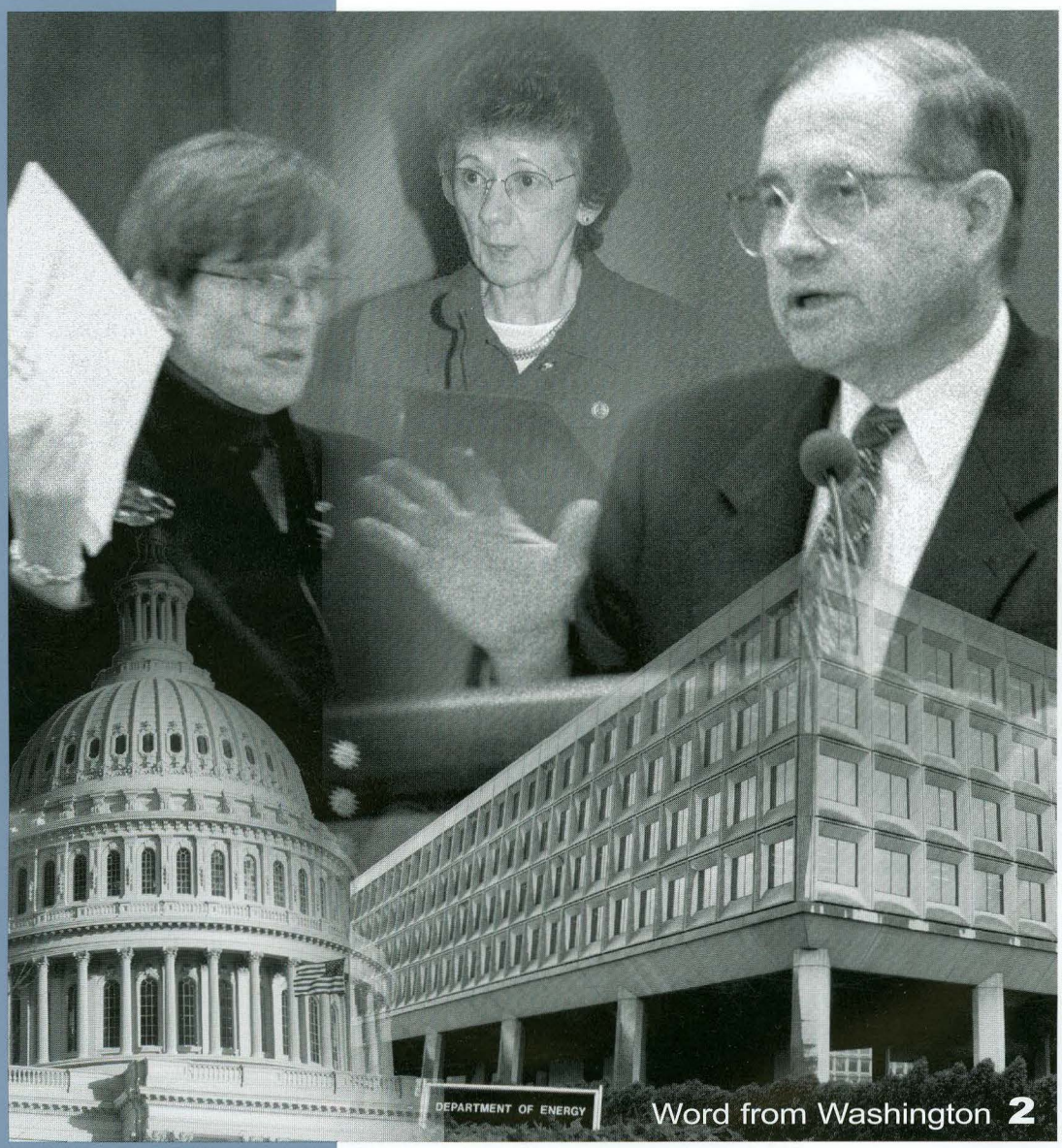
FERMI NEWS

FERMILAB A U.S. DEPARTMENT OF ENERGY LABORATORY



Word from Washington **2**

Photos by Jenny Mullins

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INSIDE:

AT URA MEETING:

Word from Washington

With trends showing increased funding for health sciences and decreased funding for physical sciences and engineering, Rita Colwell, director of NSF, commented, "...Society cannot live by biomedical bread alone."

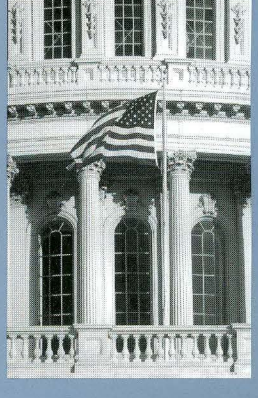
by Sharon Butler

Washington, D.C.—On February 4, in the wood-paneled Lecture Room of the National Academy of Sciences, representatives of universities and research institutions gathered to hear officials of the Clinton administration discuss details of the President's $1.77-trillion budget for fiscal year 2000 and its designs for science.

The occasion was the annual meeting and policy forum of Universities Research Association, Inc., a not-for-profit consortium of research universities that serves as a contractor to the U.S. Department of Energy for the operation of Fermilab. Its annual day-long meeting of "shareholders," the URA Council of Presidents, covered the usual business items: the elections of new member universities and of regional trustees and trustees-at-large, and reports from the URA president and chief financial officer, the chair of the URA board of trustees, the vice-chair of the Fermilab Board of Overseers, and the director of Fermilab.

But the policy discussion was, as always, the main draw for members. President Clinton had just presented his budget for fiscal year 2000 hailing a new era in fiscal abundance, and the assembled physicists and university chancellors, deans, vice presidents and provosts were eager to hear how much of that new-found wealth the high-energy physics community would see.

While reaffirming a strong commitment to research in science and technology, and acknowledging its value to the nation, the speakers at the URA forum offered, for the most part, a sobering assessment of prospects for funding in the coming fiscal year.



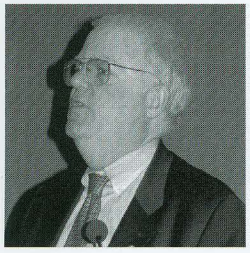
Sobering assessments

Stumping for the President's budget proposal, Rita Colwell, director of the National Science Foundation since August, called this "an excellent budget at the starting gate in what was (and remains) a very difficult budget environment."

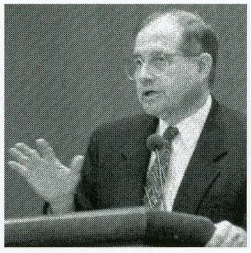
She said that the administration had produced "a strong package of investments in research," increasing funding for basic research across the government by $700 million and funding for academic R&D by over $350 million. Moreover, under the President's proposal, the budget for the National Science Foundation would increase by six percent over last year's level, with support for research projects up by eight percent.

"Taken all together, these increases—both for NSF and for research in general—provide one more reminder of the administration's commitment to investing in fundamental research," Colwell told the URA members. "They make for seven years in a row of supporting increases in research. It may not equal Cal Ripken's streak—but it's a solid record, and it's still going."

Despite this upbeat message, however, Colwell conceded that funding for physical sciences was down. "I know that's not news to many of you, but it's taken more than a few people by surprise," she said.



James Sensenbrenner, chair of the House Committee on Science, will be working on implementing the recommendations in the report "Toward a New National Science Policy."



Neal Lane, scientific advisor to the White House, called on URA members to let their voices be heard in Washington.

Photos by Jenny Mullins

Under the gaze of Albert Einstein, at the National Academy of Sciences, Peter Rosen (left) and John O'Fallon, of DOE, discuss the budget for nuclear and particle physics.

