64, $300; misc. Commodore software, $5-$15 ea., call for titles. Call Graciela at x4645 or 708-897-2811.

On-Line inline skates, good for begin., men's size 8, $10; Aerflyte figure ice skates, men's size 8 or 9 narrow, $10. Can see at WH14SE. Call Merle at x3263 or 708-964-0185.

Antique dining room buffet, $250 o.b.o. Call Karen at x2715 or 708-668-0927.

Latest design, brand new women's Indian Salwar suits and vests. Call Tanuja Mishra at 708-406-0430 afternoon/eve.

Game Gear w/car adapter & NI-CD battery pack, plug-in adapter, Sonic 2 game & carrying case, store price $220, 1 yr. old, $120 o.b.o. Call Tita at x3524 or 708-462-9655.

286 AT computer, EGA monitor, 1.66M, 40M HD, floppies, mouse, LIM expansion board, modem, PC copy card, DOS 6.2, Norton Utilities, Word Perfect, EDT, Fortran & Pascal, Lotus 123, PC Paint, graphics, games & more, $300. Call King at x4597 or 708-983-0279.

Octagonal walnut club table, 4 matching chairs w/upholstered cushions, 1 leaf, table is 42"l x 42"w x 27"h (w/o leaf), exc. cond., $300; Ladies Northwestern golf clubs, right-handed, powder blue/white bag, used twice, $300; Smith-Corona Galaxie XII manual portable typewriter w/hard-sided carrying case, exc. cond., $25. Call Shelley at x3324.

■ REAL ESTATE

1 BR apt. for rent, Geneva, close to library, Fox River, new windows w/curtains, carpet, some furniture & microwave optionally avail., heat, 2 parking spots, sm. storage room, no smoking, no pets, no waterbed, $405/month. Call Rafael at x8311.

2 BR ranch house for sale in N. Aurora, att. 1 car garage, screened-in porch, attic, frig, stove, built-in microwave, garbage disp., washer, dryer. Call Paula at 708-892-1468.

■ PETS

3 AKC miniature Dachshunds, males, 3 months old, $275. Call Joe at x2894 or 708-820-1158.

■ WANTED

Avid philatelist wants postage stamps U.S. & world-wide, remember me when you open holiday mail. Call Graciela at x4645 or 708-897-2811.

FermiNews

The Newsletter of the Fermi National Accelerator Laboratory

FermiNews is published by the Fermilab Publications Office

MS 107, PO Box 500 Batavia, IL 60510 • 708-840-3278 • FNAL::TECHPUBS

Fermilab is operated by Universities Research Association, Inc.

under contract with the U.S. Department of Energy

The deadline for the Fri., January 20, 1995 issue is WED., JAN. 11. Please send your article submissions or ideas to the Publications Office.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1994—646-065-00011

50% TOTAL RECOVERED FIBER 10% POST-CONSUMER FIBER