

Washington State

m a g a z i n e

Climate change past
and future

*Time
Will Tell*

Also in this issue: WWII spies, fungi, and the summer of 1957



saving oil, spurring the economy

That new low-maintenance wood-plastic deck you enjoyed during the summer likely was the result of research led by Professor Michael Wolcott and Washington State University's Wood Materials & Engineering Laboratory (WMEL).

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Dr. Wolcott is one of dozens of Washington State University researchers engaged in a daily quest to make the world a better place. Washington State University: because the world needs big ideas.



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by Cherie Winner

Climate change is nothing new to our planet. But this time it's different. The carbon dioxide we are putting into the air through industry, vehicle emissions, and deforestation is changing the way our soil works. That in turn affects plant, animal, and eventually human life. Through their research Washington State University scientists are challenging the conventional view that more plants and forests will solve our CO₂ problems.

33 Into the Woods

by Hannelore Sudermann

Unseen worlds live behind the bark and beneath the trees in Pacific Northwest forests. Scientists Jack Rogers and Lori Carris have made careers out of discovering these worlds and studying them. We go into the woods with them to glimpse the secret lives of fungi and their roles in nature.

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- THE FUNGAL FILES

39 Secrets & Spies

by Hannelore Sudermann

The Office of Strategic Services, our country's first centralized intelligence agency, was formed during the Second World War to train men and women in the arts of sabotage and espionage and then to send them around the world to protect our nation's interests. Among the many Washington State College students and alumni who served in that conflict, five friends and classmates trained together in the OSS, then went to North Africa, Italy, England, and China to help win the war.





TIKAL, GUATEMALA, PHOTO BY BRADEN SPOTTS

Core samples of sediment allow palynologist John G. Jones to retrieve ancient pollen deposits and determine not only how farming developed among early Mesoamerican cultures, but also how it was affected by climate change. While Jones studies past effects, other WSU scientists contemplate the future.

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FIRST WORDS

WITH MANY THINGS demanding his attention, Abraham Lincoln did not comment often or at length on agriculture. An exception was his speech to the Wisconsin State Agricultural Society at its annual fair in 1859. "... No other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought as agriculture," he said.

The stories of Lincoln's youth on the farming frontier of Illinois and Indiana remind us that his observation is not simply a romantic notion. With that thought, he joined the classical agrarians in understanding that agriculture is more than a simple matter of raising food; it is a rich culture and a creative challenge.

If Lincoln's commentary on agriculture was minimal, his impact was profound. Three years after his Wisconsin speech, and by then president, he signed legislation that created the Department of Agriculture.

That same year, 1862, Lincoln signed the first Morrill Land-Grant Colleges Act. The act donated public land to the states for colleges of agriculture and the mechanical arts, which came to include Agricultural College, Experiment Station and School of Science of the State of Washington. It should be no surprise that, in spite of our name change, we are still very much a land-grant university.

Lincoln's interest in agricultural reform was spurred by the simple recognition that not only did farmers make up the largest class in an expanding United States, but farming was its largest industry. Spurred by the concurrent Homestead Act, opportunities and challenges for American agriculture were equally profound, but a new "people's department" and land-grant colleges would rise to the occasion and give the young nation a productive and, though the word was not yet fraught with today's urgency, sustainable food supply.

As a class today, our farm population is a dramatic contrast to that of Lincoln's day, with fewer than 2 percent of Americans in agricultural occupations. However, the role of American agriculture, and of the land-grant college, may be even more vital than it was during Lincoln's presidency. For any number of reasons, agriculture is very much in the public's attention, and is alternately vilified and romanticized over many issues: immigrant labor, food quality, food safety, environmental quality.

But the challenge that may yet bring the most attention to agriculture is climate change, which gives us yet another reason to welcome WSU president Elson Floyd's repeated and refreshing commitment to agriculture. At the dedication of WSU's new research orchard in Wenatchee, Floyd acknowledged that in recent years, the University has "shied away from ag."

Then he told the gathered apple growers, "I need to know your requirements of your publicly held university. We want to make sure we're a better partner tomorrow than today."

Considering that agriculture contributes about 20 percent of global greenhouse gas emissions and that there is great

continued page seven

IMPACT.

Scientist Paul Benny,
discovering better ways to fight
prostate and breast cancer.



Professor Paul Benny, teaching the next
generation of discoverers.

The sons and daughters of Washington State
University alumni will discover a 21st-century
WSU that's making the world a better place one
idea at a time, one student at time.

You already know how much the University's
supportive academic community contributed
to your success. That emphasis remains today,
along with a commitment to providing the
best undergraduate experience of any research
university in the country.

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visit.wsu.edu



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The Washington State University Alumni Association is leading the nation in membership growth. How have we achieved this monumental feat? Thousands upon thousands of Cougars and friends have joined, vaulting WSUAA membership growth to the top of the list for major universities of a similar size.

Why are so many joining the WSUAA? First, Cougars love WSU, and becoming a member is the easiest way to show your Cougar Pride. In addition, membership provides the opportunity to directly support students through the WSUAA's student scholarship program, enhance the regional and national reputation for WSU, assist in equity and diversity initiatives, and much more. Plus, membership dues are considered a gift to WSU and are tax deductible.

Furthermore, we've added nearly ten times the number of benefits members enjoy, making membership more valuable and appealing. To discover the growing list of innovative discounts and services (**including the NEW Alaska Airlines/WSUAA Card**) call 1-800-ALUM-WSU or visit www.alumni.wsu.edu/benefits. By taking advantage of just a few of these tremendous benefits, your membership can pay for itself.

More importantly, 98% of WSUAA members surveyed would recommend joining the Alumni Association to a friend. Meaning, members in the WSUAA are extremely satisfied with their membership experience and enjoy belonging to a meaningful organization—the nation's leader in membership growth: The Washington State University Alumni Association. Join today.

**Membership Matters.
Join Today.**

WASHINGTON STATE UNIVERSITY
 ALUMNI ASSOCIATION

uncertainty as to what potential agriculture might offer as a carbon sink, there is much need and opportunity for renewed attention by the University. The Paul G. Allen Family Foundation recognized that need a few years back when it approached WSU's Center for Sustaining Agriculture to initiate the Climate Friendly Farming Project.

Bolstered by \$3.75 million in funding, the center confronted the challenge with imagination and energy. David Granatstein, one of the main thinkers behind Climate Friendly Farming, says the project has focused on three Rs: reduce, restore, and replace.

"Reduce" means reducing greenhouse emissions, for example through anaerobic digesters on dairy farms that capture methane and improve management of nitrogen fertilizer.

Project researchers hope to discover ways to "restore" more carbon to a soil sink. But first, we must better understand carbon sequestration. Unfortunately, a computer model developed by project team member Claudio Stockle has shown that such efforts may not be as restorative as hoped, as rising temperature seems to make sequestration less effective, presenting, if you will, more challenges.

"Replace"? Project researchers are exploring the potential for replacing fossil resources with biofuels and bioproducts, and have already developed a byproduct of the dairy digester that can be used in place of peat moss in the plant container industry.

Beyond the scope of the Climate Friendly Farming Project's efforts, agriculture faces many more challenges presented by climate change. How will pest and disease pressure change? What about water for irrigation? Another computer model anticipates that annual crop losses in Yakima Valley due to water shortages will reach \$79 million by mid-century, based on warming of two degrees Centigrade.

Had we been in Wisconsin to hear Abraham Lincoln's speech, we would not have yet been aware of the irony and prescient hope that it holds for us today: "... I know of nothing so pleasant to the mind, as the discovery of anything which is at once new and valuable—nothing which so lightens and sweetens toil, as the hopeful pursuit of such discovery. And how vast, and how varied a field is agriculture, for such discovery."

—Tim Steury, *Editor*

For more information, visit:

Climate Friendly Farming:

<http://cff.wsu.edu>

President Floyd's Perspectives:

<http://www.wsu.edu/president/perspectives>

The Rocky Style

I SAW YOUR GREAT ARTICLE on Jay Rockey. Jay's was the PR firm Washington Mutual used while I was there. He did many wonderful things for us, and his style was such that you would never guess that a PR firm had touched it. That is the mark of a super PR firm. Of course I also got to see Jay and the work he did for you when I was a regent. Because I knew you turned out graduates like him, I always took advantage of being a regent and recruited for the bank at every graduation. Great guy, great school, and great article.

Lou Pepper

Mr. Pepper is the former CEO of Washington Mutual Bank and a former regent of Washington State University.

Bobo

SHANNON BARTLETT'S ARTICLE on Bobo Brayton ("Baseball's My Game," Summer '07) brought back fond memories.

Twenty years or so ago my employer, KQQQ-AM 1150, entered into an agreement with WSU to broadcast Cougar baseball games. Our broadcasts were enlivened considerably by commercials for sponsors voiced by the "Old Coug" himself.

Bobo didn't enjoy access to the financial springs that flowed into the coffers of football and basketball. So he was always on the lookout for opportunities that would benefit his program and players. Putting Cougar baseball on the radio was just such an opportunity, and Bobo was ready to make the most of it.

Bobo was a natural salesman. The commercials he recorded became an integral part of the baseball broadcasts, even catching the attention of sports writers and reporters across the region. For instance, in April 1990, on the advent of Bobo's 1,000th win, John Blanchette, sports columnist for *The Spokesman-Review*, wrote, "Take away the 999 wins and Chuck 'Bobo' Brayton still has a place in the hall of fame of the mind's eye. ... Maybe you're on the road to Lewiston or Walla Walla on a Saturday afternoon, changing the dial when the oldies station segues into static and coming up between innings of a ball game out of Pullman. 'Hey!' booms a voice bereft of even a hint of a Spanish accent. 'Que pasa, muchachos? You like Mexican food?'"

Incidentally, [that] commercial for Alex's Restaurante was so memorable that we saved outtakes and spliced them together to create a short "behind the scenes" feature, which debuted between games of a double-header against Gonzaga. For your readers who might enjoy hearing that segment, it can be found in MP3 format at www.opalousedvd.com/bobo/boboradio.htm.

*Rod Schwartz
Pullman*



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World Class. Face to Face.

Jazz Down the Middle

by Hope Tinney

A little before 8 a.m. one Tuesday last spring, the jazz band at Pullman's Lincoln Middle School, a bit bed-headed and bleary-eyed, was working on a tricky rhythm. Standing at the whiteboard in Room 806, the director, Joe Covill, wrote out the notes and sang the syncopated notation.

"This is how it looks," he said, "and this is how it sounds."

It was only a refresher lesson, one they'd heard before, not only from Covill, but from the composer himself.

Greg Yasinitsky, a music professor at Washington State University, has been the middle school's composer-in-residence for the past four years. In two days' time, this band of teen-aged musicians would perform the world premiere of "Room 806," a song they helped Yasinitsky write, and they wanted to nail it.

Two days later in the multipurpose room at Lincoln, the standing-room-only crowd applauded all of the night's music, but heaped extra cheers on the jazz band's performances of "Room 806" and another Yasinitsky piece, "Muscle Car," both written especially for this concert.

Yasinitsky is a member of The Commission Project, a national composer-in-residence program. In 2000, he started working with high school students in Clarkston, then moved to the Pullman middle school in 2002.

Ned Corman, who taught music to high school students in upstate New York for 30 years, founded the program in 1994. Corman says Yasinitsky's work is a great example of why he undertook the effort of bringing composers and school kids together. "He's one of the best," Corman says. This year 30 composers-in-residence are at work in schools around the country.

It makes a difference when students see the thought and hard work that goes into creating something beautiful, says Corman. "Almost always it is the best played piece of music on the program, and it's the most enthusiastically received."

Yasinitsky's work has been performed by famous artists like trumpeter Clark Terry and drum-

He will tell you there's no great difference between composing for middle school students and world-class musicians. "The truth of the matter is, there are always limitations," he says.

"If I'm writing for my college band, I have to think one way; if I'm writing for a high school band, I have to think another way," he says. The important thing is not to

it is bad. They know when they are being condescended to," he says.

Yasinitsky familiarizes himself with the students' capabilities and then writes a piece that will push them to the next level. "Everybody wants to play music that pushes them a little bit," he says.

And it is amazing what Covill's students can do, especially since many of them picked up an instrument for the first time just a year or two ago. Ask about their favorite jazz compositions, and Yasinitsky's are at the top of the list. "We get the background when he comes in and composes something for us," says Lauren Erickson, who has been inspired to do some composing of her own. Among her favorite songs of Yasinitsky's is "Chant Noir," a piece in which she had a featured solo.

Her classmate, Alex Kale, had no idea how unusual it was for a middle school to have its own composer until he went to a summer jazz camp. When several older, more accomplished trumpet players saw Kale's music, "They were like, 'Oh man, this is so awesome! I can't believe you guys have this!'" he says. "At that point I ... realized how important it was and how special it was that he [composes] for us."

"In a sense I'm this person who comes in who shows that I care about them and what they are interested in," says Yasinitsky. "Not only that, I'm going to make something that's special that is really just theirs and nobody else's."

Like many of Yasinitsky's other compositions, the songs he writes for this teen jazz band will be published and played around the world.

"But, it'll always have their name on it," says the composer. "It'll always say at the top, 'This was written for the Lincoln Middle School Band in Pullman, Washington.'"



Greg Yasinitsky in session with the Lincoln Middle School jazz band in Pullman. Band director Joe Covill (top center) backs up the trumpets.

mer Louie Bellson, as well as by the United States Air Force Airmen of Note, one of the few touring big bands in the country today.

"dumb down" the music, he says. Even young students with just a few years of musical experience see through that. "They know when the music is good; they know when

ROBERT HUENNER

WSU's rarest book?

Frederick Meserve's *Historical Portraits*

By Trevor James Bond, Special Collections Librarian



Each 28-volume set of Frederick Hill Meserve's *Historical Portraits* contains more than 8,000 Civil War-era photographs. Due to President Holland's determination, WSU owns one of only seven copies produced.

ONE OF THE GREAT JOYS of my job at Washington State University is the time I spend in the rare books vault in Manuscripts, Archives, and Special Collections. "Rare books vault" is a romantic way to describe two large, secure, climate-controlled rooms located on the ground floor of the Terrell Library, but it's fitting, given the treasures held within.

I've been aware for years of our 28-volume set of Frederick Hill Meserve's *Historical Portraits*, a terrific source for locating photographs of leading Americans of the Civil War era. The collection's gilt-tooled, crimson, Morocco-leather spines cry out "open me." In addition to its beauty, the set is exceedingly rare. Only seven copies were ever produced.

Frederick Hill Meserve began collecting Civil War-era photographs to illustrate his father's

military memoir. At the time, there was not much interest or value placed on 19th-century photographs. In 1902, Meserve seized the opportunity to purchase more than 15,000 Mathew Brady glass negatives. In 1913, Meserve decided to share his collection by privately printing the *Historical Portraits*. Each 28-volume set contains more than 8,000 actual photographs. A busy New York City textile executive by day, Meserve spent his evenings pasting the photos onto preprinted sheets. One of the most striking things about WSU's copy is the note in pencil on the verso of the title page:

**Meserve v. 1-4, v. 7-8, v. 27-28
Library request of Dr. Holland
2-29-45 v. 5-6, v. 9-10
gift of Dr. Holland
\$195.00 per volume.**

This little inscription is a bombshell. It tells us the provenance of the purchase and the price per volume. During the 1940s, the State College of Washington Library could buy any number of books for a few dollars. The purchase also ran counter to the inclinations of W.W. Foote, the WSC librarian, who was concerned above all else in increasing the size of the library collection by counting "pieces," which included anything that could be had for free, such as brochures and railroad time tables. Indeed, in 1943 and 1944, the library accessioned 27,637 volumes, but total accessions were 532,637 (this larger figure reflects the vast numbers of "pieces"). During the 1940s and prior to the construction of the Holland Library, the lack of space for library collections was so acute, that library materials were crammed into basements and attics across campus. Had Foote had his druthers, he certainly would have used the \$5,000 to buy several thousand books, instead of the 28 volumes of the *Historical Portraits*. Why then does WSU have a copy?

There are two reasons. Since the early 1940s, the WSC Library had developed a Lincoln collection; more importantly, President Holland wanted it. In 1941, the library acquired a major collection of Lincolniana that had been developed by C.P. Bissett, a Seattle businessman.

It's clear from President Holland's papers that he ordered *Historical Portraits* and then went about raising the money for it. In 1938, Holland had created the Friends of the Library, the first such organization for an academic library in the West. With support from two alumni, he ordered facsimiles of a portrait of

Lincoln and his Gettysburg Address and, through the Friends of the Library, sent them to 204 banks in Washington State. The resulting gifts totaled more than \$9,000. Even before it was clear that this effort would succeed, in a letter to Ralph Newman of the Abraham Lincoln Book Shop, Holland wrote, "Librarian Foote has been authorized to send a check to you for \$140 to be used to pay for the leather for the binding of the twenty-eight volumes of the Meserve collection of photographs ... I am quite sure we can take care of the purchase of six or eight volumes, and I have every reason to believe we can receive additional gifts in order that we may purchase the entire set."

To ensure that the Library received the entire set, Holland purchased four of the volumes and donated them to the library.

Reading Foote's annual report and budget request for 1946 to President Wilson Compton, we can glimpse Foote's feelings about the purchase. "Meserve Lincoln Collection ... \$2,000. This is not a legitimate Library expenditure but commitments were made by the former administration. This account should be paid through a general college fund when bills are submitted."

Today we may sympathize with Foote's position—why devote limited library resources to such an extravagant purchase?—yet feel grateful for the efforts of Holland and the many previous donors who have helped develop collections that make the WSU Libraries distinctive.

You are welcome to view the *Historical Portraits* or any of the other collections in Manuscripts, Archives, and Special Collections weekdays between 8:30 a.m. and 4:30 p.m.

LANGUAGE LESSONS

When Saad Alshahrani came to graduate school at Washington State University, he didn't speak a bit of English.