Photo by Jenny Mullins

Martha Krebs, of DOE's Office of Science, unveiled the President's proposed budget figures for high-energy physics.

According to statistics gathered by NSF's Division of Science Resources Studies, the mix of funding for federal research across different fields of science and engineering has changed dramatically over the last 25-plus years. Engineering's share has declined by 12 percent, and physical sciences by five percent, while support for the life sciences has risen 14 percent.

Colwell said she was fully aware that "society cannot live by biomedical bread alone."

Like Colwell, Neal Lane, formerly the director of the National Science Foundation and now the assistant to the President for science and technology, said that spending caps implemented under the 1997 Balanced Budget Agreement placed severe constraints on the budget for fiscal year 2000 despite a projected multibillion-dollar surplus.

And while Lane acknowledged "strong bipartisan support in Congress for the whole fundamental research area," he said that making the case for the physical sciences was particularly difficult. A large biomedical industry keeps a close watch on the budget for health sciences, he said, but the constituency for the physical sciences was more diffuse and the arguments for support more difficult for the public to understand.

"Your voice is uniquely important and must be heard," Lane told the URA members.

Budget numbers

Martha Krebs, director of the Office of Science at the U.S. Department of Energy, and her staff have gone through a labor-intensive exercise of restating the office's goals, with a view to informing and even inspiring sponsors and the general public. The four goals, or themes, for "Science for America's Future" are: fueling the future, protecting our living planet, exploring matter and energy, and extraordinary tools for extraordinary science.

But the reformulation of the office's goals did not translate into better budget numbers for high-energy physics. While funding for the field increased from $668.6 million in fiscal year 1998 to $695.5 million in fiscal year 1999, the President's budget proposal asks for $697.1 million in fiscal year 2000.

The audience also heard from one congressional member, James Sensenbrenner (R–Wis.), the plain-spoken chairman of the House Science Committee, which is responsible for developing and overseeing the government's science policy.

"We in Congress recognize the strong correlation between scientific advancement and a growing economy, which is why R&D continues as a top priority," Sensenbrenner said. He cited statistics from the American Association for the Advancement of Science: total federal support for R&D reached $80.2 billion last year, an increase of 5.3 percent over the previous year.

He said that the Science Committee would pursue an ambitious legislative agenda, including items pertaining to education, external regulation of DOE laboratories and tax credits for R&D. He also said he would work with the sponsors of the Rockefeller-Frist authorization bill that proposed doubling R&D spending over the next 11 years. The legislation was passed in the Senate last year by acclamation, but no companion measure was introduced or passed in the House.

In Sensenbrenner's view, the bill "was not the best approach to achieving our shared goals of increasing federal scientific research funding and extracting the maximum benefit from our federal investments."

"The Rockefeller-Frist bill, as I've said in the past, is an empty promise," Sensenbrenner told the URA meeting, "and it is time for you folks … to get real."

The approach Sensenbrenner favors is embodied in a study he commissioned last year to "establish a road map on how money for science should be spent." That 74-page study, entitled "Toward a New National Science Policy" and released in September 1998, reaffirms the "irreplaceable role" of government in funding basic research and makes several recommendations for funding priorities.

Just what the road map looks like for fiscal year 2000, however, is not yet clear. The President's budget is one map, the Science Committee's recommendations another. If the frenzied last-minute bargaining of the last few years is any guide, the spending plan that emerges nine months hence may not look at all like the one on the table now.

The Way I See It

Alvin Tollestrup—Tevatron master builder, charter member and former spokesperson of the CDF collaboration, and muon collider maven—speaks out.

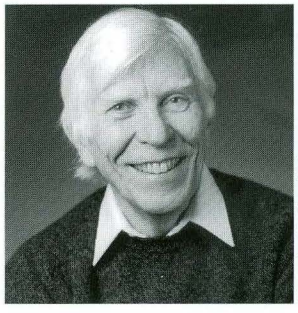


Photo by Reidar Hahn

Reading this may make you mad!

There is an impending disaster in high-energy physics, and physicists are ignoring both the cause and the solution. With uncharacteristic detachment, the experimental-physics community is avoiding involvement in the choice and development of the next accelerator for this country. The machine that became Fermilab's Main Ring was first proposed by a small group of physicists at Caltech; the university community invented Universities Research Association to build and operate this machine, an approach that followed from a history of university-developed machines.

I believe that the greatest challenge to our field over the next 50 years will be the development of affordable high-energy accelerators. It will take originality, a superb knowledge of physics, and the involvement of all of us. The problems are just as challenging to solve as those of detectors, and much more urgent!

Currently at Fermilab it is hard to get the whole physics community involved in R&D for the next step in accelerators. True, the work of preparing the detectors for the next collider run is very demanding. Work on the new detectors for CERN's Large Hadron Collider absorbs many physicists. But if we don't start now to work on the accelerators of the future, our opportunity in the U.S. will be lost.

I think the trouble in accelerator research lies in three places: the universities, the physics labs, and the funding agencies. Graduate students sit at terminals running PAW (a physics analysis program) so that they can get jobs at universities peopled by graduates from our large collaborations in which THEY learned PAW. Once, Maxwell's equations and Mechanics were the test. The universities should restore accelerator physics to its rightful place.

Second, the labs must involve the academic community in accelerator experiments. There are very interesting problems: cancellation of space charge effects in hadron colliders, muon cooling, stabilizing beams in linear colliders, superconducting rf, optical stochastic cooling... Why couldn't a student commute from Harvard to work on a large accelerator experiment at Fermilab? We need to think hard how to structure these experiments to accommodate such activity.

Finally, accelerator research must have more money: for hardware at the labs and for graduate students at universities. I would like to see some positions for postdocs to work half time on ongoing experiments and half on machine-related physics.

Our roots are in physics, but we must have tools. I was lucky. At Caltech, my professors taught that for cutting-edge measurements one must develop cutting-edge tools. I hear "We can't work on that...it will be 20 years to ...." When I came to Fermilab 24 years ago, Wilson had superconducting magnets 10 feet long that reached 1 Tesla, or one-foot magnets at 3 Tesla. But the dream was there for a 1 TeV machine, and for colliding-beam experiments that eventually became CDF and DZero. It has been great fun, and we now have a beautiful physics program at Fermilab: the top quark, sin(2beta), b physics—with the promise of the elusive Higgs and maybe even supersymmetry in the next run.

But the step after that won't happen if we all sit at our terminals running PAW!

Workshops might help...

The idea: Breathe life into the (inter)national discussion of future accelerators

The plan: A yearlong series of lively get-togethers on accelerator topics

The dramatis personae: A noteworthy speaker, a gimlet-eyed panel of experts, and a roomful of physicists and students

The first one: What's Up Worldwide with Linear Colliders?

The speaker: Dave Burke, of SLAC

The experts: Mel Shochet, U. Chicago; Hassan Padamsee, Cornell; and Norbert Holtkamp, Fermilab

The time and place: Thursday, February 25, 1999, 3:00 p.m., Fermilab

The script: The speaker speaks; the panel fires the hardest questions they can think of; the audience—well, we don't know yet what the audience will do, but dozing is discouraged.

The ambience: Somewhere between an average physics seminar and wrestling in mud

The food: Pizza and beer for all participants (Grad students take note!)

The moving spirits: Norbert Holtkamp and Alvin Tollestrup, of Fermilab. Call them with questions.

Design STUDENTS take a fresh look at PARTICLE PHYSICS.

A New Spin

Carrying the message of science to new audiences always represents a challenge for scientists, and sometimes a new outlook can offer intriguing results.

With a bow to Marshall McLuhan, the medium was the message for five students studying advanced graphic design at the University of Illinois-Chicago's Department of Biomedical Visualization.

Their project, with direction from adviser Donna Marie Hughes of Hughes Design/Communications in Chicago, was to design a multipage magazine advertisement for Fermilab, to capture the attention of a specific segment of the general public. Their approaches ranged from architecture to classical music to men's magazines—and beyond.

The students—Phil Rampulla, Sonal Saghani, Ling Yang, Tiffany Lange and Chris Dobson—have moved on to internships across the country, but their work is on display for the next month in the east side exhibit space on the first floor of Wilson Hall. You can view selections of their creativity on the following pages.

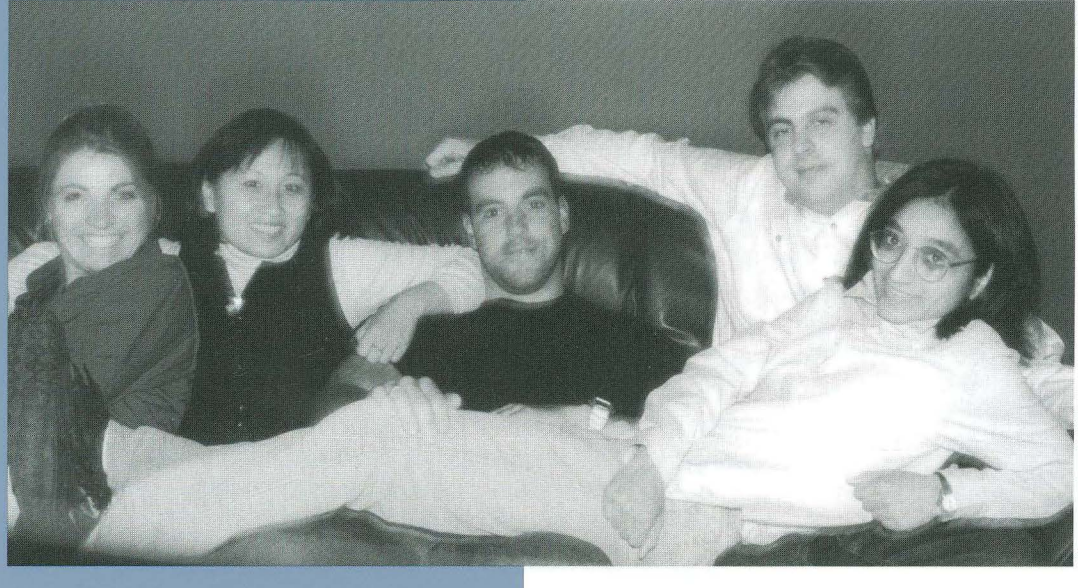
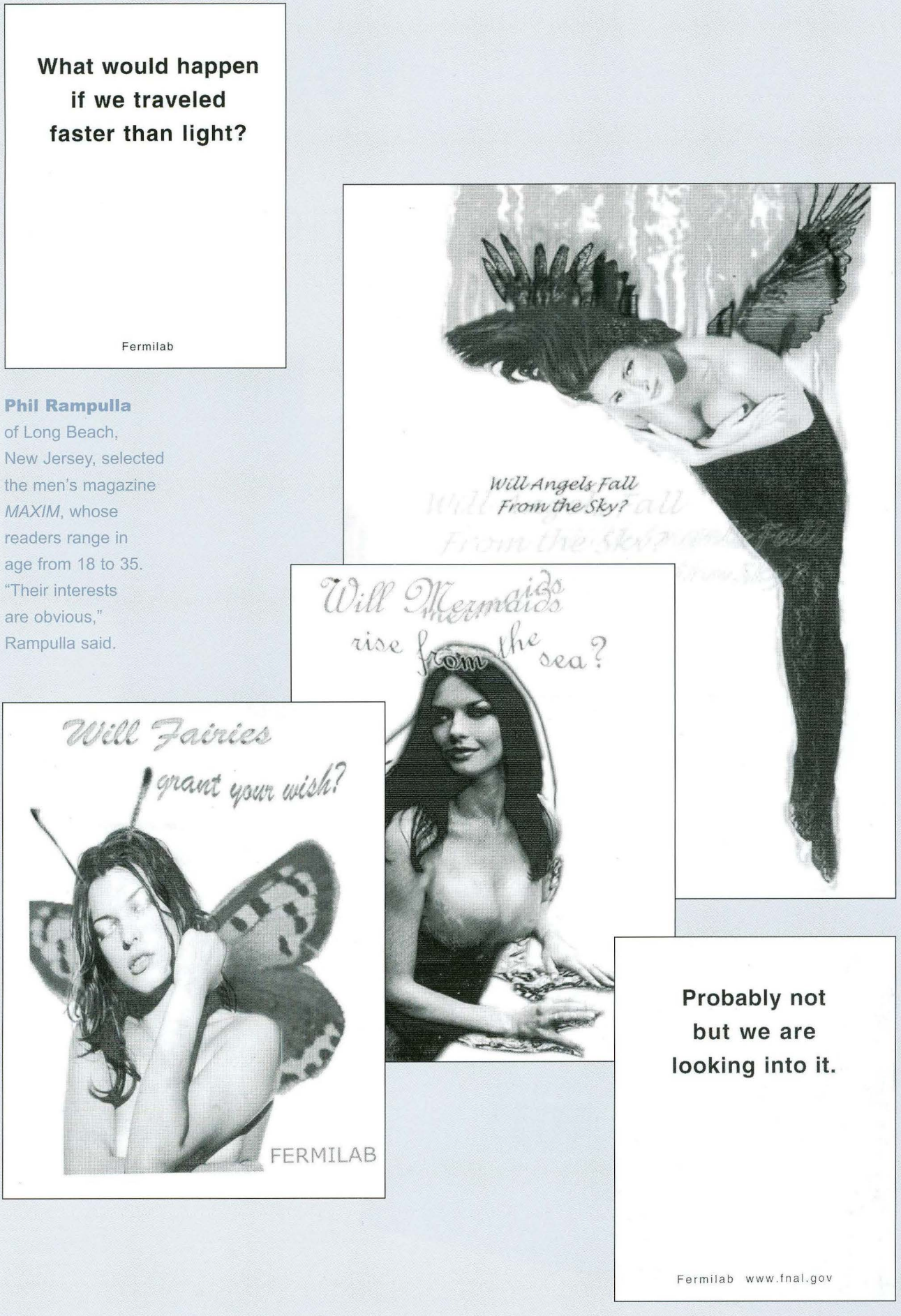