Added by the long flights from Saudi Arabia, he tried to walk out of the airport in Seattle. He didn't understand that his new home was still 300 miles to the east. The airport officials put him on a small plane to Pullman, which left him in a near-empty airport just after midnight.

"Imagine that," he says. "I didn't know anybody. No taxi, and no hotel."

Fortunately, Devon Anderson, who works for the WSU Foundation, saw Alshahrani get off the plane. She understood that he was a new student. She found him a place to sleep. The next day, she helped him find his way at the school.

Now Alshahrani is a third-year doctoral student. He speaks fluent English and is progressing quickly in his studies in economics, natural resources, and statistics. And in his spare time he teaches Arabic to American students.

"I had time," he says. "And I thought ... I could teach something about my language and tradition."

Before attending graduate school, Alshahrani had never visited the

United States. He finished college in Saudi Arabia as a math major, and the country's central bank offered to send him abroad to study natural resources and economics. "They offered me a job," he says. "But in order to get that position, I have to have a degree in economics or anything related to economics."

He chose WSU because of Ron Mittelhammer, director of the School of Economic Sciences. The economist specializes in econometrics—the combination of statistics with economic theory. His books are well known in Saudi Arabia, and Alshahrani wanted a chance to work with him.

In Pullman Alshahrani was intensely homesick for a time, and he struggled with the differences in language, food, and culture. He thought about going home, but then decided to settle in, adapt, "work hard and prove myself," he says. He powered through his intensive English courses, passing each level the first time. "He was just so willing to take risks and try," says Jeannie Bagby, an instructor at WSU's Intensive American Language Center. "And he's really gifted about learning language."

Since then, he has taken on duties as an ambassador for other Saudi students coming to Pullman, and he reaches out to non-Arab students who want to learn more about his language and culture.

Last year, after being asked by several students for private lessons in Arabic, Alshahrani went to the Department of Foreign Languages and Cultures with a proposal to teach a beginning course on language and culture. The instruction he received in his first months at WSU provided him with a good framework for teaching another language, he says.

The department OK'd the idea, requiring that at least six students sign up for the summer Arabic course for it to run. Within the first few days of registration, 14 had signed on. "We even had a waiting list," says Alshahrani.

He designed the course for students with no prior knowledge of Arabic. Using videos and textbooks, and enlisting the help of other native speakers, he immersed his class in a daily dose of the language flavored with stories, music, and details from his life back home.

Mary Cookson signed up for Alshahrani's summer course for the

experience of learning a new, very different, language. "It's not an easy class," she says. "But I have loved it."

Cookson plans to teach English as a second language and is enrolled in a University of Idaho master's degree program. "They want you to have a recent experience with a foreign language so you can have empathy with your students," she says, explaining her pursuit of Arabic.

The summer class was not typical for an undergraduate foreign language course, she says. "I am 56 years old, and there are people older than me and some who are very young. It's just a real eclectic group of people."

"I like my students," Alshahrani says. "They all seem very interested and hardworking. The worst score in my midterm was A-minus."

He says teaching the class further connects him with the community and gives him a creative outlet.

Settling into his favorite off-campus hangout, Zoe Coffee, Alshahrani grins as he talks about his expanding role as student, friend, teacher, and ambassador at WSU. "Pullman? I love it. When it's time to work, this place makes you work," he says. "But there's also room for fun."



Saad Alshahrani (center) has carved time out of his graduate studies to teach Arabic to American students. Lauren Edholm (right) and Jennifer Cupp meet with Saudi Arabian student Emad Alsubhi to practice what they learned in Alshahrani's class.



THE COUGAR WEARS PRADA

FLORENCE, ITALY—She'd perused the vintage vendors on London's Portobello Road and seen the Chanel logo stamped onto the most prestigious silk in the world in Como, Italy.

By her first morning in Florence, with its supple leather, luxury textiles, and elegant, well-heeled locals, Katy Daly's fingers were getting restless.

"I really need a needle, thread, and some fabric right now," said Daly, of Kent, Washington. By afternoon, she was winding through the narrow cobblestone alleys in the shadow of Giotto's bell tower with a small scrap of paper on which she had penciled the word *merceria* in hopes of finding an Italian haberdashery shop with a few basic sewing utensils.

It's a world away from her grandmother's cozy living room near Wenatchee, Washington, where the 21-year-old design student first learned to quilt on a 1920s Singer sewing machine. Daly is one of the dozens of Washington State University students in the Department of Apparel, Design, Merchandising and Textiles who head to Europe each year for an inside look at the haute couture fashion industry. This year, 33 students traveled with two professors to Harrod's and Marc Jacobs in London, Prada and Salvatore Ferragamo in Florence, Madame Pico and Jean-Charles de Castelbajac in Paris. And of course the Uffizzi, the Eiffel Tower, and other memorable monuments. The study tour program, in its fourth year, had to cap participation and create a waiting list due to growing demand, a trend reflected across the U.S. as the global marketplace expands.

"Definitely, there is going to be a growing distinction between those who graduate with international experience and those who don't," said University of Bologna political science professor David Ellwood, a noted globalization expert. Ellwood, also an adjunct professor at Johns Hopkins University School of Advanced International Studies in Bologna, Italy, lectures on the cultural dimensions of American power and the power dimensions of American culture. In today's job market, Ellwood said, employers value experience beyond the U.S. borders. That means the best students want international experience—which creates competition for college recruiters—and some of

the best jobs go to students who have had it, especially in fields like fashion.

"We have to address the globalization of our industry," explained Joan Anderson, an associate professor at WSU who helped found the program. "The fact is there's not that much that goes on in the U.S. anymore, except for consumption. The design, the production, the labor ... most is being done abroad."

A garment might be designed in Paris, hand sewn in India, marketed in New York, and sold in Milan. A handbag being produced and sold at the Scuola di Cuoio (Leather School) in Florence, might retail for €4,000, not only because of the high-quality craftsmanship and unique design, but also because the crocodile comes from the Nile River, the handle is an antique necklace from China with semi-precious stones, the lining is a special lambskin from Australia, and so on.

"This gives them an opportunity to finally see with their own eyes what we have been learning in my international trade class," says professor Lombuso Khoza, as her pupils watch leather artisan Francesca Gori meticulously sewing her designer handbags in a back room of the converted Monastery of Santa Croce in the garment district of Florence. "This is great for our students. I tell them, you are going to have a leg up on your peers."

Before leaving WSU for a position in Maryland, Khoza accompanied her students on what was for many of them their first trip abroad—a chance to visit three of the five big centers of fashion—New York, Los Angeles, London, Paris, and Milan. China, too, is increasingly playing a role in textiles, much to the chagrin of traditional high-end Italian garment and fabric bottegas like the renowned Casa dei Tessuti in Florence. Founded in 1929 by Egisto Romoli, Casa dei Tessuti—the original "House of Fabrics"—is now tended expertly and passionately by the founder's two sons and grandson.

Romano Romoli pedals up to his storefront on an old but sturdy black bicycle, his gray hair neatly combed, one hand gripping the handlebars, the other holding a fragrant red rose, which he hands to Anderson with the customary kiss on each cheek. He picked the rose

from his own garden, he explains later, and gives it as a token of thanks to the Americans who liberated Florence from fascism.

Inside, several rows of chairs have been set out between the floor-to-ceiling wooden cabinets filled with bolts of the highest-quality silks, wools, cottons, crepes. Once the students are settled, Romoli begins his lesson. This is the fabric the queen of Holland is having a dress made from, he says, picking up an ivory silk, and this, he says of a rich red brocade embroidered with gold thread, is from 16th-century Renaissance Florence. Here's a piece of fabric from a dress worn by Marie Antoinette, and yes, that intense swirled blue-green-violet fabric is woven from peacock feathers, he explains. A poet and a scholar, Romoli is a true Florentine renaissance man with extensive expertise in Etruscan history, literature, archaeology, and economics for starters. But above all, he is a fabric merchant and expert, who often lectures to visiting European and American students on the history of fabrics and fashion in Florence—when he's not tending to customers like Gianni Versace, Yves Saint Laurent, or Giorgio Armani.

After a refresher on the major and minor guilds and a historical overview of the marriage between fashion and fabric—it all began here in Florence, with Catherine de' Medici—Romoli is ready to drape. One by one he calls students to the front to stand with their eyes closed before a full-length mirror. After 15 seconds or so, he bustles over to his bolts and whisks out what he thinks best suits each student, then drapes and tucks her into great swaths of textiles and praise.

"You see, fabric is our second skin. For every person, and especially for every woman, you need the proper fabric. Each is a piece of art and each woman can become a queen."

This line provokes a few chuckles from the group of down-to-earth—and all female—students, most of them Washington State natives raised far from the monarchy. But they play along, warming quickly to Romoli's old-fashioned Italian charm, refreshingly politically incorrect by American standards.

"You see... her beauty is so strong, so powerful, she needs something that will calm it, you see? Like the sunset," he says, draping a dusty peach silk across brunette Gina Harb, 21.

"And this?" he says of Kristi Bleich in a light blue crepe. "Isn't she an angel? If one were to pass by they might ask, 'Where have you left your wings?'"

Marissa in teal satin—*Bellissimo!* Britney in cherry red—*Meraviglioso!* Jennifer Harrison in peach chiffon. *Bella! Bella!* For Kathi Moser, being draped in Chanel boucle was an opportunity to see "the other side of the coin." Moser, who accompanied her 21-year-old daughter, Marissa, on the Italian leg of the trip, has worked for 35 years as a buyer at Nordstrom in Seattle, where, she recounts, accessories are on fire.

Marissa isn't the only Cougar whose mom tagged along. Brittany Blazier, 19, arrived in London with her mother, Debbi, 42, and grandmother, JoAnn Cooper, 68, in tow. The Seattle mom-grandma duo both signed up for one credit and got Cougar cards in order to come. It was the first time on European soil for all three generations.

After a week, Blazier noted what a different experience it was from studying in casual Pullman, where it's ball caps, jeans, and t-shirts "or whatever's at Macy's in Moscow," she said with a laugh.

The everyday elegance, the history, and ancient traditions all made a predictable impression. But what caught most students by surprise was the weak dollar and America's tarnished image abroad.

"They were quite concerned about our national position on a global scale—with the war in Iraq and the strength of the American dollar, for example," Anderson says of the students' overall impressions. "They were really quite surprised that we were two-to-one against the pound."

Students were surveyed on their knowledge before and after the trip. The resulting data will be eventually used for research on experience-abroad programs and published this fall, Anderson says.

"The industry information... we can teach that. It's the cross-cultural experience that you can't learn in a textbook. They gain a greater appreciation of other cultures, of different ways of doing things... [for example,] that you just don't go shopping on Sunday in Paris because everything is closed."

Or the fact that in much of Europe, smoking is still cool and fur is not faux.

While these students might not think twice about biting off a piece of elk jerky, the unapologetic use of exotic animal skins and furs in the European fashion industry seemed to touch a nerve. Walk into some Seattle coffee shops wearing a mink stole and stingray shoes, and you risk touching off another round of WTO riots. But in much of the Old World, furs are still a sign of affluence, to be worn proudly at the slightest autumn chill. At a presentation of exotic animal skins used in the production of shoes, bags, and accessories at the Scuola di Cuoio, the Italian guide matter-of-factly addressed the topic from the outset: "I'm sorry. But we are going to talk about animals today," she said as she pulled out large flaps of ostrich, crocodile, and stingray. In London, a hat designer for Vivienne Westwood and Gucci didn't even bother with a disclaimer when exclaiming her affection for fur.

"She said, 'Fox is absolutely my favorite animal to work with,'" recalled Katy Daly, "and I was like, 'oh, those are the cutest.'"

Daly is quick to point out that she is "definitely not a PETA person," referring to the animal-rights group People for the Ethical Treatment of Animals.

"I wear leather, I eat meat. Cows are okay. I don't have a problem with cows," Daly said, while peering into the display cases at the Salvatore Ferragamo museum of shoes. "But I don't think you should kill a sea leopard or an antelope for a pair of shoes."

Nevertheless, the tour expanded Daly's horizons just in time for her to start her post-graduation job search next summer. "I realized during this trip that yeah, I could do this," she said. "I could adapt to living in London. It was really an eye opener." ●

Andrea Vogt migrates between Washington State and Italy and is equally comfortable in designer wear and a WSU sweatshirt.

Left: Inside the Casa Dei Tessuti (House of Fabrics) bottega in Florence, Italy, Kelle Jones and Courtney Schenfield admire the gold thread woven into a Florentine brocade from the 1500s.



ANDREA VOGT

History was made...

THE FIGHT FOR EQUITY FOR WOMEN'S ATHLETICS IN WASHINGTON

by Hannelore Sudermann



As graduates of Washington State University's master's-degree program in physical education, and later, as coaches and members of the faculty, Jo Washburn '64 (*left*), and Sue Durrant '62 (*center*) had an interest in seeing women athletes get an equal share of the University's resources. Karen (Blair) Troianello '80 and her teammates did too. Thirty years ago they and their colleagues and classmates won *Blair v. Washington State University*, a landmark women's rights case that changed the way Washington's public colleges and universities support women's athletics.

BACK IN THE LATE 1960s, when Jo Washburn was athletic director for women's intramural sports at Washington State University, she had to stretch \$1,200 to cover all the expenses of the volleyball, gymnastics, basketball, field hockey, skiing, and tennis teams.

Women's athletics was a second-class affair. The athletes had to carpool to away games and sleep four to a hotel room to save money. They had to buy their own uniforms. They helped set up spectator seating for their meets. And they trained only when the facilities weren't being used by the men's teams. Few, if any, received athletic scholarships.

Meanwhile, their male counterparts traveled in chartered busses, had access to private locker rooms, and enjoyed the full support and resources of the athletic department.

Title IX, a 1972 federal law mandating gender equity for any educational program or activity that received federal financial support, was supposed to change all that. If that weren't enough, that same year, the Washington legislature added an equal rights amendment to the state constitution. Both provisions said that women deserved an equal share of public resources, including funding and access to facilities.

But WSU's administrators, like those of other schools around the country, were slow to improve the experience of women athletes. So in 1979 the students, along with their coaches, sued the University. *Blair vs. Washington State University* became a landmark women's rights case for Washington, setting a precedent for all public four-year colleges and universities in the state.

Track athlete Karen (née Blair) Troianello '80, was the lead student plaintiff. Coach and faculty member Sue Durrant '62 represented the coaches and faculty. Thanks to their testimony and the support of other

athletes, coaches, and educators on campus, equity prevailed and history was made.

This year marks the 35th anniversary of Title IX and Washington's Equal Rights Amendment and the 30th anniversary of Washington State Supreme Court's ruling in favor of WSU's women athletes and coaches. *Washington State Magazine's* Hannelore Sudermann talked with retired faculty members Jo Washburn '64 and Sue Durrant and alumna Karen Blair Troianello about their memories of the suit.

JO WASHBURN: There had always been inequity between women's and men's sports, but I don't think it really came out in the open until Title IX. When it passed, there were meetings all over campus to talk about inequities. We knew the law said we had to change, but there were people crying that this will be the doom of college athletics. There were others on campus who said, "we'd like to help [women's sports], but we can't hurt the men's sports."

SUE DURRANT: We were into the 70s before we really had team uniforms. The students supplied their own equipment You were constantly running into barriers

and trying to figure out strategies to get around them.

KAREN BLAIR TROIANELLO: When I was on the women's track team, our sweat suits were hand-me-downs from the men's team. The men's coaches were full-time coaches. The women's had to both teach and be a coach. I was on a student board to look at the inequities, and they were pretty obvious.

SD: We assumed the University would do the right thing. Wrong. They drug their feet and drug their feet. Following Title IX, all institutions had to do self-studies. Not just athletic programs, but academics, living arrangements, and honor societies Then you made recommendations as to how to improve the situation. We did. And, well, nothing happened.

JW: We wrote reports, reports, reports, trying to get the University to see that we could be the leader here. Well, we ended up being the leader, but not how we thought we were going to be.

SD: The high schools were improving their programs. We were starting to get students in who said, "How come it's not better here? It's not as good here as what we were experiencing in high school." They started to become more vocal

in terms of the discrepancies. The [women] student athletes started saying, "How come we can't go by bus?" We said we can't afford it. They just thought that was ridiculous. We can do it for the men. They started noticing a lot of the discrepancies. A group of athletes filed a Title IX complaint. A year from then, nothing happened. Additional ones filed a second Title IX complaint.

KBT: I was just there willing to take a stand. I loved WSU. I always wanted to go there. It's where my parents had gone.

SD: We didn't want to file lawsuits. But after two efforts at complaints with the athletes [they grew frustrated]. A lot of the students lived on the west side of the state. They discovered this fledgling Northwest Women's Law Center in Seattle. We were their initial big case. They filed a lawsuit under the state equal rights act, because Title IX hadn't been tested yet. The state ERA already had been tried in public schools, and was resolved in favor of the women athletes.

KBT: I wanted ... things to be fair for people like me who really wanted to compete and who really worked hard at it.

SD: We met with the lawyers and talked about what was going to

happen. A lot of us [on faculty] were tenured, so we felt they couldn't just immediately push us out the door. We had some sort of assurance that we couldn't be fired outright for insubordination. It was very clear from the beginning that no matter who won the case, it was going to go on appeal [W]e talked about what the pros and cons were and that it was not going to be a pleasant experience.

KBT: I think it was tough for people like Sue and Jo, who put their jobs on the line. Students cycled through in a few years. It was easier for us.

SD: The suit was not what we wanted to do. We tried everything else. We tried to be rational and reasonable. We were left with no alternative. They didn't even ... try to settle out of court. I think all the way through, they thought they were going to win this one.

JW: Sometimes it was eye opening in terms of who was on your side. People would come up and talk to you, but they wouldn't do it overtly. They'd do it quietly. "We support you, but don't tell anyone."