Photo provided by UIC

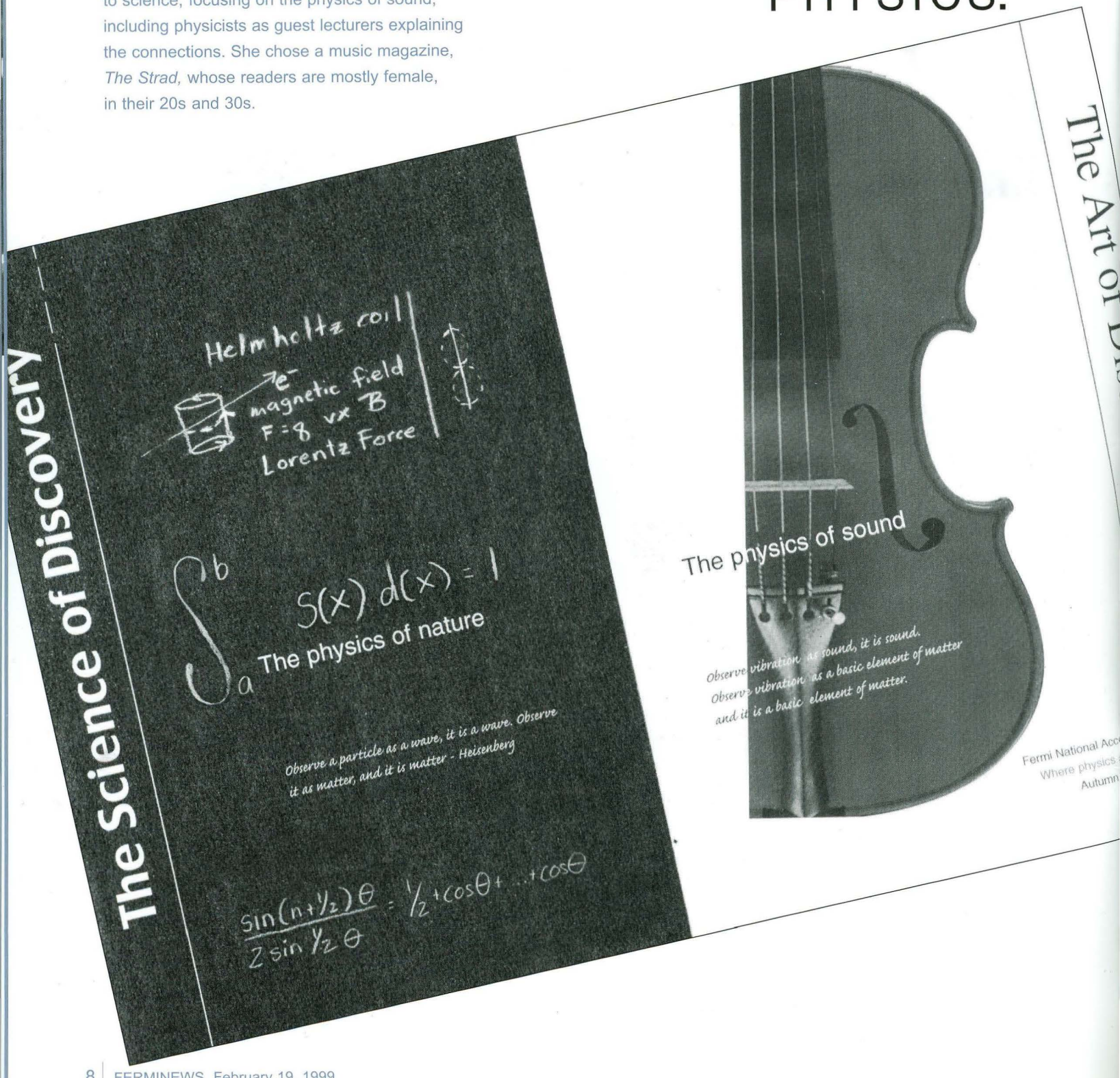
The Young and the Insightful: from left, Tiffany Lange, Baltimore, Maryland; Ling Yang, Ann Arbor, Michigan; Phil Rampulla, Long Beach, New Jersey; Chris Dobson, Rockford, Illinois; Sonal Saghani, Chicago.



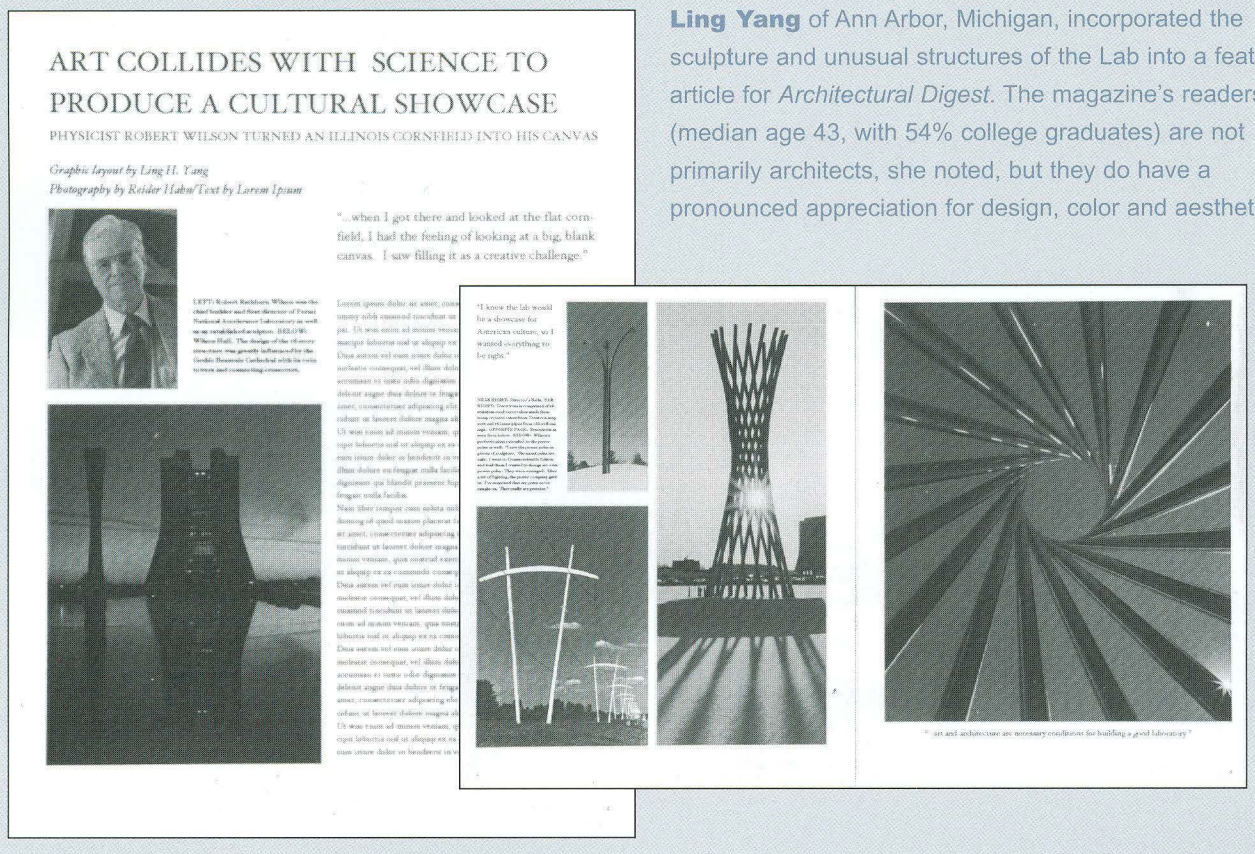
Phil Rampulla of Long Beach, New Jersey, selected the men's magazine *MAXIM*, whose readers range in age from 18 to 35. "Their interests are obvious," Rampulla said.

Take a fresh look at PARTICLE PHYSICS.

Sonal Saghani of Chicago envisioned a concert series demonstrating the relationship of music to science, focusing on the physics of sound, including physicists as guest lecturers explaining the connections. She chose a music magazine, *The Strad,* whose readers are mostly female, in their 20s and 30s.



Ling Yang of Ann Arbor, Michigan, incorporated the sculpture and unusual structures of the Lab into a feature article for *Architectural Digest*. The magazine's readers (median age 43, with 54% college graduates) are not primarily architects, she noted, but they do have a pronounced appreciation for design, color and aesthetics.



ART COLLIDES WITH SCIENCE TO PRODUCE A CULTURAL SHOWCASE

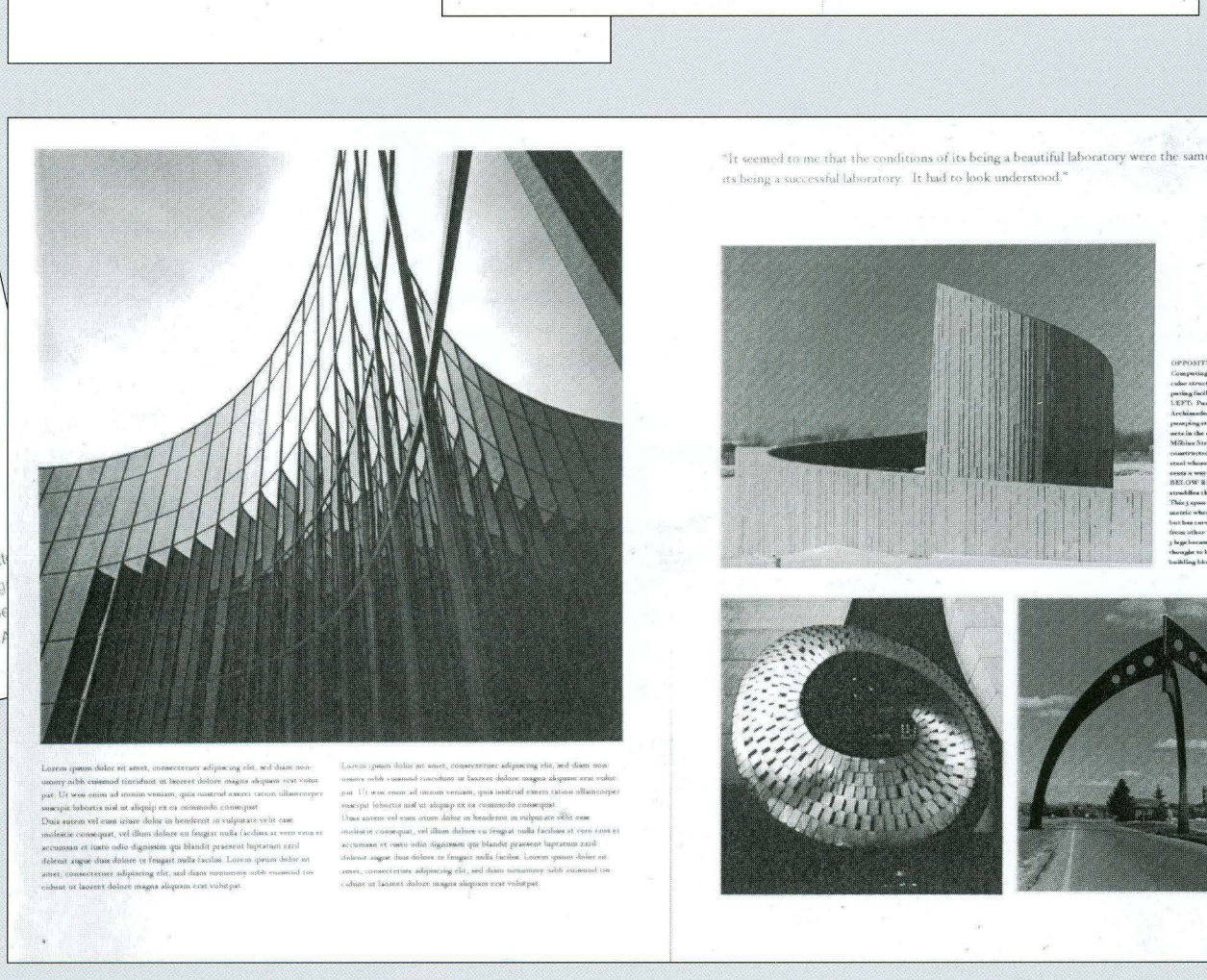
PHYSICIST ROBERT WILSON TURNED AN ILLINOIS CORNFIELD INTO HIS CANVAS

Graphic layout by Ling H. Yang
Photography by Reider Hahn/Text by Lorem Ipsum

"...when I got there and looked at the flat cornfield, I had the feeling of looking at a big, blank canvas. I saw filling it as a creative challenge."

"I know the lab would be a showcase for America's culture, so I wanted everything to be right."

"...art and architecture are necessary conditions for building a good laboratory."



"It seemed to me that the conditions of its being a beautiful laboratory were the same conditions as its being a successful laboratory. It had to look understood."

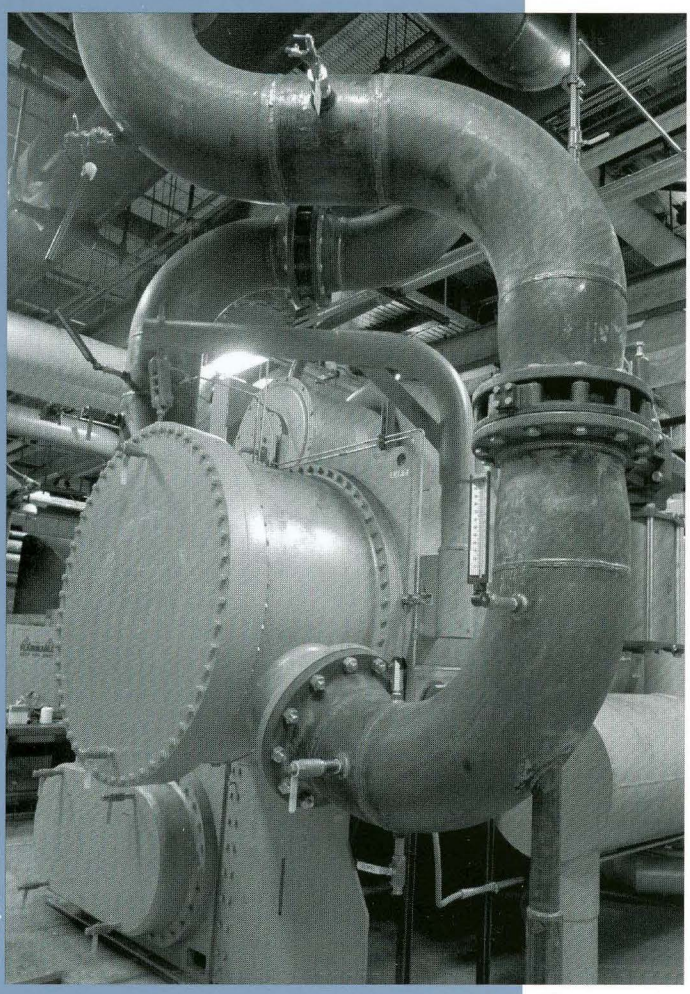
All Pumped UP

Upgrades have Central Utility Building flexing new muscles.

by Mike Perricone

When it's fully operational, the upgraded control room of Fermilab's Central Utility Building will stand as a testimonial to the Lab doing its homework.

The new digital-TV screens on the wall will display schematic diagrams of all the cooling water systems, from the cooling ponds around the site to the cooling towers atop the Central Utility Building. Operators will be able to spot a problem valve quickly, and spend their time fixing a problem instead of locating it—eventually even making corrections with the push of a button. The redesigned control console offers digital readouts on temperatures and pressures throughout the system, replacing the old-fashioned knobs, dials and gauges.



Photos by Fred Ullrich

Under the Utilities Incentive Plan, Commonwealth Edison installed state-of-the-art equipment like this 1,400-ton chiller, which will use about half the energy of the machinery it replaces.

"It's state of the art, year 2000 technology," said Fermilab Engineering Project Manager Steve Krstulovich. "We're replacing the 1960s technology, dating from the time Fermilab was built."

All because a dedicated group of people kept doing their homework until they found the answer to a knotty funding problem.