SD: It was our intent to improve conditions for athletes, not to better ourselves. Our purpose was to make conditions so that women had more opportunities to be athletes at Washington



State University. When the lawyers were doing their discovery, we were in the buildings at 5:30 in the morning to view locker rooms ahead of anybody being in them. Male athletes would make the assumption that female athletes had the same resources. They had no way of knowing ... [for example] that we had one big locker room that served everybody—the general student population, faculty, athletes—just one big locker room in the basement of Smith. That's all there was.

It was just a complicated case. So the initial ruling [generally in favor of the women athletes, but excluding football from the equity considerations] was not a big surprise.

Even though the University was guilty of gender discrimination in athletics, some of the fine print within all that did not match up.

Everybody was so burned out at the end of the lawsuit, even our lawyers were saying, "Are you sure you want to go ahead?" I said, "We didn't come this far to stop now." So we appealed.

In 1982 the *Blair vs. Washington State University* appeal went to the

state supreme court. The plaintiffs argued that WSU's football operations should be included in determining how much money should be allocated to provide equity in women's sports. In 1987 the supreme court agreed, noting that the state equal rights amendment contained no exception for football.

In the immediate aftermath, soccer joined the list of women's

sports offerings. A year later, women's crew was added. Scholarships were established, busses provided. Today, according to the most recent report, women's sports has nine teams, an operating budget of more than \$1.6 million, and \$2.2 million in athletic scholarships. ●

ONE HUNDRED YEARS OF APPLE CUPS

THE FIRST CONTEST between cross-state rivals Washington State and the University of Washington took place on a muddy field in Seattle in November 1900. The Washington Agricultural College "Farmers," as we were known then, made the 290-mile trek from Pullman to Seattle to play the UW "Sun Dodgers" in the pouring rain. The match ended in a five-to-five tie.

Because the two teams will play their 100th game together this year, we thought we'd take a look back at the history of that long relationship.

Meeting up with the UW just after the turn of the century was a spotty endeavor. After the first five annual matches—a tie, one win, and three losses for Washington State—the rivalry went on hold for two years. Then we met for another two years, but skipped a few seasons through the early teens. It's

not that Washington State didn't have an organized team. In fact, during one missed season, 1915-16, we went to the Rose Bowl. But in the early years, the University of Washington always demanded we go to Seattle for the game, says Dick Fry, retired director of WSU sports information and author of *The Crimson and the Gray*, a history of the WSU Cougars. Back in the early 1900s, Washington State's athletic director, Fred "Doc" Bohler, said, "Hey we're not going to go over there every year," according to Fry, who says that the Cougs had no trouble finding games, playing teams like Oregon, the University of Southern California, and Montana.

The rivals skipped two more years starting in 1943, when Washington State, along with Idaho, Oregon, and Oregon State, cancelled football

for the duration of World War II. The Cougars didn't see the Huskies again until 1945. The two teams haven't missed a contest with one another since.

Until 1962, the annual WSU-UW game was known as the Governor's Cup. Then Washington's apple industry started a sponsorship, and the historic contest was renamed. This year, Boeing joined the fun with a four-year sponsorship of around \$1 million.

To see a slideshow with images of past AppleCups, visit *Washington State Magazine Online* at wsm.wsu.edu.

—Hannelore Sudermann



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FIELD

CAMP

by Tim Steury

TOP PHOTO BY JOHN SNYDER

Richard Daugherty—"Doc"—can't remember where exactly the site was in relation to the present reservoir created by Lower Monumental

Dam on the Snake River. He'd been holding out a little hope that maybe there would be some sign of the work he had supervised during that summer 50 years ago.

"It's sure good to see it again," he says, but admits that he doesn't recognize much. The native village that he and his students had excavated now lies under 30 or 40 feet of water. Many of those former Washington State College students now stand around with him in the early summer heat and reminisce, picking out geologic features, remembering the sweat and sunburn and—judging by the many stories floating around—the great fun they had while they were making their contribution to archaeological knowledge.

"Where's the railroad?" asks one former worker.

Underwater, says Bill Harder, whose land we are on and who is the source of the Harder Site's name. Harder had met the group in Kahlotus, the nearest town, and led the way down to the river.

This visit to the site is the conclusion to a reunion of the former students and archaeologist who labored under the eastern Washington sun all those years ago. One field camp member has since died, and another couldn't be tracked down, says Marilyn Dillsi '59, who seems to have been the

chief instigator of this reunion. But most of the rest had heeded her suggestion they regroup and recall their summer together.

Daugherty and his student crew excavated two large house pits, each nearly 40 feet in diameter. Like others in the area, the 1957 dig was an attempt to assess the history of native people of the area before the series of dams on the lower Snake buried the ancient villages under water. In spite of efforts by Daugherty and ge archaeologist Roald Fryxell, only a portion could be surveyed, and much evidence is now submerged. Just within the reservoir created by Lower Monumental Dam, there were maybe 30 other occupation sites, says Daugherty.

Once Congress approved the building of four dams on the lower Snake, archaeologists surveyed the area for sites that would be destroyed by the reservoirs. Eleven habitation sites were recommended for excavation. Yet undiscovered was the Marmes rock shelter upstream, which would be frantically excavated by Daugherty and Fryxell in a race against the flooding by the completed Lower Monumental Dam in 1968. The Marmes shelter revealed that humans had occupied the area for at least 11,000 years, far longer than what had previously been thought.

Tragically, an attempt to protect the site against the rising reservoir with a dike failed, and whatever additional knowledge we might have gained about the region's earliest inhabitants now lies beneath 40 feet of water.

"Down at the mouth of the Palouse was a big village," Daugherty says, "but this was more recent and smaller."

The results of the 1957 dig became the subject of a thesis by Monte Kenaston ('66 M.A.) several years later. Carbon dating of the lowest occupied layer dates the first occupation between A.D. 187 and A.D. 687. A great number of artifacts had been retrieved from the site, including stone projectile points, knives, and scrapers, and bone awls. Kenaston concluded that residents of the site probably depended heavily on elk and bison, which later disappeared from the area, but also ate fish and fresh-water mussels.

The field camp was notable not only for its heat and dust, but also for being the first sponsored by WSC to include women. It included seven males and eight females. Dillsi credits Daugherty for the breakthrough and praises him for encouraging female graduate students.

A mixed-gender camp undoubtedly added to the sociability of the summer. Monita Engvall Horn '60 wrote home regularly and shared her epistolary account with the others.

Although the work itself got some mention, most of her letters deal with the heat and the pranks and interaction of the group: "After the digging began in earnest we had fun," she writes. "Whenever the wind blew, and there was almost always a breeze, the dust came with it. After leaving the pits we were coated with dust and looked more like coal miners ... than archaeologists. The river was the first place everybody headed. It was swift and later became shallow and warm, but at the time it was cold. Most of us would rather freeze than remain mudpies. There were very few flowers in the area. When we arrived the hills were overgrazed and parched and when we left they were more parched. There was very little time to collect flowers and with the heat and rattlesnakes, less ambition."

Now, 50 years later, it's still hot here on the flank of the canyon. Hot and dusty. The decision is unanimous to head back to Kahlotus for shade and lunch.

Top photo: Archaeologist Richard Daugherty reminisces with field camp students about the summer of 1957.

For more photos of both the '57 field camp and the 50-year reunion, visit wscn.wsu.edu.

1957

I N S E A S O N

Pears

by Tim Steury

“They
resemble
nothing
else.”

—Wallace Stevens,
A Study of Two Pears

There are few things finer than a perfectly ripened pear. We Washingtonians are thus among the luckiest people on earth, because after wide geographical and temporal wandering, the pear seems to have found its true home in our state.

That being so, is it not strange that the pear is not more popular? The question is hardly new. In fact, U.P. Hedrick, in the monumental and beautiful *Pears of New York*, spends three large pages exploring why, even in 1920, the pear was not more widely eaten.

Given that Washington grows more than 24,000 acres of pears, it would seem that many people do enjoy them. However, this compares to well over 160,000 acres dedicated to apples, and Washington is currently by far the largest pear-growing region in the country.

Apples are, in fact, part of the pear's problem. The seasons of both, for the most part, coincide. Apples are more direct, both in use and in taste, than the pear, though my point should not be interpreted as disparaging the apple—or the pear, for that matter. Edward Bunyard, author of *The Anatomy of Dessert*, perhaps the greatest paean to fruit ever composed, wrote that

“The pear must be approached, as its feminine nature indicates, with discretion and reverence; it withholds its secrets from the merely hungry.”

The pear, in other words, can be a little intimidating to the uninitiated. How many shoppers have poked a hard pear, wondered how to treat it, and then picked out apples instead, which can be eaten directly from the store or the tree?

Pears just are different. For one thing, unlike apples, they will continue to ripen once

through cold storage, so that it develops a perfect soft, buttery texture.

Interestingly, that perfect texture comes about as a result of another potential imperfection. Pears, like apples, ripen from the inside out. As the seeds ripen, the tissue senesces, giving off ethylene that ripens everything else. When that core gets too old, it becomes soft and brown.

This is exacerbated by high amounts of carbon dioxide, which inhibits respiration and causes the pear



plucked from the tree. In fact, if they are allowed to ripen on the tree, most commercial pears will become gritty or “sandy.”

Once past a certain point of development, the pear acquires sclereid or stone cells, says John Fellman, our post-harvest horticulturist. These cells give the ripening fruit structure, as well as a sandy texture. However, if the pear is picked at just the right time, when it is mature, but not ripe, it can be conditioned

to suffocate. The CO₂ does not diffuse well in the pear, as it does in the apple, which has more air space. However, the condition in the pear that inhibits the diffusion, the hydration of the polymers and such of the cell walls, is

what gives the pear its silky texture.

I recently read H.B. Tukey's *The Pear and Its Culture*, published in 1928. In the 1920s, Tukey introduced dwarfing rootstocks for apples at the New York State Agricultural Experiment Station and became horticulture chairman at Michigan State in 1945.

He was the father of Ron Tukey, extension tree-fruit horticulturist at WSU until his

death in 1987 and the namesake of the WSU Tukey Orchard. Ron's brother, Harold Jr., was the director of the Center for Urban Horticulture in Seattle. Another brother, Loren, an internationally known pomologist and educator, was extension tree-fruit specialist for four decades at Penn State until his death in 1998.

What struck me about the elder Tukey's book is that not a whole lot has changed regarding pear culture since 1928, at least apparently.

However, says Tim Smith, an Extension horticulturist for Okanogan, Chelan, and Douglas

counties, we now live in revolutionary times. Pear packers have learned from the banana industry. Bananas are also picked green, then ripened with ethylene. For the past couple of years, pears have been treated similarly, with a preconditioning process. In fact, says Smith, pears you buy in the grocery are guaranteed to ripen within a week of your buying them.

Not that they were really all that difficult to ripen before. They just have this mystique of being difficult and not entirely predictable. If your pears haven't been treated with ethylene in the packing house, just put them in a paper bag when you get home. Or put them in a bag or bowl with a banana, which exudes large amounts of ethylene. The pears will ripen within a few days.

But the greatest revolution is probably coming on the genetic side, says Smith. Amit Dhingra, a genomicist, recently joined the horticulture and landscape architecture department to address any number of genetic issues in fruit, focusing currently on apples, pears, grapes, and cherries.

Pear growers in Washington have singled out a couple of pear issues that they'd like people such as Dhingra to address. First is tree size. Whereas the apple industry has indeed been revolutionized by dwarfing rootstocks, no one has developed a satisfactory dwarfing rootstock for pears. What this means is the trees are not as easily harvested and, most important, take longer to bear.

The other thing Dhingra is addressing is the time to flowering. Pears take several years to

flower. Not only is this economically frustrating for growers who plant new stock, it requires of pear breeders the patience of a Zen monk.

Researchers elsewhere recently announced that young apple trees have been induced to flower at four months of age. This means nothing toward commercial bearing. What it does mean is that genetic material can be extracted from that apple and examined for favorable traits, such as resistance and flavor.

Dhingra plans to get pears to do the same—which does not happen through traditional horticultural means. Rather, he employs what he calls CSI, or controlled sport induction. A sport is a mutation that may display a trait better than its parent. He uses gamma radiation to create mutations in the genetic material. Even though useful mutations are rare, those rare instances can offer nice surprises. The ruby red grapefruit, for example, is the result of radiation-induced mutation.

Pears possess an ancient provenance. The genus *Pyrus*, of which the pear is a part, probably originated in western China. The common pear, in all its thousands of named varieties, has been cultivated and savored in Europe and Asia for centuries. One of the earliest mentions of the pear in Western literature is the passage in the *Odyssey* where Odysseus lingers in Alcinous's garden, which grew the "gifts of the gods," pomegranates, apples, and pears.

Over hundreds of years, the challenge the pear presents to the impatient consumer has for gourmands promised the increased pleasure that follows anticipation. Another trait that

sets the pear apart from the apple is that it's been slow to change, even in its named varieties. The Bartlett, known as the Williams Bon Chretien or Stair pear in Europe, is over 200 years old. It is still the leading commercial pear in Washington.

But increased competition, particularly from China, is pushing the pear industry to think change and variety, and Dhingra hopes to help induce new varieties through his CSI. Developing a new variety currently takes at least 25 to 30 years. Shortening the time to flowering with a favorable mutation would greatly reduce the time it takes to develop a variety.

Currently, there is only one active pear-breeding program in the country, a USDA effort in Virginia. Dhingra says an understanding has been reached, by which the program will move to Washington eventually.

Meanwhile, the dominant commercial varieties in Washington will satisfy. And in spite of my earlier discussion, don't, says Smith, be too particular about when you eat that pear. A crisp pear can be just as sweet and flavorful as a buttery one. In fact, crisp pears are preferred in Mexico, where many Washington pears are shipped.

The climate that makes Washington ideal for grapes and apples serves pears equally well, says Smith. Cool nights, warm days. Aridity that discourages disease.

But then, as if he's just remembered, Smith drifts off on a wistful reverie about the first time he tasted pears poached in wine ...

Center: Bartlett pear, from *The Pears of New York*, U.P. Hedrick, et al., New York Department of Agriculture, 1921.

Creatures from the Dark Lagoons

by Cherie Winner

Unheralded microbe helps
WSU scientist solve puzzles
of DNA repair

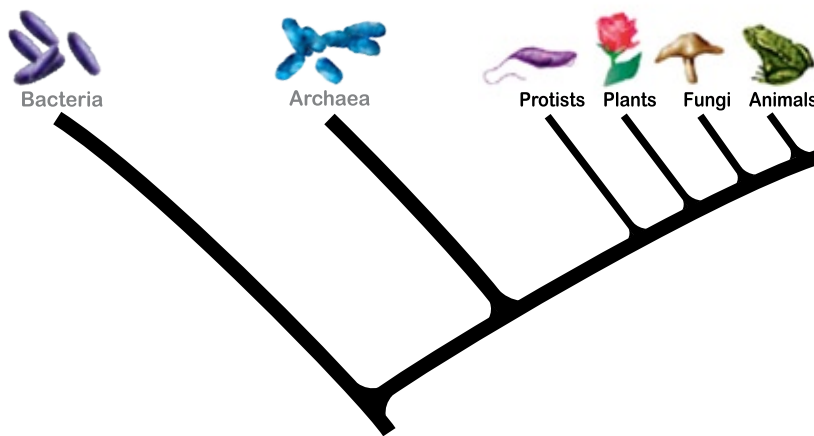
CYNTHIA HASELTINE wants everyone to know that the microbes she works with are not bacteria.

They look like bacteria; each *Sulfolobus* is a single cell that has one circular chromosome and lacks a nucleus. But in their genes and the way they read and repair their DNA, these organisms bear a closer resemblance to us than to bacteria—and those similarities make *Sulfolobus* an excellent model system for learning about how our cells handle DNA, and how the process sometimes goes wrong.

Haseltine's microbes belong to the group of organisms known as Archaea (ar-KAY-uh). Most Archaea are extremophiles, living in hot, saline, acidic, or other extreme environmental conditions. *Sulfolobus* is partial to pools hot enough to scald and as corrosive as battery acid. For years after the discovery of Archaeal species in the 1970s, scientists called them "Archaeobacteria," a name that indicated both their evolutionary age and the assumption that they were members of the bacterial clan.

"Everyone thought they were just really weird bacteria that lived in really strange places," says Haseltine. That changed in 1996, when the first Archaeal genome sequence was published. It turned out that Archaea aren't kin to bacteria after all. On a tree-of-life diagram based on similarity of DNA sequences, bacteria are on the left and eukaryotes, those organisms (like us) with multiple chromosomes enclosed by a nucleus, are on the right. Archaea lie in between, but closer to the eukaryotes. In other words, they're more closely related to you and me than they are to *E. coli*.

NORHLIGHT IMAGES, KEITH COOPER



exactly the same thing, just without all the fancy extras. So we're trying to figure out how the Model T works."

Research on Archaeal recombination proteins has already provided insights into the development of breast cancer. A few years ago a major strand-exchange protein, which helps swap a damaged section of DNA for a correct section, was isolated from an Archaeal that lives near deep-sea thermal vents. When biochemists took a closer look, they found that the protein, RadA, is almost identical to a human recombination protein called Rad51. That caught the attention of researchers studying Brca2, a protein linked to the development of breast cancer. They knew that Brca2 and Rad51 worked together, but they couldn't tell how, because Rad51 always fell apart soon after being purified. Scientists were able to use the sturdier RadA as a stand-in for Rad51 in lab tests, and solve the puzzle of how Brca2 interacts with it in the human DNA-repair system.

RadA isn't the only Archaeal protein that's tougher than its human counterpart. Most eukaryotic proteins must be kept cold, and even then, they can degrade within an hour of

Archaea resemble bacteria, but based on their DNA sequences, they are more closely related to plants and animals.