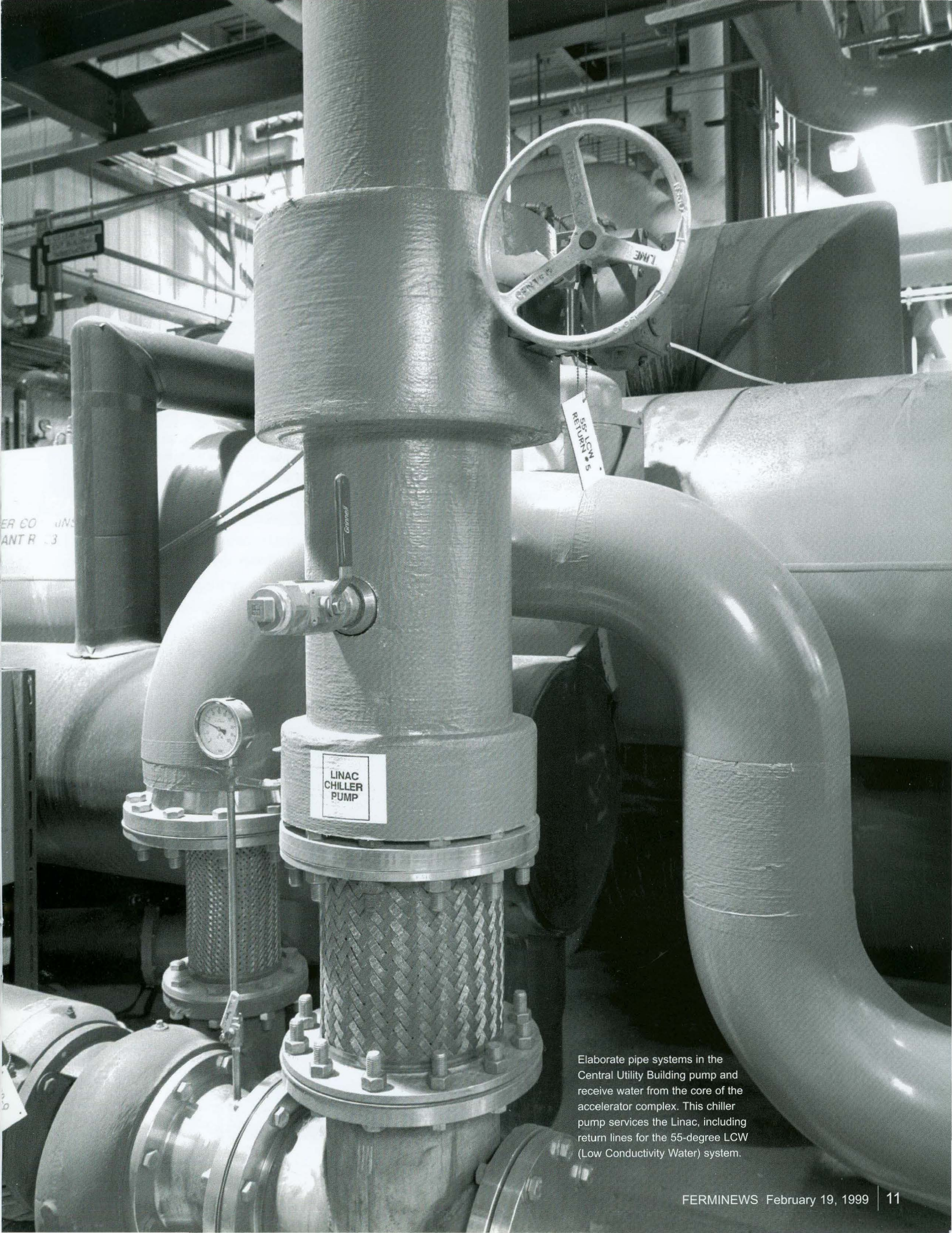
The changeover isn't limited to the control room, and it doesn't simply mean new bells and whistles for this "pumping station" at the heart of the Lab's cooling system, where cooling water is circulated to meet the needs of both machines and employees, experiments and offices.

The Central Utility Building has a symbolic location, surrounded by Wilson Hall and the first stages of the accelerator complex. It seems to rise out of the cooling pond for the Booster accelerator; in fact, it moves the water through the outdoor pond system that dissipates the heat absorbed from the machinery. The $3.5-million upgrade for the building's pumping systems goes right to the core of the reliability of the accelerators that keep pushing back the frontier in the Lab's high-energy physics experiments.

"When Fermilab was built, the design took all of the chilling capacity required for operating the accelerators, and for the comfort cooling of Wilson Hall and put it all together in a single group of chillers," said David Nevin, head of the Lab's Facilities Engineering Services Section.

"We're pushing 30 years now," Nevin continued. "As the system grew older, and the loads grew larger, we found that we would have problems with the comfort cooling and those problems could in turn knock out an accelerator. In other words, the accelerator would stop because somebody's thermostat in Wilson Hall wasn't working properly. That was an untenable situation."

That untenable situation is about to be officially reversed by a project as creative in its funding as in its technology, after more than two years of shepherding by Nevin, Krstulovich and the Department of Energy's on-site



Elaborate pipe systems in the Central Utility Building pump and receive water from the core of the accelerator complex. This chiller pump services the Linac, including return lines for the 55-degree LCW (Low Conductivity Water) system.

Fermi Group—with a sizeable assist from the Illinois utility giant, Commonwealth Edison.

Lab Director John Peoples first charged Nevin with upgrading the Central Utility Building three years ago. Nevin formulated a comprehensive, but unfunded, plan. Dixon Bogert of the Beams Division alerted Krstulovich and Nevin to a federal energy-saving program as a possible funding source, but their application foundered in the bureaucracy. Krstulovich then went back to his homework and, along with Assistant Director George Robertson, kept digging until he found the Utilities Incentive Program.

"The program said that if you can prove to a utility company that you can save money with new installations," Nevin explained, "then you can go to that utility company and have them provide that equipment, and pay the utility back from the savings."

The UIP process has a longstanding connection with the Department of Defense. Robertson, familiar with the program from his tenure as a major general in the Army Corps of Engineers, brought in consultants to explain the arrangement, offer sample contracts, and help the Lab develop its own package.

"Without George Robertson's timely intervention, the entire project might never have happened," Krstulovich said.

In April, Commonwealth Edison will complete the installation of equipment that separates the building's cooling functions into two segments, one for the comfort system and one for the process system. Krstulovich said the only direct out-of-pocket costs borne by the Lab stem from the time going into preliminary design and oversight.

"The upgrade will pay for itself in five years," Nevin said. "The first payment to Commonwealth Edison is not due until fiscal year 2000. And the payments will be made entirely out of operating funds—money we would have been spending anyway. Commonwealth Edison has done a super job of accommodating our needs and schedule. They've really been a partner with us on this."

The critical elements in the installations are the new chillers, refrigeration units that are far more energy efficient and environmentally friendly than the units they are replacing. There are two 1400-ton chillers and one 750-ton chiller for the process side, and two 800-ton chillers for the comfort side. All the chillers are free of ozone-depleting chlorofluorocarbons, and they will use about half the energy of the original equipment. The average home uses an air-conditioning system with a capacity of between two and four tons; the Central Utility Building's process system alone has a capacity of 4,500 tons, the equivalent of about 1,500 homes.

In addition to being more efficient, the new system will also be more "robust," as Nevin describes it. Cooling capacity can be shifted from the comfort system to the process system when necessary, meaning the accelerators will have dependable backups in case problems arise.

"We'll have backup on top of backup," Krstulovich emphasized.

Dependability, new technology, creative funding, environmental responsibility, added "robustness," savings in money and energy—they add up to a testimonial to the rewards of doing your homework.

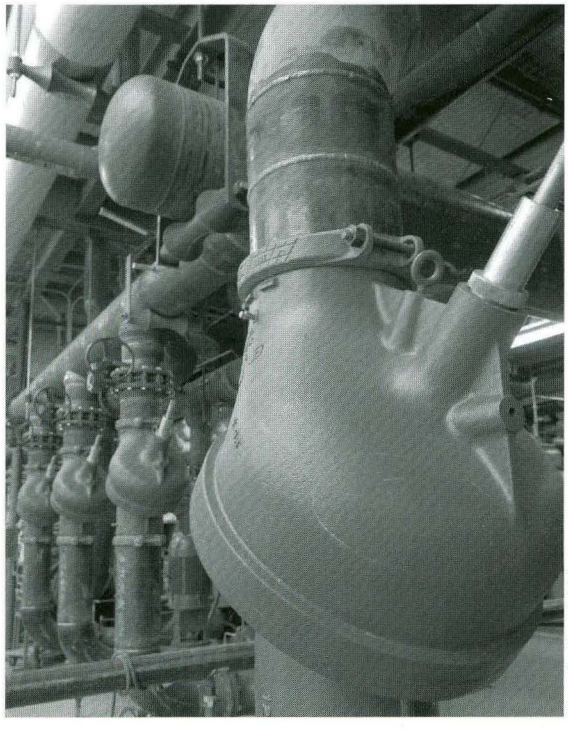


Photo by Fred Ullrich

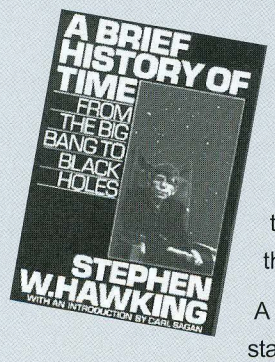
This new lineup of chilled water pumps will handle the comfort cooling side of the revamped systems in the Central Utility Building. The muscular bulge in the pipe houses a triple-duty valve.

the talk of the town

Hawking Ponders Infinity

"CAN YOU HEAR ME?"

A substantial baritone, round and full; the accent borderline Scottish or Welsh, but schooled well short of a full brogue. A hint of wry in the tone, promising a barb or two before the night's work was done.



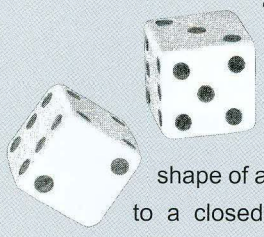
The voice immediately owned every expanse of the Arie Crown Theater at McCormick Place, Chicago's gargantuan convention center by the lake. But who owned the voice?

A motorized wheelchair rested at center stage, life support apparatus stacked behind the wheels, its inhabitant almost too still for reality. His head leaned unmoving against his right shoulder, his skeletal body angled in the chair like an oddly-bent wire coathanger. In front of him was a small custom computer console, where a minute twitch of his finger activated an ultra-sophisticated speech synthesizer that generated the theatrically-comfortable voice without movement of lips.

"My greatest achievement is being alive today," began Stephen Hawking, overcoming the symbolic distance between computerized voice and ravaged body, verbally striding into his lecture on "The Universe in a Nutshell." During his frequent long pauses, the auditorium was as still as the night sky.

Leading off a four-part lecture series on "Our Expanding Universe," presented by Chicago's Adler Planetarium, Hawking selected his theme from a speech of *Hamlet:*

"We could be bordered in a nutshell and count ourselves kings of infinite space."



Hawking suggested he was comparing the shape of a nutshell—a tiny, slightly flattened sphere—to a closed surface that could comprise our known universe, Yet a sense of great things in maddeningly-confined space seemed a metaphor for his own state.

"The prospect of an early death focused my mindpower wonderfully," said Hawking, diagnosed with amytropic lateral sclerosis (Lou Gehrig's Disease) in 1963 at the age of 21, and given a life expectancy of two to three years.

Now 57, and since 1979 the Lucasian Professor of Mathematics at Cambridge University (the post once held by Sir Isaac Newton), this most prominent theoretical physicist since Einstein is also a star of popular culture. He is the best-selling author of *A Brief History of Time*; host of the BBC television series *Stephen Hawking's Universe*, which has been viewed around the world; and perhaps most impressively to the many high-school students in his Chicago audience that night, soon to be featured as an animated version of himself on *The Simpsons* (though many of the older scientific notables on hand will certainly be watching, too).

Already that day, he had lectured at the University of Chicago, at a symposium on inflationary cosmology co-sponsored by the university, Fermilab and the Pritzker Foundation. On this Friday night, January 29, he declared that incorporating the Uncertainty Principle into Einstein's theory has been the greatest challenge for theoretical physics in the last 30 years. He also recalled that Einstein had reacted angrily to the Uncertainty Principle by declaring: "God does not play dice!"

Hawking countered: "All the evidence shows that God was actually quite a gambler, and the universe is a great casino, where dice are thrown, and roulette wheels spin on every occasion. Over a large number of bets, the odds even out and we can make predictions; that's why casino owners are so rich. But over a very small number of rolls of the dice, the uncertainty principle is very important."

He spoke of imaginary time, a dimension at right angles to regular time, encompassing every possible closed surface that the universe could have generated in its multiple histories—histories growing from all the possibilities of rolling the dice an

infinite number of times. The universe must have every possible history, he said, with our existence a restriction of history: we live within the minority of histories containing galaxies and stars.

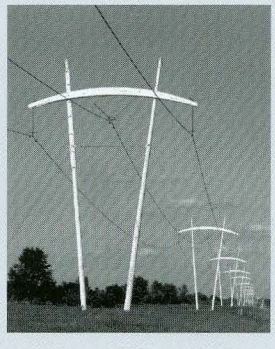
"If the universe were different," he reasoned, "we would not be here to observe it."

And if Hawking's universe were different?

"My expectations had been reduced to zero," he said simply. "My ALS ruled out most careers except for theoretical physics. I am happier now than before my condition appeared."

—Mike Perricone

Aging Utility Poles



Running north from Wilson Hall is a row of utility poles so spare in shape they look like sculptures by Giacometti—whimsical larger-than-life birds with long legs and outspread wings, peeling off to the horizon. They bring in the power that makes our protons go 'round.

Robert Wilson, Fermilab's founding director, designed the utility poles to resemble the Greek letter pi. Pi is, of course, a ubiquitous symbol in particle physics (and in math). It is that magical relationship between the diameter of a ring and its circumference, and the root name of those strange particles from cosmic rays that spill into our atmosphere unannounced.

Wilson wasn't being cute when he designed the poles. He just wanted to make utility poles that weren't as ugly as the ones that commonly line American roads. "I went to Commonwealth Edison and told them I wanted to design my own power poles," Wilson once recounted. "They were outraged. After a lot of fighting, the power company gave in. I'm surprised that my poles never caught on. They really are prettier."

The fight Wilson referred to involved questions of practicality: Whatever Commonwealth Edison thought of their aesthetics, it wasn't convinced the poles would be functional, and the company required full-scale testing to ensure that the poles could carry any anticipated load. Fermilab was allowed to erect the poles only when the testing proved them fit.

Over the years, the poles have drawn still more trouble. The poles were never capped, which left their tops subject to the elements.

In 1986, and again in 1991 and 1992, sound (and other) tests were done to determine whether the poles were deteriorating. Inspectors tapped them with mallets—a nice ring meant the douglas fir was solid inside; a dull thud signaled the wood was rotting away. Ultrasonic tests were also done in which a transmitter was placed on one side of a pole and a receiver on the other, and the velocity of the sound wave measured as it passed through the wood. The news was not reassuring.