Haseltine uses *Sulfolobus* to study DNA recombination, the essential process of swapping strands of DNA between chromosomes. Recombination occurs during DNA repair and, in eukaryotes, during the production of eggs and sperm. If something goes wrong in the process—if a cell can't recognize the strands to be swapped, cut out the relevant sequence, or make and

splice in an alternate version—death or disease results.

In eukaryotes, at least 30 proteins are needed to perform recombination. *Sulfolobus* accomplishes the same actions with just a handful. Haseltine compares the human system to a Cadillac and *Sulfolobus* to a Model T.

"They're both cars; they both go," she says. "[*Sulfolobus*] is a very, very simple one. It does



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being purified. Since *Sulfolobus* grows in very hot conditions, its chemical components are well adapted to heat. Room temperature doesn't faze them at all.

"You can purify a protein and put it on a shelf for four years, and it'll be good," says Haseltine. She points out that since *Sulfolobus* normally lives at 80°C, being at room temperature of 25°C is comparable to being frozen. "That's a 55°C difference in temperature," she says. "For *E. coli* growing at [human body temperature of] 37°C, a 55-degree drop puts it at minus 18°C"—well below the freezing point of water.

The downside of Archaeans' thermal quirks is that most of the standard techniques for purifying and testing proteins were designed to run at cold temperatures. *Sulfolobus* proteins don't function in the cold. Haseltine has had to adapt common lab assays to work at high temperature and low pH. So far her methods have been very successful; she's been able to purify a number of recombination

proteins from *Sulfolobus* and is now pursuing experiments to find out exactly how they contribute to recombination.

Haseltine is also trying to spread the word about Archaea. She understands that they're still unknown to most people. She had never heard of them until she did a grad school rotation in an Archaeal lab. It didn't take her long to throw in her lot with the odd organisms.

"I thought, wow, they grow in boiling acid. That is so cool! Nothing should be growing in boiling acid. Seriously! ... I've never gotten away from the coolness factor."

She says she's seen coverage of Archaea in biology textbooks grow from a paragraph, to a paragraph plus a picture, to a few pages.

"Over time it's gotten better," she says. "Now we actually get three pages of a chapter. But often the instructors will skip it"—probably because they themselves don't realize how significant Archaea are.

So far, most of the interest in Archaea has come from biotech firms quick to recognize the commercial potential of enzymes that will work under harsh conditions. The starch-



COURTESY CYNTHIA HASELTINE



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digesting enzyme from *Sulfolobus*, for instance, was first isolated by a Japanese company that put it to work in a high-temperature beer-brewing process.

Archaea were first collected from Yellowstone hot springs, and Haseltine and her students visit the park as often as they can to collect fresh samples of *Sulfolobus*. They skip the sparkling blue and green pools (which have neutral or high pH) and head straight for the murkiest mudpots. "We pretty much look for anything that's got a low pH," she says. "Anything that smells sulfury. The pools that the public walks by and goes, 'Eww, that's nasty!,' we're like, 'Yay! They're going to be in there!'"

Sulfolobus's wide distribution—it also lives in hot pots in Italy, Iceland, Japan, and New Zealand—raises the tantalizing possibility that Haseltine could find a source right here in Washington.

"That's one of the reasons I'm really glad to be here at WSU," she says. "It's a volcanic state. My bet is that within reasonable driving distance, there's going to be hot springs here that have *Sulfolobus* in them"—possibly unique species that will offer new perspectives on how our cells work. ●

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by Cherie Winner — illustrations by Aaron Ashley & John Paxson

TIME WILL TELL

Human cultures have faced climate changes many times before, sometimes responding with ingenuity, other times succumbing to ecological devastation. The current change in climate brings a special challenge. Research by Washington State University scientists shows that the high levels of carbon dioxide that are boosting the earth's temperature are also changing the way ecosystems work. When it comes to carbon, plants and the soil organisms they depend on have their limits—and those limits may soon affect us.

ILLUSTRATION BY JOHN PAXSON

Even for seasoned archaeologists, it was an unsettling find. At the site in Belize of a sizeable Maya town, in the layer of artifacts left just before the town was abandoned, John G. Jones and his colleagues from around the United States came upon a pit full of skulls.

"In this pit there were 29 healthy human heads," recalls the Washington State University archaeologist. "Well, they were healthy up to the point when they were removed."

The skulls had belonged to men, women, and children. Their teeth were in excellent condition, a good sign that they came from members of the ruling elite. During the decades before the heads were separated from their bodies, the Maya had been struggling with political degeneration and increasingly bloody wars. Then the climate changed. The rains stopped. Crops failed for several years running, and the soil of their barren fields lay open to erosion by wind and every short cloudburst.

"We're having a very discontent population," says Jones, who tends to speak of ancient people and events in the present tense. "One of the reasons they're discontent is because of climate change. Their rulers' job—their only job—is to keep the rains coming. It was a cushy job for a couple thousand years. But all of a sudden what we're seeing is the rain stops coming, and the environment changes. People are starving."

"What could they do? They could yell at the rulers, saying, 'You promised you'd give us rain.' They could blame it on the gods, or ask the gods to intercede. They could move."

In the end, he says, the people rose up, dispatched their failing rulers, and dispersed. The skull pit marks the end of habitation at that site. Similar events may have occurred in other Maya centers, as the great civilization collapsed under the stress of political unrest and ecological devastation.

"They had a good run," says Jones. "They had 2,500 years or so. Most cultures don't last that long."

JONES TRACES CHANGES IN CLIMATE, and how human societies responded to those changes, by examining pollen grains trapped in lake and estuary sediments. Pollen is tiny but incredibly durable; as long as it stays completely dry or completely wet, he says, it lasts just about forever. He has easily identified pollen grains more than 300 million years old.

On field expeditions, Jones and his graduate students use a five-horsepower motor to drive a coring tube deep into sediment near village sites being investigated by other archaeologists. The team they work with includes experts on soils, cultural artifacts, radiocarbon dating, and tiny plant crystals called phytoliths, but Jones goes first, using pollen to sketch the major event horizons in the core. "We'll say, 'Hey look, something's happening at 180 centimeters below the surface, and another one at 400 centimeters. Let's get radiocarbon dates on these right now, because that takes a little time.'" After he lays out the basic framework, he and the others go back and fill in the details.



ROBERT HUBNER

To find out what plants were growing near a study site, John G. Jones takes samples from one- to two-inch intervals along a yards-deep soil core. A series of acid baths will dissolve extraneous material and transform each sample into a clean specimen of pollen grains and residual charcoal.

His three-inch-wide, 11- to 15-yard-deep cores record a vast span of environmental and human history. They go deep enough to reach material laid down before people settled the area. Jones and his colleagues recently showed that agriculture in the New World began around 5200 BC, significantly earlier than previously thought. It was driven in part by population growth and the need for a reliable food supply, and in part by a change in climate that made cultivation more likely to succeed.

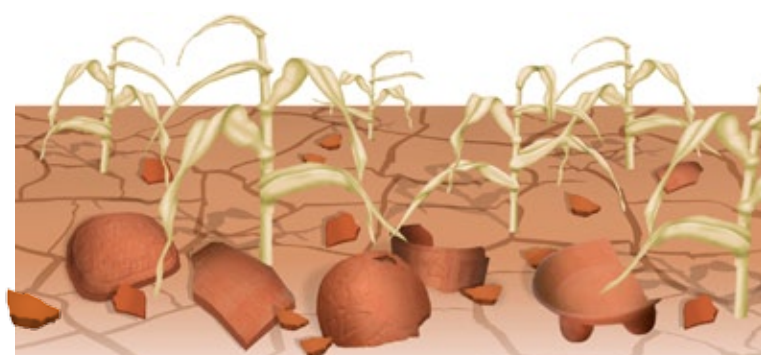
Jones reads these events in the small but distinct tracings in the cores. A layer of charcoal from prolonged, large-scale burning shows when people first cleared the forests. Then tree pollen disappears from the cores, and pollen from maize and squash appears in large numbers. The wild ancestors of those plants grew in very different habitats, so finding them together in a place where neither would grow on its own means human cultivators brought them there. Weed pollen shows up along with the crops; even the first farmers had to contend with unwelcome visitors. By the time the Maya came into Belize between 1800 and 1500 B.C., the land was already shorn of trees and under cultivation.

Then, after centuries of continuous farming, come signs of the ecological disaster that precipitated the downfall of the Maya: a sharp decline in crop and weed pollen, and a layer of eroded soil so common throughout the region that it's been labeled "Maya clay".

"I can't think of one core that doesn't have it," says Jones. "It's not just in Belize, it's in Guatemala, it's in Mexico; everywhere we look, we see the same kind of thing."

"This is a change in climate on a horribly denuded landscape, and all of the soils are just washing away ... It's a sobering picture."

MASSIVE EROSION is an obvious disaster in any agricultural system, but more subtle changes to the soil can be just as dev-



In Jones's soil cores, pollen tells the tale: When early Mesoamericans began cultivating crops, trees such as poisonwood were replaced by edible plants such as maize, squash, manioc, and breadnut trees. Sun-loving alders became more abundant as forests were cleared, and pest plants like ragweed and goosefoot thrived alongside the crops. Large-scale burning to clear land left bands of charcoal throughout the agricultural period. Shallower portions of the cores (not shown) bear evidence of drought, erosion, crop failure, and social collapse.

YEAR (BCE)

3188

4348

5145

DEPTH (cm)

850

900

950

1000

1050

1100

1150

1200

1250

1300

astating. WSU ecologists Dave Evans ('90 Ph.D. Botany) and Rick Gill are finding that high levels of carbon dioxide (CO_2), the major cause of our current climate change, are altering plants and soils in ways that could profoundly affect the health of ecosystems and our ability to feed ourselves.

Unlike previous "natural" warming trends, present-day warming is not the result of sunspot activity or cyclical fluctuations in temperature. This episode is being caused by a huge increase in the amount of CO_2 and certain other gases in the earth's atmosphere. Like panes of a greenhouse, these gases keep heat in; hence the name "greenhouse gases."

Among the greenhouse gases, carbon dioxide merits special attention because, quite apart from its role in boosting temperature, it has profound effects on living things. Plants take in atmospheric CO_2 through their leaves. If they have enough water and nutrients such as nitrogen, they use the CO_2 to make sugars and other molecules. Plants then leak some of those sugars from their roots, which benefits the soil bacteria and fungi that, in turn, provide the plants with nitrogen that they process from sources in the soil. The reciprocal interactions among plants, fungi, and bacteria are the basis of all plant growth, all forests, all grasslands, all agriculture.



COURTESY RICK GILL

RICK GILL, along with colleagues from Duke University and the USDA's Agricultural Research Service, has been studying how a grassland ecosystem copes with different levels of CO_2 . On their research site in north Texas, a 110-yard-long tube of greenhouse fabric encloses a strip of native prairie in a sort of atmospheric time tunnel. Constrictions in the tube divide it into 5.5-yard-long segments, and pumps create a stepwise gradient of CO_2 in the segments from one end of the tunnel to the other. At one end, representing the future, CO_2 is at 550 parts per million (ppm), the level it's predicted to reach by 2100. In the middle of the tunnel, CO_2 is at today's level of 375 ppm. At the other end, CO_2 is at 220 ppm, the level that prevailed in earth's atmosphere for at least ten thousand years, until the Industrial Revolution and our large-scale burning of fossil fuels began nudging it upwards in the mid-1800s.

The researchers first asked whether plants would grow bigger and faster in the presence of a higher level of CO_2 . That possibility is the basis of one of the major strategies proposed for fighting climate change: using plants to take more CO_2 out of the air and sequester it as part of the structure of the plant. Gill

ILLUSTRATION BY AARON ASHLEY

INTENSIVE AGRICULTURE

INCIPIENT AGRICULTURE

PRE-AGRICULTURE

goosefoot

manioc

squash

maize

alder

ragweed

breadnut tree

white poisonwood

and his colleagues found that higher CO₂ levels did lead to more plant growth—for a few seasons. Then growth stalled.

Gill says there's a limit to how much carbon plants can take in and how much carbon-rich plant material, such as fallen leaves, soil microbes can recycle before they run into other constraints. Both plants and microbes need nitrogen and other nutrients as well as carbon. Some nitrogen sources are small molecules that microbes can process easily. Others are so large and complex, and require so much energy to break down, that most microbes don't bother. They simply slow their growth rather than attempt to mine the nitrogen out of those sources.

Under elevated CO₂, says Gill, "plants are much more efficient, they photosynthesize more, they grow more. But then that litter falls to the ground. Microbes have to break it down, and before long they run out of nitrogen. So there's a natural negative feedback in the system that slows down carbon sequestration."

The feedback is called "progressive nitrogen limitation." It's been observed in forests as well as grasslands, and it poses a big problem for carbon sequestration schemes.

"It doesn't let the system respond to the rising CO₂ in the way that we're forecasting it will," says Gill. "We spend all of our time focusing on carbon, carbon, carbon, with the hope being that, as we pump more and more CO₂ into the atmosphere, native ecosystems will suck some of that out."

Gill says the notion of carbon sequestration is so widespread it's become embedded in many of the models used to predict the extent of climate change.

"They assume that we're only going to be at 550 parts per million 90 years from now, because a third of the CO₂ we produce will end up in trees or in soils," says Gill. "What we're showing is, *don't count on it*. Because the assumption that's built into that is that you've got abundant water and abundant nutrients. And we're saying, that doesn't happen."



CAROLYN M. EMERSON

AT DAVE EVANS'S STUDY SITE in the Mojave Desert, just north of Las Vegas, nine rings of PVC pipe supported by thin posts hang above the creosote bushes and burro-weed. Twenty-five yards across and about five feet off the ground, the

white rings look like something out of a science-fiction show, a signal to alien landing craft, perhaps. In fact they are part of one of the longest-running experiments ever attempted to try to assess the effects of extra CO₂ on natural ecosystems.

The experiment ran for 10 years. Six of the rings served as controls, three with ambient air blown over the plants they surrounded and three "silent," with no blowers. In the three experimental rings, the pipes blew enough CO₂ into the area enclosed by each ring to raise the level there to 550 parts per million.

While his colleagues from the University of Nevada assessed how the plants responded, Evans examined the soils and underground organisms. He found that Mojave soil reacted very differently than Gill's grassland soil. In areas of high CO₂, it had more nitrogen available for plants and soil microbes to use. But there were a couple of catches. In normal years, most of the extra nitrogen was scarfed up by soil organisms, not plants.

And wet years were something else again.

As anyone who has visited a desert during a wet year knows, rain works wonders. Plants that may not have been seen for a decade or more flourish and bloom. Evans's colleagues found that in wet years the high-CO₂ rings showed a lot more plant growth than the rings without added CO₂. But it wasn't the creosote and other large native plants that grew more, or the small native annuals that nature buffs might go to the desert to see.

"The biggest increase was in invasive annuals," says Evans. "It's the invaders that were responding." Areas within the high-CO₂ rings were choked with red brome, a close relative of the cheatgrass that has spread through Washington in recent decades. Areas in control rings and outside the rings had very little of it. It was the combination of extra CO₂ and extra water that allowed the red brome to flourish.

Evans says invasive species can rapidly exploit new nutrient supplies. The Mojave's native plants can't make the same kind of quick score. They specialize in endurance and the ability to make do with a little. "It's in it for the long haul," says Evans of creosote, which can live for a thousand years.

The main threat from invasive species in the Mojave may come at the end of the growing season, says Evans.

"Red brome is good fuel for wildfires. The grass dies and dries in late summer. So one consequence of elevated CO₂ in arid ecosystems could be an increase in fire frequency or intensity, due to the presence of these invasive annuals. That could kill the system, because the native plants aren't tolerant of fire at all."

Evans sees the long-term effects of that whenever he visits the site on the Hanford reservation where he did his doctoral

research. Twenty years ago, he says, the landscape was sagebrush interspersed with bunchgrasses that offered good grazing opportunities for cattle and wildlife.

"Then cheatgrass came in. It all burned 10 to 15 years ago, and now all we see is the cheatgrass. The sagebrush hasn't come back."

And the burning continues. This past August, fire charred more than 20,000 acres of cheatgrass-dominated land at the Hanford reservation.

When they took a closer look at what was happening in their soils, Gill and Evans found subtle but significant changes. In Gill's tunnel, plants in the middle and in the high-CO₂ segments of the tunnel grew more and deeper roots.