"Heart rot" had set in. Black ants had invaded. Woodpeckers had chipped away, digging for insects. Fungi with long Latin names were taking over.

Good poles were treated with a combination pesticide-fungicide, bad ones with copper naphthenate. Sections were swathed in chicken wire to ward off the woodpeckers, who subsequently flew these coops. Fused rods made of boron, a toxic substance, were inserted to stem the spread of fungi.

At one point, even researchers in the Forest Service, under the U.S. Department of Agriculture, took interest in helping out, but after running samples of wood borings to identify the sources of the trouble, their funding dried up.

All the attention on these unique utility poles could not reverse the damage, but it did extend their useful life. A three-year, $2.5-million project to replace them won't have to begin until 2002.

—Sharon Butler

Mini-Symposium on the Early Days of Fermilab

On Wednesday, March 10, a mini-symposium on the early days of Fermilab will honor Ned Goldwasser on his 80th birthday. Goldwasser was Fermilab's first deputy director. The open symposium in Ramsey Auditorium will include perspectives on the international character of high-energy physics. This is an excellent opportunity to learn more about Fermilab's roots. With Bob Wilson, Ned Goldwasser established Fermilab and guided it through its first decade. After leaving Fermilab, Goldwasser served as vice chancellor of the University of Illinois and worked at the SSC Central Design Group.

Six outstanding scientists will participate, including Norman Ramsey and Rich Orr. Ramsey was founding president of URA and winner of the 1989 Nobel Prize in physics. Orr led many activities at Fermilab, from the Business Office to the Tevatron project. With several others, Orr received the National Medal of Technology for the Tevatron work. Other speakers will include Bill Fowler, leader of the 15-foot bubble chamber project and super-conducting magnet development, and Yoshio Yamaguchi, a particle theorist at the University of Tokyo, who has been active in the international side of high-energy physics for many years. David Jackson, the author of a celebrated book on classical electrodynamics, will recall the establishment of the theory program at Fermilab. The symposium will close with reminiscences and observations from Goldwasser.

For more information, call Dick Carrigan, X8755, or Jackie Coleman, X3027.

LAB NOTE

URA Scholarship Information

Candidates for Universities Research Association (URA) scholarships are reminded that applications are due March 1.

Applications are available from and should be returned to Human Resources, WH15SE, M.S. 124.

LUNCH SERVED FROM 11:30 A.M. TO 1 P.M. $8/PERSON

DINNER SERVED AT 7 P.M. $20/PERSON

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HTTP://WWW.FNAL.GOV/FAW/EVENTS/MENUS.HTML

LUNCH WEDNESDAY, FEBRUARY 24

Cheese Fondue

Salad of Mixed Greens with Mustard Vinaigrette

Poached Pears with Raspberry Sauce

DINNER THURSDAY, FEBRUARY 25

CARNIVAL

Black Bean Soup

Roast Suckling Pig

Rice with Pigeon Peas

Stewed Chayote

Pineapple Flan and Tropical Fruit

LUNCH WEDNESDAY, MARCH 3

Catfish Veracruz

Steamed Carrots & Zucchini w/Chipotle Chili Butter

Herb Green Rice

Spiced Bananas & Ice Cream

DINNER THURSDAY, MARCH 4

BOOKED

FERMI NEWS
FERMILAB
A U.S. DEPARTMENT OF ENERGY LABORATORY

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CLASSIFIEDS

FOR SALE

- '97 Ford F250 Supercab, 8' bed w/bedliner, ac, overdrive, Omaha (contractor's) Topper. Towing package & set up for trailer brakes, 351 cubic in. (5.8L) V8, teal green, low miles, $21,000 w/topper, $20,000 w/out. Call Scott Doerr, long distance pager (630) 266-4430.
- '87 Volvo 240 DL sedan, auto, 160K miles, gray, cc, orig. owner, $3,000. Call Bill, x4173 or (630) 879-6841.
- Queen size mattress, box, frame w/2 night-stands, $85; PC 486DX, 66 MHz, 650 MB Hard Disk, 16MB RAM, 32K CD drive, 14.4K Modem, Window 95, MS Office 95, w/keyboard & mouse (no monitor), $150. (630) 355-1253 or chendi@fnal.gov.
- Queen size waterbed w/oak frame & side cabinets & newer, quality mattress, $250 or obo. Call Jeff x3951 or (630) 876-3293.
- House, in Warrenville, Summer Lakes Subdivision, 3 bdrm ranch w/central air, vaulted ceilings & exposed beams, oak parquet flooring in kitchen, dining & living rms, 99% energy efficient gas fireplace, 2 car garage, screened & carpeted front porch, tri-level cedar deck w/seating. Custom wood fence w/lighted planters. Must see, very unique. Asking $146,900. Call Karen, x5427 for appointment.

FOR RENT

- Apartment to sublet: unfurnished, 1 bdrm in Warrenville, $635/mo. Phone Thornton, x3150.

WANTED

- French Tutor. Looking for French tutor to teach 3 children in our NE Aurora home, 10 mins from the lab. Two 12 year olds and one 8 year old. Please call Kevin if interested, x2788 or (630) 859-3427 or kuk@fnal.gov

CALENDAR

Web site for Fermilab events: http://www.fnal.gov/faw/events.html

FEB 20
Fermilab Art Series Presents: *William Bennett, Flute in Recital with Clifford Benson* $10. All performances begin at 8 p.m. in Ramsey Auditorium, Wilson Hall. For tickets or more information call (630) 840-ARTS.

FEB 21
Barn dance in the Kuhn Village Barn from 2-5 p.m. Music by Lower Fiddle Class, calling by Paul Ford. All dances are taught, people of all ages and experience levels welcome. Admission is $5, children under 12 are free (12-18 $2). Sponsored by the Fermilab Folk Club. For more info call Lynn Garren, x2061 or Dave Harding, x2971.

FEB 25
Wellness Works Presents: Y-ME a workshop on Breast Cancer Awareness by the National Breast Cancer Organization, "What you need to know about breast cancer" from noon – 1 p.m. in Curia II conference room.

FEB 26
International Film Society Presents: *The Sweet Hereafter.* Dir: Atom Egoyan, (Canada 1997, 110 mins.) Film at 8 p.m. in Ramsey Auditorium, Wilson Hall, $4. (630) 840-8000.

MARCH 2
Wellness Works Presents: "How Muscles Work", Covert Bailey's Video Series, noon – 1p.m. in 1 West.

MARCH 10
The Fermilab Barnstormers Radio Control Model Club annual Delta Dart Night in the Kuhn Barn at 5:30 p.m. All Fermilab employees & their families are invited. The Delta Dart is a small rubber band powered airplane constructed of balsa wood & tissue paper. Build one in ~ 45 minutes and fly it for fun and prizes. Barnstormers will guide you through every step of the construction & give tips for flying. Materials cost $1 for adults & teenagers, juniors (12 and under) are free. Everything you need to build & fly is provided. The junior's fly off will be held at 7 p.m. For more info call Fred Krueger, x5515, or Jim Zagel x4076.

ONGOING
NALWO coffee, Thursdays, 10 a.m. in the Users' Center, call Selitha Raja, (630) 305–7769. In the barn, International folk dancing, Thursdays, 7:30–10 p.m., call Mady, (630) 584–0825; Scottish country dancing Tuesdays, 7–9:30 p.m., call Doug, x8194. English classes on Tuesdays at the Users' Center. Beginners from 9–10 a.m. & intermediate students, 10–11 a.m. Fee of $ 4 per morning. Students welcome to attend both classes. Lessons taught by Rose More, (630) 208-9309.

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