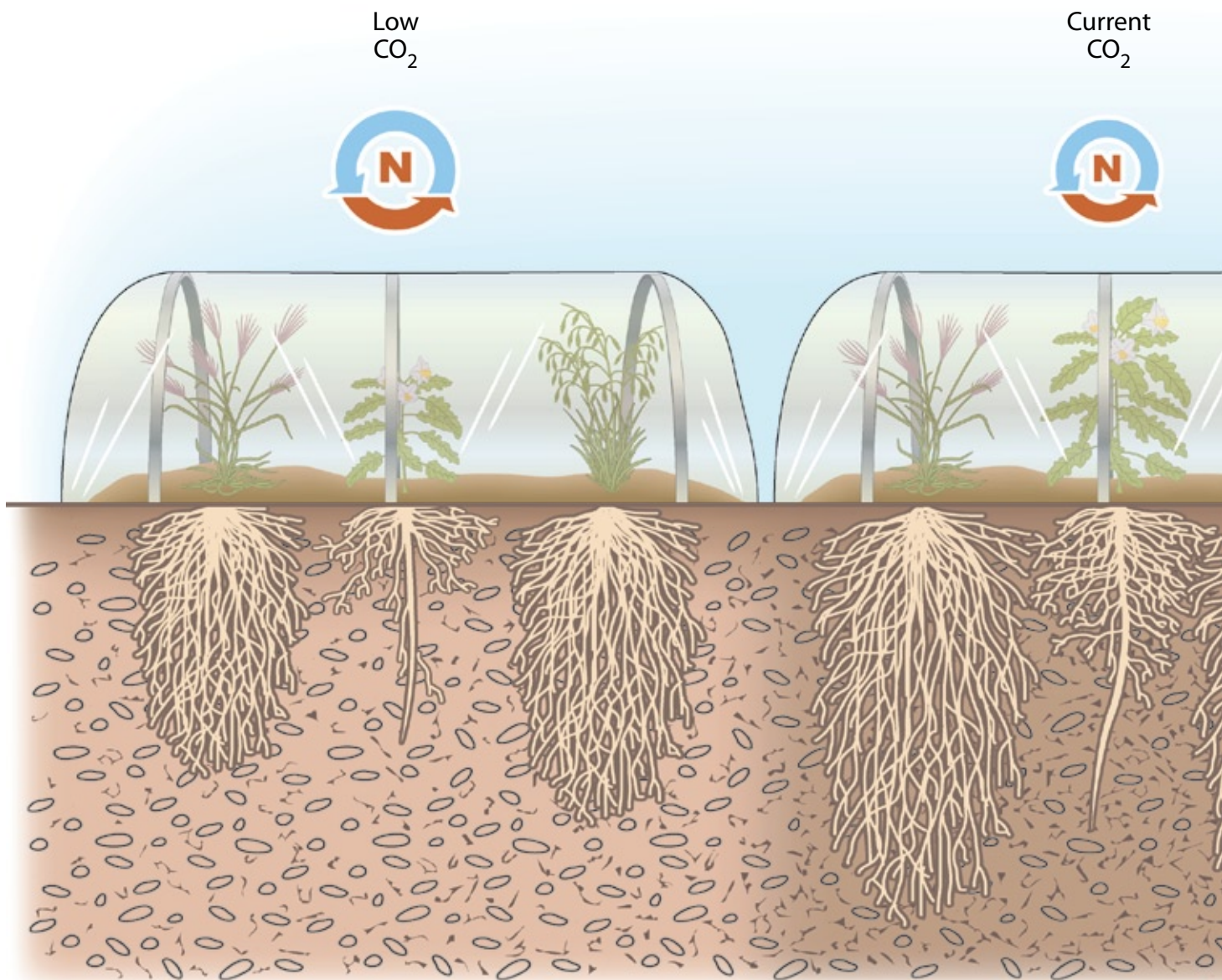
"They end up building fewer and fewer leaves and more and more roots, trying to tap into the nitrogen that's available," he says. That could pose a problem for grazing animals, both domes-

tic and wild. The total size of plants will be the same, but more of each plant will be below ground, where grazers can't reach it.

The search for more nitrogen affects the community of soil microbes too, says Gill.

"There's pretty good evidence that bacteria aren't very good at it," he says. "They're small, they're individual cells, they need their carbon source and their nitrogen source adjacent to one another. But if you're a fungus, you've got long mycelia, and so you can tap in [to deep sources of nitrogen]. So what we see is that as CO₂ increases, you get a shift from a bacterial-dominated community to a fungal-dominated community."

The same thing happens in most forest systems that have been studied, and Evans also found it in desert soils. During the last three years of his Mojave experiment, he supplied the test rings with a different isotope mix of CO₂ that allowed him to trace where the extra CO₂ ended up.



"What we found is that mainly the fungi are seeing this new carbon," says Evans. Bacteria took up very little of it.

Gill says the shift toward fungi, at the expense of bacteria, could send ripples through the whole biosphere.

"It changes the patterns in which nutrients are being made available," he explains. "It changes the nature of the organic material within the system."

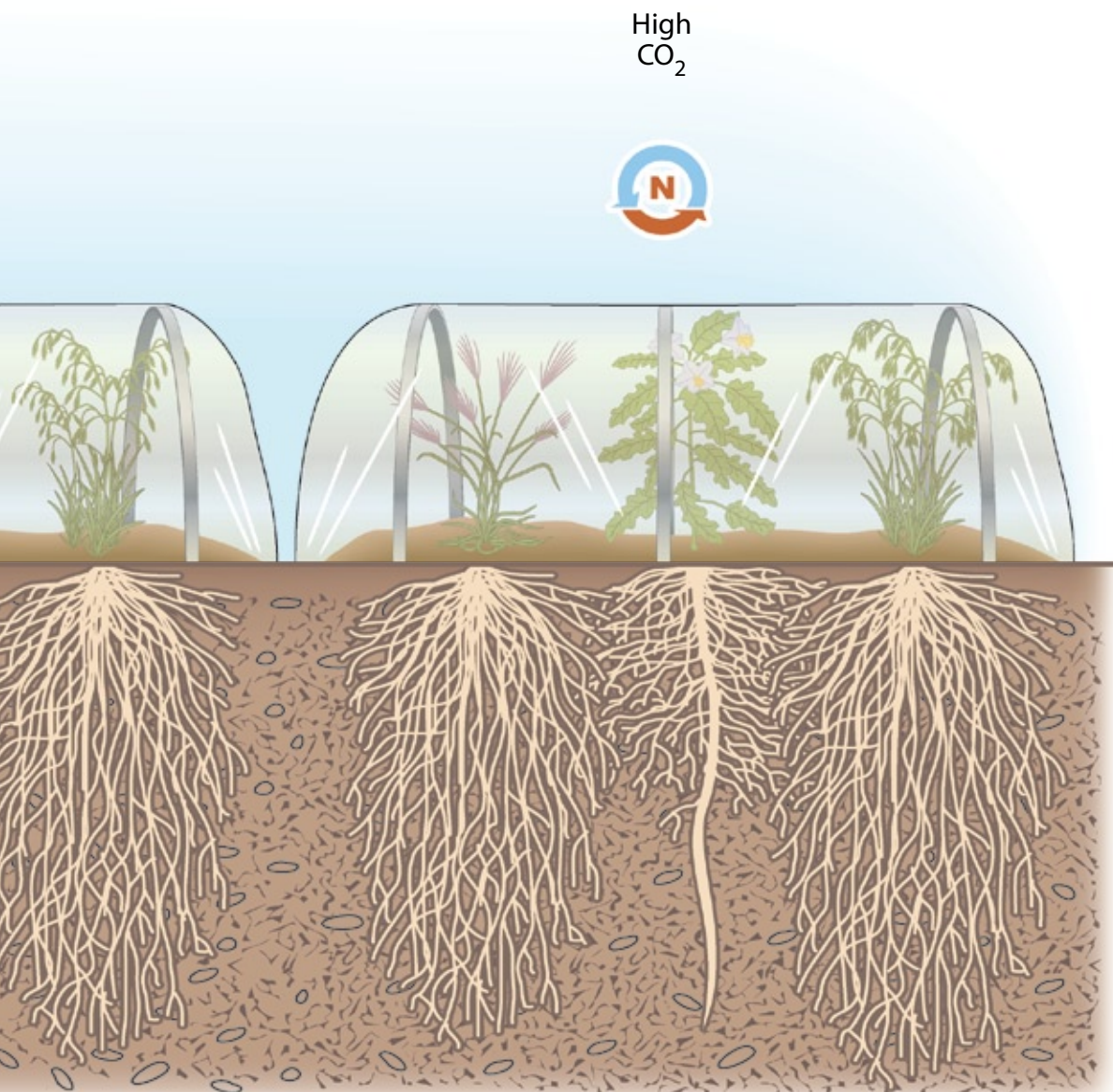
The details may be complicated, but the conclusion is simple: CO₂ that we have put into the air is changing the way the soil works.

THEN THERE'S THE LOOK BACK offered by the "old" end of Gill's tunnel. It's one of the few scientific studies of ecosystem response to climate change that doesn't take today's conditions as its starting point.

"People think that today is sort of the standard that we're working off of," says Gill. "I think we often fail to recognize

that today is very different from prehistoric conditions. Plants lived [in an atmosphere that contained] from 220 to 260 parts [of CO₂] per million for a long time, for 10,000 years, since the last interglacial, and they evolved to deal with that. In a hundred years, we've increased [the concentration of CO₂] by 150 parts per million—a huge change."

Exposing plants and soil to a preindustrial level of CO₂ provided startling results. From the low-CO₂ segments of the tunnel to the middle, where CO₂ is at current levels, "we see lots of changes in the way the plants photosynthesize, the rate at which they lose water, how they use the nitrogen, and the microbial community [in the soil]," Gill says. "It's very, very sensitive over that initial range. As you move from preindustrial levels up to where we are today, there's pretty good indication that there's a net accumulation of carbon—that these ecosystems *did* act as carbon sinks, slowing the rate of greenhouse gas accumulation.



Rick Gill's enclosed strip of Texas prairie showed that plants, nitrogen cycling, and soil organisms under current levels of CO₂ (center) have already changed, compared to those under pre-industrial levels of CO₂ (left). Higher levels of CO₂ projected for the future (right) resulted in even bigger root mass and more soil fungi, as the organisms tried to tap into deep sources of nitrogen that would allow them to use the extra carbon. Exposing plants to higher CO₂ levels is akin to giving them more bricks without supplying the mortar to hold them together, says Gill. "You can't keep building higher and higher, if you don't have everything you need."



ILLUSTRATION BY AARON ASHLEY

Dry years ← → Wet year

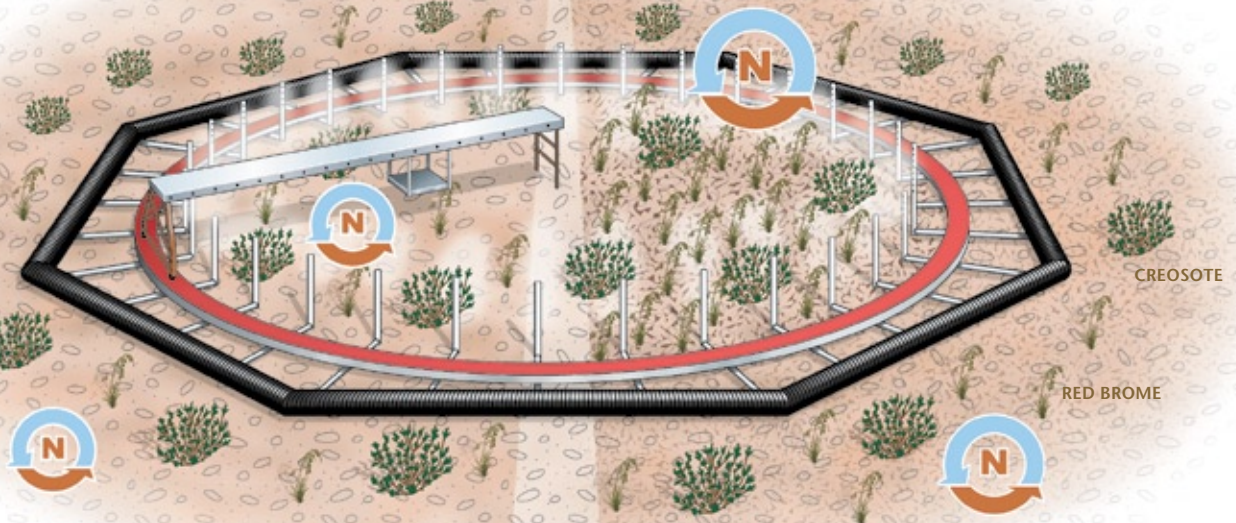


ILLUSTRATION BY AARON ASHLEY

At Dave Evans's study site in the Mojave Desert, plants and soil organisms took little note of added CO₂ during dry years (left). The big changes came in a year with high rainfall (right), which spurred the normally water-limited soil organisms to process more nitrogen. But even with

plenty of water and more nutrients available, the main plant beneficiaries were invasives such as red brome. The platform extending into the ring allowed Evans to gather samples without walking on the soil or disturbing the plants.

"But then when we start [at today's level] and move up to 550, what we find is that they aren't nearly as sensitive, they aren't as well-suited to absorbing elevated CO₂."

In other words, grassland ecosystems have already adapted to today's higher CO₂ levels—and may not be able to adapt further to the even higher levels they'll be exposed to in coming years. With similar changes going on in other ecosystems, the implications for us are grave. We can no longer count on earth's resilience to bail us out, any more than the Maya could reclaim their lost soil by offering prayers to the gods.

"The ability of native ecosystems to function on our behalf, at least from a carbon-balance standpoint, is not likely to continue as strongly as it has in the past," says Gill. "As far as forecasts go, consider the future to be worse than you thought."

SO WHAT DO WE DO about climate change? What *can* we do?

Perhaps the clearest message from Gill's and Evans's work is that we have to stop putting so much CO₂ into the

atmosphere. As the saying goes, when you've gotten yourself into a hole and you're trying to get out, the first step is to stop digging.

Gill says biodiesel and other new energy technologies could make a big dent in our CO₂ output and give us a chance to address the damage already done. Carbon sequestration programs, which encourage people to plant trees to offset the CO₂ they generate by driving a big car or running a business, are more problematic. They've gotten a lot of attention as a possible cure, but nitrogen limitation and other constraints make them a short-term solution at best.

"You may be able to tweak the system so that over the scale of 50 years, 100 years, you increase carbon storage, but that's only if there's abundant nitrogen and enough water, and we haven't paid nearly enough attention to that," says Gill. "We can't just look at this in terms of carbon sequestration. We have to start looking at the interconnections." ●

TO LEARN MORE: libarts.wsu.edu/anthro/faculty/jones.html
www.sees.wsu.edu/Faculty/Gill/index.html
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by Hannelore Sudermann



INTO THE WOODS

PLANT PATHOLOGIST JACK ROGERS is always ready to step off the trail and into the cool forest to uncover its secrets. Or, even better, to collect them.

His targets, most often, are fungi, nature's great recyclers. These organisms break down dead matter and inhabit living matter. They're everywhere, but they aren't always easy to see. They have secret lives beneath soil and behind bark, and many only surface to reproduce. But Rogers knows where, when, and how to look—whether

it's a certain stand of trees after a cold winter, a south-facing slope in the fall, or an area of a recent burn.

Rogers is built like a small bear and has a fog-horn voice. It carries pretty far when he's prowling the woods, and, along with a whistle, comes in handy when he gets separated from his fellow fungi hunters. His voice also holds a flavor of West Virginia, something he picked up during childhood, around the same time he acquired a taste for the outdoors. When he says words

PHOTOILLUSTRATION BY BRUCE ANDRE AND JOHN PAXSON

like fungi and morel, the last syllable hangs on a bit long.

His first taste of fungi came during childhood, thanks to his Lithuanian grandmother. “People from her country know fungi and love them very well,” he says. She gave him tastes of the savory mushrooms that were a staple of her diet in her native country.

His first notions of them as wildlife came from his father, a biology professor, who wrote an article about the oyster mushroom in a West Virginia magazine back in the 1930s and who often took him on outdoor adventures. He knew the woods, says Rogers. “He certainly knew more than I do about moss and ferns.”

But Rogers surpassed him with fungi. During a long career at Washington State University—44 years and counting—the professor served as president of the Mycological Society of America and has become director of the Mycology Herbarium, a vast collection of fungi housed at WSU. He even has a fungus named after him: *Poroleprieuria rogersii*. The organism was discovered by two mycologists a few years ago on the decaying bark of the *Heliocarpus* tree in Mexico. The scientists, one American and one Mexican, decided to name it in Rogers’s honor.

In college he found true love: the morel. It’s not the most spectacular mushroom. Plain, often black or grey, its stem is hollow, and its variegated cap looks like a sponge. But the modest fungus is a highly desirable treat, sprouting up in the warm, wet spring. It’s particularly tasty sautéed in butter or olive oil or coated with cream. It’s Rogers’s favorite fungus to hunt and eat.

This is one mushroom that has been very difficult to domesticate, says Rogers. It does well in forests that have recently experienced a catastrophic event like a wildfire or flood, even logging. While there are some efforts to commercially cultivate them, the best way to get them is still to just go into the woods and look.

Rogers’s colleague, Lori Carris, remembers hunting morels with him shortly after she was hired at WSU in 1989. She and a graduate student piled into Rogers’s orange 1972 Chevy half-ton and, in spite of the sheeting rain, drove 40 miles out of Pullman to hunt. The torrent didn’t matter; Rogers was leading them on a mission.

“I remember that trip,” he says. “It was one of the best morel collecting times I ever had. We collected sacks of them.”

One of Rogers’s research interests is sac fungi, or ascomycetes, including the morel. These organisms produce spores in an ascus, or sac. He is also interested in fungi that inhabit and infect forest trees.

Seeing Rogers enjoying a successful career that has brought him national renown and taken him to places like Mexico and Hawaii to collect specimens, it comes as a shock to think that



In the fall Lori Carris heads to the woods every week to hunt for fungus—for her study, for her mycology classes, or simply to eat. Here she spies a forest conk fungus growing on a tree. **Left:** Choice black morels.

his life in Pullman almost didn’t happen. With his wife, Belle, he moved to WSU in 1963 as a new Ph.D., having rushed though the last year of his studies to take a job in the Plant Pathology and Forest Range Management departments. The winter they arrived was one of the worst on the Palouse—month after month of grey skies and flooding. “If I had the fare out, I’d have left,” growls Rogers. “The whole area was a mass of mud. It was the most depressing sight I’d ever seen.”

The classes he taught in forest pathology were packed with students, including veterans of the Korean War. And they were demanding, especially on a first-time instructor. Rogers spent the first part of that year stressed, exhausted, and depressed.

But then he ventured out to forage. “The spring was beautiful. I got out into the woods and everything was OK.” And since his job was to study and teach forest pathology, one of his prime duties was to go out and hunt. He decided to stay for a while.

Constant hunting for specimens is a habit with most mycologists and pathologists. Roderick Sprague, a WSU pathologist in the 1940s and 50s, often found specimens for the University’s collections on the fly. His notes reveal details like “I collected this when I had to change planes in North Dakota.”

Rogers’s office and adjoining workspace are an ecosystem unto themselves. They are packed with papers, thousands of specimens, microscopes, books—and a case of Diet Coke. There’s just enough space left for a small computer. One morning last summer Rogers was sitting at it working on paper about a new fungus he discovered in Hawaii. “Isn’t it beautiful?” he says, showing a close-up photograph of a black patch he found on the bark of a tree. Its pores and smooth black surfaces look like



LORI CARRIS

THE DARK SIDE OF FUNGI

lava. Rogers tells me he plans to name it for Pele, the Hawaiian goddess of volcanoes.

That's just one of his immediate projects. He's also harboring a strange find from the Netherlands. He pulls from a small bag a four-inch-long object, brown, and thinner than a pencil, with a lighter colored cap at the end. This was growing on live hardwood in a tropical greenhouse, he says. He hadn't seen it before, but as a favor was working on identifying it. He is culturing some of its spores to observe its growth behavior. "If you can't germinate the spores, you can't do anything with them," he says.

While watching them grow in his lab is exciting, finding them in the wild is even better, says Rogers. He's got fungus fever.

"Oh yeah, I jump up and down and holler when I find something," he says.

It's different than other kinds of hunting, or picking wild blackberries, or fishing, he says. "If we were surrounded by morels and you could get them any time you wanted to, it wouldn't be a lot of fun," he says. "The chase is the fun."

WHAT LIES BENEATH

Whole worlds exist beneath the soil and behind the bark. Networks of fine filaments called mycelia digest food, breaking down organic matter. With enough food reserve, the mycelia will produce fruiting bodies, in some cases, mushrooms. Under the right conditions, they push above the soil or bark, mature, and release spores, which develop into new fungi.

"Fungi have been involved in life's process since the very beginning," says Rogers. If they hadn't, nothing would decay, and we'd be surrounded with dead matter, he says. The earliest plants, and the organisms that ate them, needed some early version of fungi to break down the dead matter. Over a billion years ago the fungi followed the plants onto land, aiding them in absorbing nutrients and using them for food.

There's some evidence that the fungi enabled plants to evolve on land, says Carris. They were present before vascular plants evolved, and may have served as a type of primitive "root" for early land plants.

Fungi evolved in various directions, resulting in an estimated 1.5 million fungal species. Some types live freely in nature and reproduce as mushrooms, like Rogers's morel. Others are yeasts, molds, mildews, and parasites, including athlete's foot. They usually attach themselves to their food sources, absorbing nutrients through their cell walls, and excreting enzymes to break down organisms. Some are saprophytic, which means they decompose dead organisms. Others are parasitic, infecting live plants and animals, and harming their hosts. Mycorrhizal fungi attach to the roots of plants, helping them pull nutrients and moisture from the soil. Finally, endophytes help protect plants from other fungi, infections, and predation.

Pathologists and mycologists like Rogers agree there is much more to learn about the biology, safety, and ecology of fungi. What makes them grow when and where they do? What ben-

A WOMAN HAS A MYSTERIOUS GROWTH on her lung. A puppy suddenly suffers liver failure. These two mysteries have a common suspect: fungus. Both were the subjects of recent investigations undertaken by Jack Rogers and Lori Carris.

Doctors at the University of Washington Medical Center removed the growth from the woman's lung. Suspecting a fungus, they sent a sample to Rogers to examine. He forwarded it to an Austrian medical mycologist, because he didn't have the proper containment system to propagate it in Pullman. "We presumed it was something she breathed," he says. After watching it progress through a life cycle and reproduce, Rogers discovered that what came from the lung was a fungus. Fortunately, the patient lived. She also presented a case that may be a first for modern medicine. "It was right on the edge of a genus of a fungi that occurs on wood," he says. "But it looks like it is a warm-animal parasite."

Now Rogers is working on a paper about the find for the *Clinical Microbiology Newsletter*.

Carris's case was also rare, but not so rare that she hasn't seen it before.

This time it came from Massachusetts, where a veterinarian who had graduated from WSU's College of Veterinary Medicine was confounded by a sick dog brought in to her practice. The owners had seen their bulldog puppy in the back yard eating something under an oak tree. Now the dog was very seriously ill, nearly comatose, and the veterinarian was scrambling to diagnose the problem. She contacted Patricia Talcott, a toxicologist at WSU. Suspecting a fungal culprit, Talcott turned to Carris, who, examining a sample of the mushroom, confirmed that it was a fungus common around oak trees, and deadly poisonous to animals. Though the couple lost their puppy, they had a new baby, and a new awareness of the mushrooms around their home.

"People don't think bad mushrooms grow in their back yard," says Talcott. "They were very lucky the identification was made."



ISTOCKPHOTO: SEBASTIEN WINDAL



THE FUNGAL FILES

IN THE EARLY 1970S, while still a fairly new faculty member, Jack Rogers was handed the care of Washington State University's fungal herbarium, a vast collection of preserved samples of fungi collected in the Pacific Northwest and around the world.

The collection was initially part of a larger herbarium started by Charles Vancouver Piper, a well-known botanist and agronomist who came to work at Washington Agricultural College and School of Science—later known as State College of Washington—in 1892. In those early years, Piper traveled throughout the Pacific Northwest, providing some of the earliest additions to the collection. In 1915 the fungal collection was split off from the main herbarium due to what Rogers calls “an acrimonious relationship” between plant pathologist Frederick DeForest Heald and a botanist named Ferman Pickett.

Heald and his successor, Charles Gardner Shaw, built on the fungus collections, eventually amassing more than 70,000 specimens.

Rogers inherited stewardship of the collection when Shaw retired. It was a big responsibility, requiring him to preserve a record of diversity over time and to provide material that could help biologists and other scientists identify plant disease. “It wasn’t a matter of wanting to do this,” says Rogers. “I was told, ‘You do it.’”

One of the main problems with maintaining the herbarium is that there’s no funding for it, says Rogers. But because of the historic and scientific value of the collection, he and his colleagues have kept it working and accessible.

Today the herbarium inhabits a cool, dry room in the basement of the new Johnson Hall addition. Items in the collection are kept wrapped loosely in paper and are stored in mushroom-colored, ceiling-high, compact rolling shelves. Besides Rogers and his colleague, Lori Carris, who come to drop off new specimens or retrieve old ones, the only visitors are students working to create an online database of the large collection. Sharing part of a \$400,000 National Science Foundation grant with WSU's Ownbey Herbarium for phanerogamic—i.e., seeding or flowering—plants, Rogers is able to hire undergraduates to input the data.

The collections of pyrenomycetes—fungi that grow in the aftermath of fire—and rust, smut, and downy mildew fungi are known and valued worldwide. “This is the premier collection for the Inland Empire,” says Rogers. “But we have specimens from around the world.”

efits do they provide the plants and other creatures that surround them? What are their life cycles? How are they affected by alterations in the environment, such as logging, fires, pollution, or global climate change?

When it comes to fungi, most of us haven’t wanted to know, says Rogers.

Many peoples, including the French, Italians, Slavs, and Southeast Asians, embrace fungi and use them regularly in food and medicine. Americans, though, have had an uneasy relationship with them. For them they have been associated with mystery, the supernatural, poison, darkness, and decay.

“People in the U.S. in general have a certain fear of fungi,” says Rogers. “I think it goes back to our English heritage. We’re more sensitive and suspicious than other cultures.”

In *Alice’s Adventures in Wonderland*, the giant mushroom contains magical powers, one side making Alice shrink, the other making her grow huge. Emily Dickinson referred to the mushroom as nature’s outcast face.

Fear, mostly unfounded, has pushed our palates and our curiosity away from these organisms. But that’s starting to change, especially as we sample the cuisines of other cultures and look to eat locally produced foods. Wander into Pike Place Market and check the corners of the produce stalls, and you’ll find caches of wild mushrooms.

One Saturday last summer, morels were selling for \$30 a pound. Light, firm, a little like a dry sponge, they smelled of earth and forest.

Fungi, like morels, can help a fire-damaged landscape recover. They can also digest pollutants, breaking down such toxins as pesticides, paints, diesel, and tar. They turn tainted soil into fertile material to host future life. In his book, *Mycelium Running*, mycologist Paul Stamets argues that fungi can rescue habitats, enhance forest health, and make toxins inert. He also points to mushrooms that can be used as antibiotics and agents for treating cancer.

Yet only about 70,000 of 1.5 million species of fungi have been described. And of those, we still have limited information about what makes them grow when and where they do.

Now, with global climate change a major focus for research, fungi are still being overlooked. Most investigations have focused on ecosystem activities in the spring and summer. Events that take place in autumn, including decomposition and decay, are only now being examined, say Rogers and Carris.

But fungi are changing their behavior in response to global warming along with the rest of nature. In a recent article published in *Science* magazine, scientists in England observed that mushrooms and fungi, across species, are maturing and fruiting earlier and for a longer season. Decomposition, in England’s forests, at least, is taking place more rapidly. Scientists are just now trying to figure out what all this means, says Carris.

As trees and other plants are stressed by changes in climate, they will be more susceptible to fungi and diseases, says Rogers. He expects fungi to be on the rise. In any case, when looking at issues of the environment, it’s high time the fungi were considered, he says.

THE FORAGERS

Deep in the woods, there also exists a hidden human world.

Ten percent of the world's wild edible fungi are produced in the Pacific Northwest, and thousands of people from northern California up through British Columbia are out hunting for them.

While Rogers was making his first explorations into Washington's forests in the 1960s, the state was starting to realize the value of its forest products. In 1967, the legislature enacted a law regulating the harvesting, transplant, and sale of forest goods like mushrooms.

In the 1980s and 1990s, commercial fungus hunting expanded on public lands throughout the Northwest. At the time, landowners and the general public had no real sense of the value of mushrooms and medicinal plants, crucial parts of the forest's understory ecosystem, says Jim Freed, special forest products specialist for WSU Extension. Freed works with commercial foragers as well as landowners whose properties are popular sites for gathering mushrooms and other forest products like moss, sword ferns, salal—a plant used in floral arrangements—and conks—shelflike fungi that grow on the trunks of trees. He urges foragers to harvest gently and leave behind some of the mushroom and plant life, so that more might grow back. "People need to know when to pick, how to pick, and how not to pick too much," he says.

Morels, for example, should be cut at the stem rather than plucked from the ground. That leaves the base behind, protects the habitat, and provides potential future mushrooms.

When Freed started work for WSU in 1977, he realized he had to convince the public and government that there was a lot more to a forest than the trees. It took a large fire in 1979 to open everybody's eyes, he said. The blaze near Bend, Oregon, left behind ideal growing conditions for morels and the highly desirable matsutake mushrooms. More than 2,000 people came to camp and hunt mushrooms, says Freed. Land managers, shocked at the turnout, were overwhelmed. They kept asking Freed, "Where did these mushrooms come from?" He had to explain that they were there all along, just hidden beneath the soil.

The Pacific Northwest is one of the most diverse and productive regions of the country when it comes to fungi, particularly medicinal and edible fungi like truffles and mushrooms. In an average year, wild edible fungi in the Pacific Northwest support a \$50 million industry.

Most hunters are out looking for three types of mushrooms: the matsutake, the chanterelle, and the morel. The matsutake, a chewy mushroom that grows in pine stands, commands the highest price, being less abundant and highly desirable, especially in the Japanese market. Morels are more abundant than the matsutake, but are still highly valuable. Chanterelles are a favorite in European cuisines.

Commercial foragers in the Pacific Northwest are mostly immigrants and first-generation citizens, often from Asia and Mexico, says Freed. They do serious hunting in the woods, and are incredibly efficient at finding and removing what's valuable. They sell their finds at buying stations, often pick-up trucks parked at



PHOTOILLUSTRATION BY BRUCE ANDRE



BRUCE ANDRE

Jack Rogers started his career as a teacher and forest pathologist in the Pacific Northwest. Today he travels the world hunting for fungi that affect hardwoods, though he still visits the local woods each spring to hunt for morels. **Below:** A local chanterelle.

intersections near the hunt sites. On a bad day, they could make \$70. On a good one, hundreds. On a very, very good one, \$1,000.

That's why many commercial hunters are very secretive and protective of their sites. Even hobby hunters can be territorial.

"Some people say there is a gold rush mentality," says Freed about the people who flock to the woods to hunt. But he sees that changing, as our attitudes about mushrooms change. Freed envisions a day when families will go out foraging with an experienced guide. Children could learn about the woods, and the whole family would have a great outdoor experience. "They do this in Japan," he says. "Besides, wouldn't it be better to go in and pick your own?"

SHARING SECRETS

Lori Carris's chanterelle spot is about 40 miles from Pullman. She happened upon it one fall day while exploring an area known for its wealth of spring mushrooms. She was cruising along a gravel road in the woods, when she saw a flash of yellow. "I stopped in a hurry, and then put my car into reverse." There, just off the road, lay the most beautiful, buttery patch of mushrooms.

Of course, I ask her to take me there. "I can take you, but you'll have to ride in the trunk of my car," she cracks.

As we head out of town, she explains that she only shares this site with a small group of friends and a few select students. "This is where I've found these beautiful golden mushrooms," she says, her voice softening. "Once I discovered one as big as a dinner plate. Oh, it was a beauty."

She took a picture of it, she says. Then she took it home and ate it.

When Carris was in college, she never imagined a career in plant pathology. After finishing school in the Midwest, she happened into a master's program at Washington State University. She worked with raspberries and their uptake of a fungicide. So her first work with a fungus was less about how to find it and study it, and more about how to get rid of it.

After college, she got a letter from a scientist who wanted her to work with him as a doctoral student at the University of Illinois. Then she was lured back to Pullman with the prospect of a job in the plant pathology department. Today she teaches basic fungus and plant pathology courses, and is often called upon to identify molds that show up in homes and public buildings, as well as fungi that affect crops. Her specialty is smut fungi, which affect wild and cultivated grasses, including the thousands of acres of wheat and barley that cover eastern Washington.

Carris may not have planned to go into mycology, but once she's in the woods, it's clear she's cut out for it. Within seconds, she's off into the brush, her puff of blond curls catching the glints of sunlight filtering through the trees. Aha, she says as she runs her fingers up a *Corallorhiza*, a coral root orchid. It doesn't have chlorophyll, she explains. It uses a fungus to absorb nutrients collected by the trees around it. It wouldn't be here if it weren't for the mycorrhizal fungi in the soil, she says.

When she's mushroom hunting, she carries a red plastic grocery basket and wears a magnifying loupe and plastic whistle around her neck. She always brings along a copy of *Mushrooms Demystified*, because even scientists can use help identifying their finds. But mushrooms aren't her only prey.

A half-hour into our hike, she drops to her knees in front of a pile of elk dung. She picks up a pellet and holds it to her loupe. She could bring this back to her lab, where, under the right conditions, it will sprout a variety of fungi, particularly mushrooms. It's a great thing to show students, she says.

As for the chanterelles, the sampling she collects for teaching is woefully small. "It's hard for me to preserve my specimens for class," she confesses. "It's because they're so good. I have to eat them."

One of her great peeves is seeing "wild mushrooms" on a menu. More often than not they're commercially grown shiitake or oyster mushrooms, she says. "There's nothing wild about them. Consumers need to know that."

The chanterelle, on the other hand, just can't be grown commercially. "There's something that they're getting from the tree that we can't figure out how to replicate," says Carris. But in the wild, they can be plentiful. They appear near a wide range of tree hosts, especially conifers, as in the woods we're visiting. We agree to return in a month or two to hunt for them.

As we leave the forest behind, we pass a large, manicured farm with thoroughbreds and green pastures sectioned with white fences. The owners have picked a beautiful spot to settle, says Carris. "But I wonder if they even know what's back there in the woods." ●





Secrets & Spies

IN FEBRUARY 1943, Elmer Harris '42 arrived in North Africa on a top-secret assignment. World War II was at its height. Germany had invaded France, Denmark, and the Soviet Union, and the United States was fighting Japanese forces in the Pacific.

Nazi troops, led by General Erwin Rommel, were rapidly taking territory in northwestern Africa. To stop them, the Allies, under commanding general Dwight David Eisenhower, had moved their headquarters from London to Algiers to fight Axis occupation.

Harris, who was known to his friends as "Pinky," was under orders to collect munitions and meet up with Jerry Sage '38, his old classmate from Washington State College. Sage had already been in the region several months, making trouble for the Nazis.

They were stationed in Algeria near Tunisia and the Kasserine Pass. Both men worked for Roosevelt's secret army, the Office of Strategic Services (OSS), and both had been given very general orders: Do what you can to slow down the Germans.

Sage and his crew were harassing Rommel's forces by blowing up supplies and soldiers behind enemy lines. They would set bombs in the road and then bury them under a pile of manure, making them nearly invisible to the Italian and German soldiers driving through. "It was a job you did on the spot. And to get what [equipment, manpower, and munitions] you needed, you begged, borrowed, or stole," said Harris, one of several OSS agents who attended Washington State, and the only one of the five who figure in this story to be still alive.

On this particular mission, Sage was planning to "do a sabotage job" on the front lines in Kasserine Pass to weaken



the German forces and help an American combat command. He arrived to find that the command had already been outgunned by German Tiger tanks. He decided to take a few men and get behind enemy lines through a flank being held by a British outfit. He and his men wove their way into a German minefield. They were spotted and tried to run, hoping the British would fire on the Germans to give them cover. Instead, two German shells exploded just above them. One man was hit in the leg and head with shrapnel; Sage was hit in the leg and shoulder, but he could still move. He dragged the man as far as he could, then promised to come back for him after dark. Crawling a short distance away, he lay in a depression in the sand, hoping the Germans wouldn't spot him. It didn't work. Fortunately, he managed to jettison his guns, dagger, and other spy equipment before his captors loaded him into a tank. Had he kept them, they would have known he was a spy, and would have killed him.

As Harris drove up the road for his meeting with Sage just a half hour later, a local who was a member of Sage's crew came zooming toward him in a jeep, shouting, "Mr. Harris, Mr. Harris! Major Sage is captured!"

"I'll never forget that," Harris said during a recent interview at his home in Edmonds. "I missed him by half an hour."

Over the next few days Sage made several attempts to escape. He even tried to steal a truck. He and two other prisoners managed to slip out of a moving train, only to stagger through the desert and get caught and handed back to the Germans. Sage was again able to escape detection as a spy when the two other prisoners, who were airmen, told the Germans he was their commander, leading them to believe he was a pilot.

Harris, meanwhile, returned to his station, where he was set up to train American and guerilla spies to parachute behind enemy lines and bring information back to Allied troops.

The Washington State connection

Sage and Harris weren't the only men from Washington State College to end up in our country's first secret service agency. At least three more trained with them and served in critical wartime posts in China, England, and France.

Sage was among the first to join. The Spokane native was handpicked because of his efforts training recruits on the West Coast, his athleticism, and his readiness to use his fists. An ROTC student and first lieutenant in the Army Reserve, he sought active duty in 1941, believing that the United States would soon join the fight against the Nazis. He reported for duty early and was quickly placed in command of a field bakery platoon. He trained his men to carry rifles in their hands and ovens on their backs. But that assignment didn't last long. He was pulled into an officer training school at Fort Lewis, and just a few weeks later was called across the country to Washington, D.C.

He arrived to find himself in a private meeting with William Donovan, a Medal of Honor winner from the First World War whom President Roosevelt had appointed chief of the intelligence community. Donovan, then operating under the title of

coordinator of information, was just starting to shape the Office of Strategic Services.

He told Sage he had a job for him as agent, saboteur, and possibly assassin. To Sage, it sounded exciting. It was a chance to take action against the Axis forces. "I'm aboard. Yes, sir," Sage told Donovan.

His first stop was a secret training camp called Area B on Catoctin Mountain in Maryland. Sage learned hand-to-hand combat, how to use a fighting knife, and how to kill silently. He was made an assistant instructor. From that perch, he saw his WSC classmates filter in. Chris Rumburg '38, a farm boy from eastern Washington who was student body president and played center on the football team when Sage played end, showed up among the first military officers to be trained as instructors. Along with him came Joe Collart '39, who had been a diver and member of the Washington State gymnastics team. Collart used his engineering education and Rumburg's brawn to build a confidence course for the camp. They erected a structure of tall logs with crossbeams to help the men overcome fear and vertigo at great heights.

At the camp, Harris, who was living nearby and training with the Marines, ran into Rumburg, and they went out and had a night on the town together. Not long after that, Harris's name somehow made it onto the OSS list. Besides being a trusted friend of several other agents, Harris had a good Marine career going, and had broken many shooting records while training at Pendleton. His years growing up and hunting in Ketchikan may have given him the gun smarts that served him so well in the Marines. "Well, on your ninth birthday you got a gun," he said.

Harris's former fraternity brother, Arden Dow '40, also joined the trainees at Area B. "Donovan and Roosevelt decided they should have a secret force that wasn't tied to just the Army or the Navy," said Harris. "They could get anybody they wanted. I don't know who pulled me out of the Marine Corps, but someone did."

The men learned how to change their appearance, how to handle all kinds of weapons and explosive devices, and how to tell if their rooms or luggage had been searched. They also learned how to jump out of airplanes and collect strategic information from behind enemy lines. Some, including Sage, were sent to England to refine their spycraft under the guidance of their British counterparts.

When the Americans joined the Allied efforts during World War II, the new OSS agents were ready to go.

Agents of history

Rumburg, who spent the early part of the war training new agents at the Catoctin camp, was eager for a mission overseas, said Harris. He was made an officer and given a command leading men into France from England. Sadly, he never made it to France. On Christmas Eve 1944, Rumburg was crossing the English Channel with more than 2,000 servicemen on a converted Belgian passenger liner, the S.S. *Leopoldville*, when the ship was hit by a German U-boat torpedo five miles off the coast

of France. Rumburg hurried below decks to help save the hundreds of American soldiers waiting there. Witnesses say he threw off his coat and dove into the icy water that was filling the boat to rescue a soldier who was calling for help. Harris said that was the last he heard of Chris. "I talked to three people about it. They said he was on the third deck, and his crew was down on the lower deck. He went down below to get the crew out because they got torpedoed, and he was never seen again." Although nearly 800 U.S. soldiers were killed in the incident, the full story of the *Leopoldville* wasn't made public until 1996. It was suppressed, according to several historians, because the Allied governments were embarrassed that so little had been done to save the soldiers on the sinking ship.

Arden Dow became a senior OSS officer in China. For a time he was a deputy in charge of OSS/SACO affairs. SACO (the Sino-American Cooperative Organization) was an effort to join U.S. and Chinese soldiers in a force to fight the Japanese. American soldiers integrated themselves into Chinese culture, learned the language, and moved into Chinese communities.

Dow appears in the history books as a witness to a diplomatic faux pas that could have destroyed the relationship between the OSS and Chinese nationalist forces. According to *OSS in China*:

deep in country. It took him days to unwind and return to normal, said Harris. But the presence of Dow's old friend helped him adjust. When Dow went home to the states, he became a teacher, Harris recalls.

Joe Collart joined the IX Engineer Command, which built airfields in England during the war, according to public records. Later he became a colonel in the U.S. Army and took part in Army construction projects in Vietnam. After a long military career, he retired and returned to Washington. He passed away in 1999.

After his capture at Kasserine Pass, Sage was sent to Germany, where he sat out the war in Stalag Luft III, the POW camp made famous by the movie *The Great Escape*. The character of the American soldier played by Steve McQueen was based, in part, on Sage, who spent many hours in the cooler and was constantly trying to break out. In one attempt, he squeezed out of a moving ambulance. Preparing for another, he was playing catch with a fellow prisoner and tossed the ball close to the fence to find a spot where he wouldn't be seen from the guard towers.

Besides persisting in his attempts to escape, he taught fellow prisoners some of his OSS skills, including the art of silent kill-



Left to right: An OSS Parachute Jump School certificate; Arden Dow receiving a medal from William Donovan (U.S. Army photo/John Chambers); a spy kit of blades and knives (Museum of World War II, Natick, Massachusetts); a German guard box (U.S. Air Force Academy Library).

Prelude to Cold War, by Maochun Yu, an American brigadier general went to Chungking in 1944 to meet with the two SACO leaders, U.S. Navy commander Milton Miles and Chinese general Tai Li. The meeting went smoothly, but afterward, at a welcoming party that Li gave in the general's honor, the relationship fell apart. Dow gave his account in an urgent top-secret report to Washington, explaining that the general drank during the meal, said disparaging things about Chiang Kai-shek and his wife, and denigrated the Chinese people and their culture during a vulgar and racist two-hour tirade.

Dow later apologized to Li for the incident, at which point the Chinese leader vented his anger. The whole SACO effort was in danger, Dow told his superiors in Washington. Fortunately Miles and Dow's superiors were able to repair relations.

Later in the war, Dow traveled deep into China to gather information about potential enemy forces and to train guerilla fighters.

Harris was assigned to the parachute school in Kungming, so he was close by when a team brought Dow out of his station

ing. He writes in his autobiography, *Sage*, about the tunneling efforts for which the camp is famous. He explains that crowds of prisoners, presumably gathered to take self-defense classes, would provide cover for men transferring excavated dirt from the tunnels. They would then dump the dirt on the ground through their pantlegs. The other prisoners would shuffle about and disperse the dirt into the surrounding sand.

Sage finally managed to escape in 1944, toward the end of the war. During a prisoner march between camps, he buried himself in a pile of rutabagas at a farm where they were spending the night, and was overlooked the next morning by the German guards. "This final escape was the easiest of any I had attempted," he wrote. Sage took several months to make his way out of Europe and travel back to North Africa before heading home. One of the first things he did when he got to Washington, D.C. was call Ernie Krom, a buddy from WSC who was enlisted in the Navy, and invite him to dinner. Sage went on to a career in the Army, and in 1985 published his account of his time in the OSS. He died in 1993.



And what of Pinky Harris?

After missing his meeting with Sage in 1943, he went back to Algiers to train agents to parachute behind enemy lines. He was stationed close to Eisenhower's headquarters—close enough to trade daily greetings with the future president. He was also close enough to pick up bits of information to pass on to parachutists infiltrating enemy lines. When Eisenhower turned his focus on Sicily, Harris and his crew parachuted in first to spy on the Germans and Italians.

As U.S. forces pushed farther into Europe, Harris and his team went too. He eventually ended up in Italy, then India, Burma, and finally China. He remained attached to the parachute school throughout, and made a number of jumps out of B17s and B24s.

After the war, he left the service and moved back to Washington with his wife and college sweetheart, Betty. They settled in Seattle. This year, Harris turned 90, and he and Betty celebrated their 65th wedding anniversary.

At its peak, the OSS was a \$43-million-a-year operation and stationed 7,500 men and women overseas. But politics and power struggles in Washington, D.C. brought it to an end. In 1945, Donovan was released from his duties, and the OSS was broken apart. The secret intelligence and special operations pieces were given to the War Department. And the foundation, networks, allies, and operations the OSS had established became the beginnings of the Central Intelligence Agency. Some agents stayed on to work for the CIA, while many others, like Harris, went back to civilian life.

Harris is still amazed that he and almost all his Washington State classmates survived the war and came home to lead normal lives, have jobs, and raise families. "A lot of times I got in a place and said, 'What am I doing here?'" he said. "We were so damn lucky, it wasn't even funny." ●



Elmer Harris '42

Was first stationed in North Africa, then went to Italy, India, Burma, and China. Trained agents to parachute behind enemy lines.



Jerry Sage '38

Was captured by the Nazis in North Africa and spent much of the remainder of the war trying to escape German POW camps, including Stalag Luft III.



Chris Rumburg '38

Trained OSS recruits at Mt. Catocin. Died in 1944 while crossing the English Channel in the S.S. *Leopoldville*, which was sunk by a German U-boat torpedo.



Joe Collart '39

Went to England as a member of the IX Engineer Command to build airfields.



Arden Dow '40

A senior OSS officer in China. Worked on SACO, an effort to join U.S. and Chinese soldiers into a single army to fight the Japanese.



Yogendra Gupta '73

Regents Professor of Physics and
Director of WSU's Institute for
Shock Physics.

Recipient of the Eminent
Faculty Award.

Examines atomic and molecular
structure of materials under high-
pressure shock compression.

Loves to help his wife in the garden.

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An Interview with community leader

Mary Alyce Burleigh

'64 History

TWO YEARS AGO Mary Alyce Burleigh bought herself a bright yellow scooter. The former Kirkland mayor and current city council member uses it to zip around town to meetings and local fundraisers. She finds she is as busy in her retirement as she was during her 29 years as a teacher for Redmond High School. Recently she parked her scooter and perched on a city park bench in downtown Kirkland to talk with Hannelore Sudermann about life, civic involvement, and getting 80 miles to the gallon.

My goal was always to be a high school history teacher. I really took a broad range of courses at WSU. As a high school teacher you have to know a little about a lot of things. When I graduated in '64, I got what I believe was the only high school history position on the west side open to a woman. In those days most history teachers were coaches, and the only teams were for guys.

I taught at Burlington Edison for a year, and decided I really needed to go back to graduate school. I just felt **I wanted to know more**. So I reenrolled at WSU. It made me a much better history teacher. What you learn in graduate school, which you really didn't focus on as an undergraduate, is how history is written. I learned to focus as much on how and who wrote the history as much as what they wrote.

I decided to serve my community. After that first year of graduate school I went into VISTA [Volunteers in Service to America]. This is during the Vietnam War and the beginning of the civil rights movement. I went down to Florida



MATT HAGEN

and South Carolina to work with migrant workers and textile workers. We were tutoring and doing things like nutrition and sanitation education. It was like going to another part of the world. The white textile workers wanted nothing to do with us, and the government didn't want us to work with blacks. ... What I learned was invaluable, but I realized, "I'm not doing anything for anybody here." So I resigned and came back to Washington. I was lucky enough to land a job at Redmond High School, where I spent the next 29 years.

I met my husband when I was involved in the Eugene McCarthy [presidential] campaign in 1968 ... I've always had an interest in civic involvement. That VISTA experience, that was enough to radicalize anybody: To be in America and have third-world conditions. I think also my education at Washington State contributed ... It was just the time. You saw that social justice was something you had to start working on in a serious way.

I taught in a British comprehensive high school for a year (1977–78) on a Fulbright grant. I was teaching Anglo-Saxon invasions and Tudor-Stewarts as well as 20th-century world [history]. If you've seen the Sidney Poitier movie, *To Sir with Love*, it was like that. It was a very tough school, and there was very limited equipment. There weren't enough textbooks, and discipline was not good. I was considered to be a great success, because my kids were sitting down in class.

[In the States] **we moved** to North Rose Hill. When we annexed to the city of Kirkland, it seemed apparent that we needed to get ourselves organized as a neighborhood. I was one of 12 people who organized the North Rose Hill Neighborhood Association. We wanted to get the neighborhood involved in civic affairs and try to get people a sense of community and belonging. Now Kirkland has a neighborhood association in every neighborhood. They are not created by the city. They are independent units on their own.

I ran for city council in 2002, after my husband died. I have learned that most of the

problems facing Kirkland or any other town are regional in solution. For example, the bumper-to-bumper traffic through the center of town between four and six p.m. is commuter traffic. They'd rather be sitting down here than sitting on the freeway.

One of the fun things I do is represent the Association of Washington Cities on the Shorelines Hearings Board. Anybody who wants to, say, build a dock, if they don't get a permit, they can appeal to the Shorelines Hearings Board. If they do get a permit, and the Department of Ecology doesn't like it, we hear it. We've given up on Lake Washington in terms of people porcupining it with docks. The real issues are up in the San Juans and in Puget Sound. Docks have a negative impact on habitat, salmon habitat. Our job is to project the shoreline and the habitat.

Towns can change. Where the library is now, used to be a gravel potholed parking lot. Where the marina is now, same thing. You certainly didn't have any quality restaurants. Everything you wanted to do, you went into Seattle. We never came downtown, frankly, the first 15 years we lived here. There was nothing to come down here for. Now I'm down here all the time. This is the heart of our town. It's sort of our living room. People think of Kirkland as a small town with a small town feel. But we're the 17th-largest city in the state. We have close to 50,000 people. What gives you that? It's that residents know people. That's what creates a sense of community. That's what being a small town is—it's feeling connected with the community.

I'm so grateful that the people on the city council back in those days had the foresight to take a look at the waterfront, which was all shipyards and oil tanks, and think, "That's going to be parks." They had this vision to say that we could have these parks. They really set the town and culture. Our job is to not mess it up, but to build on it.

We do things gracefully, if possible. With Tent City [a homeless encampment that circulates through church parking lots in

eastern King County], the goal was to make it work and engage the community in the process. I got a call one Friday afternoon from a pastor telling me Tent City will be here next Saturday. By Monday, the city had an informational Website up. We went through a public process and tried to address peoples' concerns. There were some people who went to whatever community Tent City was coming to, and rile up people. When Tent City was moving in, I went over and welcomed them, and moved a few boxes. One of these guys reported me to the attorney general for violating state law or something. That prompted a headline in the *Eastside Journal*: "Mayor Criticized for Helping the Homeless." I have that one in my scrapbook.

A former student of mine **found the scooter** on *Craig's List*. She said, "Why don't you get this one?" So I did. It's a Honda Metropolitan. For a place like Kirkland, where you can basically ride all over the place, it's just fun. And it's different and kind of cute. It has character. It was named by the previous owners "Bumble," so I put some bees on it. I don't ride it in the rain or in the dark. And I try to stay off the major arterials.

I love our community, and I love my neighborhood. I spent last Saturday morning spreading bark at Mark Twain Elementary ... Our school district spends zero on maintenance and landscaping. And we think it's important that a school looks like it's valued and it looks good from the outside. We spent four hours picking up litter and spreading bark around, so when the kids come to school on Monday it looks good.

I play on the over-55 coed softball team, The Kirkland Classics. They're a fun bunch. But this was not a great season for me. I got hit in the back of the head with a line drive and ended up with five staples. And then I dove for a ball in the infield and landed on my face and got a concussion. Other than that, it's a lot of fun. I think there's a different mindset. People don't look at it as retiring and sitting in a rocking chair. It's more, you retire from your job and you get involved with something else.



"The day was long," she continues. "like any spent lolling in pajamas/ with a new companion short on talk/ and a little standoffish."

"A Middle Child Is Born" took her nine years to write, Flenniken tells me, as the middle child plays in the next room with a friend. "I had a vision of what that day was like," she says. "But it was polluted with all this extraneous stuff." Finally she forgot enough, and she could write about it.

While she was writing the poems that would become *Famous*, published last fall by the University of Nebraska Press, both her parents died, within three months of each other, and one of her best friends committed suicide.

After her parents died, Flenniken felt a strong need to start over, and she and her

Kathleen Flenniken

You Have to Say What's True

KATHLEEN FLENNIKEN (NÉE DILLON) '83 writes about her children and vacuuming, about sex and death, about fame and Edna St. Vincent Millay's husband ("Oh the beauty of his wretchedness."). Her poems are tight and clear and smart and often very funny. While she was at Washington State University, she studied civil engineering.

A career in engineering that evolved toward poetry may not be typical, but it's a fine match, says Flenniken. In engineering, "you can't hide behind your language. You have to say what's true, and if it's not true, that's a problem that needs to be fixed." And with that, you are ready to read Flenniken's poems:

In "A Middle Child Is Born," the speaker contemplates "this tiny red soul" in her arms and weeps, "for the ruined life of her radiant firstborn."

Richland Dock, 1956

Someone launched a boat into the current,

caught and delivered fish to the lab
and someone tested for beta and P-32.
Someone with flasks and test tubes tested
and re-tested to double check the rising values.

And someone drove to the public dock
with a clipboard and tallied species and weight.
Chatting with his neighbors, Which fish
are you keeping? How many do you eat?

And someone with a slide rule in a pool of light
figured and refigured the radionuclide
dose. Too high. Experimented frying up
hot whitefish. No. No. Then someone decided

all the numbers were wrong. Someone
from our town. Is that why we
were never told? While someone fishing—
that little boy; the teacher on Cedar Street—

caught his limit and never knew.

family moved to the house they live in now, north of the University of Washington and just west of Lake Washington. As she got used to the new neighborhood and its new sounds, she sometimes would hear a train whistle, which was odd. There were no train tracks in the neighborhood. But it sounded so near.

Although she finally realized the train was across Lake Washington, its wail echoing against the hills above her house, it became a ghost train, carrying her mother and father through the living world. If she could find the tracks, she writes, she could wait for them at the boarding gate, as she did when she was a girl “hungry for stories/ of their holidays away.”

Flenniken loved writing even in college. But her father had always been so proud of how well she did in math. Wanting to honor him, she went into engineering. Also, she says, growing up in the Tri-Cities, there were scientists all around her. It was a very comfortable world.

After she graduated, Flenniken

worked at Hanford for three years as a hydrogeologist and environmental engineer. Then she moved to Seattle, married, worked toward a master’s in engineering at the UW, then worked again as a civil engineer. But after her second child was born, she quit.

With two little boys and no job, her brain needed a little stimulation. She tried night classes and started reading poetry. Then she took a poetry class, and she fell in love. *Famous*, the result, won the *Prairie Schooner* Book Prize in Poetry.

Still, the transition is a little difficult, she says. “When do you start calling yourself a poet?”

Well, *I’d* call her a poet. A refreshing one. The few poets I read anymore are generally at least a century old. Aside from exceptions such as Dana Gioia and Billy Collins, I find much of contemporary poetry insular, academic, and dull, kind of an inside joke. I have become one of those literary troglodytes who “just don’t get it,” confused as to what, for example,

the language poets have against offering an insight, invoking a luscious metaphor, or telling a good story.

Maybe there isn’t any “it” to get, says Flenniken, who, much to my pleasure, tells a good story and contradicts my disillusion.

“One advantage of coming into poetry old,” she says, “I was set in my ways. I could say, I like that, I don’t like that, and not figure something was wrong with me because I don’t get it.”

But now she’s on to something new, combining her engineering training with the language of poetry, which actually has been her aim since the beginning, and has finished a manuscript about Hanford.

—Tim Steury

● To read Kathleen Flenniken’s poetry, go to www.kathleenflenniken.com. For a review of *Famous*—and for ordering information—visit wsm.wsu.edu.

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CLASS NOTES

1930s

Virginia Griffith ('38 Ed.) recently celebrated her 100th birthday. After graduating from WSU, she and her husband, John, moved to Oregon, where she taught elementary school. She now lives in Portland.

1950s

David E. Allen ('52 Engl.) is an Episcopal priest. Once a month he assists the Boston Chinese Ministry at St. Paul's Cathedral in Boston, Massachusetts.

1960s

Melanie (Wood) Berg ('63 Home Ec.) retired after 33 years of teaching students ranging from preschoolers to college students. She now lives in the Big Bottom Valley near Mount Rainier.

Daryl Wall ('65 Mech. Engr.) and wife, **Barbara Wall** ('65 Hist.), are retired in Miami. They spent two years with family in the Peace Corps in Ecuador, and 37 years with Boeing living in Honduras, Mexico, and the USA.

Shaikh M. Ghazanfar ('69 Ph.D. Econ.) is professor emeritus at the University of Idaho in Moscow. He published two books: *Medieval Islamic Economic Thought: Filling the "Great Gap" in European Economics and Islamic Civilization: History, Contributions, and Influence*. He is editor for the *Encyclopedia of Society and Culture in the Ancient/Medieval World*. Ghazanfar received the Moscow Community Unity Award in 2005 and the UI Martin Luther King Distinguished Service Award in 2007.

Bill Price ('69 M.A. Anthro., '82 Ph.D. Anthro.) was named executive director for the American Language Institute at San Diego State University.

1970s

Ashok Dhawan ('70 Elec. Engr.) is CEO of Mobius Microsystems, a producer of timing technology for electronics. The company is headquartered in Sunnyvale, California.

Tor Holtan ('71 Bus. Admin.) is vice president and chief innovation officer of Kellen Company, a global professional services firm.

Jim Smiley ('71 Comm.) is director of operations for Steele Fitness. Previously, he worked for Bell telephone system for 20 years and was regional vice president for U.S. West. He also started a consulting company and served as president of a nailing and stapling equipment company. He has two children and lives with his wife in Minneapolis, Minnesota.

Dick Sturza's ('71 Bus.) car is a token to his alma mater. He completely restored a '67 Mercury Cougar, painted it crimson with silver pin striping, and emblazoned "WSU Go Cougs" on the hood. He lives on Camano Island.

William (Willie) Lyon ('72 Bus.) retired after 35 years as a manager with the U.S. Customs Service in New York.

He is now taking time to ski, work out, and travel.

Jeff Thomas ('73 Engl., Ed.) is accounting manager for The Neiders Company LLC, a Seattle-area real estate investment firm.

Sam H. Ham ('74 For. & Range Mgt., '79 M.A. For. & Range Mgt.) won the William C. Everhart Award from Clemson University for sustained achievements in fostering an appreciation for our natural and cultural heritage. He is director of the Center for International Training and Outreach and is a professor of communication psychology and international conservation at the University of Idaho.

Margaret (Tylczak) Heffelfinger ('74 Comm.) published her third book, *Every Dog Has Its Day*. Her son, Hart, helped illustrate the book.

Stewart Anderson ('76 Ed.) is assistant vice principal for Hiawatha and Scootney Springs elementary schools in Otello.

Lucille Linden ('77 M.C.E.) was presented the Meritorious Service to Extension International Programs award at the National Conference of International 4-H Youth Exchange. She was the first woman named National Coordinator of the 4-H Japan Exchange in 1982, and has worked with three Japanese exchange programs.

1980s

Howard Strand ('80 Crim. J.) and his wife, Brenda Nellums, have a winner. Their homebred thoroughbred, Gabby Lane, won her first race at the prestigious Del Mar racetrack in California. In early August, the horse paid \$71.40 on a \$2 win.

David Bricka ('81 Bus.) is executive director of the Chamber of Commerce of Sedro-Woolley, his hometown.

Don Ott ('82 Comm.) is commissioner of the California Pacific Conference, a 10-member Division II athletic league sanctioned by the National Association of Intercollegiate Athletics. He was an associate commissioner of the West Coast Conference for 16 years. He is also pastor at the Castro Valley (California) First Baptist Church.

Robert Lowery ('84 Comm., Polit. Sci.) is director of publications at Central Washington University. He is the voice of the Wildcats and was honored as the 2006 employee of the year at CWU.

Jonnelle Pierce's ('85 Elem. Ed.) son, Austan, was diagnosed with cancer in 2003. After many surgeries, chemotherapy, and radiation treatment, Austan's cancer is in remission. He lost his left leg in 2006 while battling the disease. The family lives in Spokane.

Karen Chong-Wulff ('86 M.B.A.) is vice president of the fixed-income division at ICMA-RC, a non-profit organization that manages and administers retirement plans for the benefit of public

sector employers and employees. She lives on the East Coast.

Cindy (Browne) Rosefield ('87 M.A. Mus.) is director of instrumental music at Las Positas College in Livermore, California. She has played bass with the band Wake the Dead and with jazz guitarist Mimi Fox. She and her husband, Tom, have two children.

Janet White's ('88 Zool.) oldest son, five-year-old John Jr., is co-starring in the Lifetime Television Network hit series *Army Wives*. The series is filmed in Charleston, South Carolina, where the White family resides.

1990s

Julie (Lesmeister) Bock ('91 Ed.) received her master's degree specializing in elementary reading and literature from Walden University. She graduated with a 4.00 GPA.

Cary C. Countryman ('92 Polit. Sci., '95 M.B.A.) was elected president of the Hospitality Information Technology Association (HITA). After leaving WSU, he earned a Ph.D. from Purdue University. He teaches hospitality and tourism management at Brigham Young University and lives in Hawaii.

Alan Anderson ('93 Bus. Admin.) is a partner at the Blackwell Sanders law firm in Kansas City. He will focus his practice in energy law, including conventional and unconventional exploration and production, as well as renewable resources.

Elesa (Baerwald) Field ('93 Engl.) and husband, **Mark Field** ('92 Hum.), Bothell, welcomed a daughter, Avery, May 19, 2007. Avery joins brother, Ethan. Elesa manages a team of web editors, and Mark is a graphic designer.

Shannon Cohen ('94 Comm.) is a teacher for the Sumner School District and was recently awarded the WAVE Teacher of the Year award. Previously, she was a producer for FOX Sports.

Marlowe Dawag ('94 Chem. Engr.) married Joseph Laubach August 3, 2007, in Kirkland.

Pete Tingstrom ('94 Bus. Admin.) received an M.A. in national security and strategic studies from the Naval War College in Newport, Rhode Island.

Angie (Anderson) Weedon ('94 Child Cons. & Fam. Life) and Erik Weedon had their first child, Kellen Fredrick, July 9, 2006. Kellen will be a big brother in November.

Tracy (Hacklin) Dullum ('95 Bus. Admin.) recently celebrated one year in business as a mortgage broker at Anchor Bay Mortgage, Gig Harbor.

Stacy (Siroky) Perrus ('95 Comm.) is marketing communications manager for Arbitron, Inc. in Columbia, Maryland. Previously, she worked with the National Association of Broadcasters and helped develop their Webby-nominated website.

Tamara Taylor ('95 Polit. Sci.) is senior deputy prosecuting attorney in the

Felony Unit of the Yakima County Prosecuting Attorney's Office. She is engaged to Thomas Hanlon. The wedding will be in November at Christ the King Catholic Church in Richland.

Jeff DiNanno ('96 Comm.) and wife, Sonja, announce the birth of their daughter, Sofia Bella. Sofia was born in Lake Forest, Illinois.

Duncan Wilson ('96 Ag. Ed.) is executive director of Sound Youth Counseling in Tacoma. The Christian ministry works with at-risk youth in collaboration with Tacoma Public Schools, the juvenile court, and other local churches and social services organizations.

Karen Temple Rich ('97 Comm.) is agency principal and partner at Rich Marketing, a firm in Seattle that consults on advertising. She joins her husband and business partner, Court Rich.

Jan (Shupe) Staley ('99 Crim. J.) and husband, **Richard Staley** ('98 Ed.), welcomed the birth of their second child, Taylor, July 2007. Richard is principal of the middle school in Tenino, where he served as assistant principal in 2006.

2000s

Kevin Bellinghausen ('00 Hum.) and **Zoe MacFarlane** ('01 Bus. Admin.) were married July 21, 2007 in Seattle.

Jessica (Ray) Flatt ('00 Pysch.) and Robert Flatt, a graduate of Sam Houston State University, were married September 2003. She currently works as a behavioral health specialist with Maternity Support Services at Community Health Care in Pierce County.

Shana (Heaton) Horvath ('00 Comm.) gave birth to a baby girl September 2007. She lives in southern Idaho.

Bryan Long ('00 Music, '01 Ed.) is assistant principal of the elementary school in Umatilla, Oregon. He welcomed the birth of his first son, Devin, in April.

Bill Wisneski ('00 Comm.) won two Emmy Awards from the Pacific Southwest Chapter of the National Television Academy for producing and writing. His documentary told the story of a woman who leads humanitarian efforts in Vietnam.

Holly Merrie Nakamoto Yep ('00 Comm.) and **Timothy Sil-Ming Yep** ('02 Arch.) announced the birth of Dominic Kim-Hong Yep, born July 2, 2007, in Pleasanton, California.

Angela (Smeltz) Scharnhorst ('02 Spanish) graduated from medical school and is now a resident at the Medical College of Wisconsin in Milwaukee.

Karen Whelan ('02 Soc. Sci.) graduated from the William S. Boyd School of Law at the University of Nevada, Las Vegas, and is a practicing attorney for Thagard, Reiss & Brown, LLC in the areas of construction defect defense and insurance defense.

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Holly Wysaske ('02 Engl.) married William Jones July 2006 in Maui, Hawaii. The couple lives in Spokane and both work for KHQ-TV.

Shawna Geier ('03 Psych.) and **Josh Labberton** ('03 Comm.) were married June 10, 2007, in Lacey.

Marissa Nixon ('03 Engl.) and **Paul Thompson** ('05 Pharm.D.) were married January 14, 2007. They live in Kent.

Christina L. Gilchrist ('04 Ph.D. Ed. Psych.) is director of research for Wellspan Health of York, Pennsylvania, a community-based nonprofit organization and health network.

Patrick Heaton ('04 Bus. Admin.) is head of operations at the Sherwin Williams Commercial Branch in Meridian, Idaho.

Megan (McCarthy) Nelson ('04 Soc.) is an academic advisor at Oregon State University's College of Business.

Jessica (Allen) Siderius ('04 Comm.) and **Graham Siderius** ('05, Bus. Admin.) were married August 18, 2007. They will reside in southern California.

Brian Keith ('06 Bus. Admin.) was promoted at Portent Interactive, an internet marketing agency in Seattle. His new job is in business development.

In Memoriam

1930s

Dorothy Darby Smith ('31 Sp. & Hear. Sci.), 97, March 16, 2007, Spokane.

Allan Bell ('33 Pharm.), 95, August 29, 2007, Issaquah.

Clark Booth Goldsworthy ('33 Bus. Admin.), 95, June 11, 2007, Wenatchee.

Katherine Woodmansee ('33 F.A.), 95, July 22, 2007, Camarillo, California.

John F. Bohler Jr. ('34 Econ.), 95, June 16, 2007, Menlo Park, California.

Lucille Milbrath ('36 Home Ec.), 92, Corvallis, Oregon.

Kenneth L. Sieveke ('37 Ag.), 91, August 21, 2007, Tekoa.

Norman Olson ('38 D.V.M.), 93, June 29, 2007, Oxford, North Carolina.

Drusilla (Wrather) Adams ('39 Gen. Stud.), August 5, 2006, Spokane.

1940s

Joyce Johnson Hansell ('41 Pharm.), 87, May 30, 2007, Pendleton, Oregon.

E. Clifford Rosell ('41 Bus. Admin.), 88, June 16, 2007, Prince George County, Virginia.

James F. Steiner Sr. ('41 Bus.), 88, January 8, 2007, Fairfax City, Virginia.

Jesse D. Cochran ('42 Engr. & Arch.), 88, March 17, 2007, Spokane.

George D. Duby ('42 Gen. St., '43 D.V.M.), 87, January 22, 2007, Chehalis.

Marion Cooke Callow Hayes ('42 Home Ec.), 85, June 6, 2007, Tacoma.

Lynn B. Miller ('42 Mining Engr.), 88, July 15, 2007, Bellingham.

Ruth E. Wegsteen ('42 Bus. Admin.), 88, June 11, 2007, California.

John L. Bakke ('43 Zool.), 85, June 16, 2007, Seattle.

Robert G. Martini ('43 Bus. Admin.), 85, March 17, 2007, Woodburn, Oregon.

Meriel M. Fultz ('45 Comm.), 84, May 22, 2007.

Katherine "Kay" P. Schuehle Grigg ('45 Home Ec.), 84, July 1, 2007, Seattle.

Tom Kitayama ('45 Hort.), 83, June 5, 2007, Union City, California.

Betty-Lee Tannehill ('45 Pharm.), 86, August 12, 2007, Pasadena, California.

Ray L. Broughton ('46 Bus. Admin.), July 9, 2007, San Mateo, California.

R. Vernon Divers ('47 Ag.), 86, August 5, 2007, Olympia.

Lucille K. Houghton ('48 Home Ec.), 83, May 31, 2007, Seattle.

Robert J. Martin ('48 Ag. Sci.), 91, May 26, 2007, Spokane.

Norm Lowery ('49 Phys. Ed.), 84, August 28, 2007, Everett.

1950s

Marilyn Rostedt Appling ('50 Home Ec.), 79, July 26, 2007, Shelton.

Weston H. Foss ('50 Polit. Sci.), 78, July 9, 2007, Seattle.

Ruth Mary Fricke ('51 Home Ec.), 77, March 12, 2007, Bellevue.

Marjorie Stansfield ('51 M.S. Psych.), 82, February 12, 2007, Tacoma.

Shirley A. Wallace x'51, 77, May 2007, Denver, Colorado.

Rudy Autio ('52 M.F.A.), 80, June 20, 2007, Missoula, Montana.

Dolores Bryant ('52 Gen. Stud.), 79, May 28, 2007, Golden, Colorado.

Richard Addison Calkins ('52 Bus. Admin.), 76, June 8, 2007, Everett.

Thomas B. Graham ('52 Hotel Admin.), Sherman Oaks, California.

Glenn Louis Blubaugh ('53 Engl.), 79, May 31, 2007, Ocean Shores.

Jack Green ('53 Mech. Engr.), 75, June 28, 2007, Tucson, Arizona.

Forest Holland ('54 Voc. Ed.), 80, April 23, 2007, Marysville.

Wesley Vernon Tolliver ('54 M.S. Sp. Comm.), 80, June 9, 2007, Beaverton, Oregon.

Richard Huson West ('54 D.V.M.), 83, July 3, 2007, Oakhurst, California.

Johannah Grigsby ('55 Soc.), 73, June 10, 2007, Beaverton, Oregon.

Wayne P. Otrin ('55 Ag.), 78, May 18, 2007, Yakima.

Lon Smith ('55 Bus. Admin.), 75, March 2007, Hilo, Hawaii.

Robert Bashaw ('56 Ed.), August 29, 2007.

Janice D. (Meister) Crum ('56 Sp.), 72, June 29, 2006, Medford, Oregon.

John Theodore Halin ('56 Civ. Engr.), 74, March 31, 2007, Bellevue.

Betty Jo Jensen ('56 Home Ec.), 72, June 3, 2007, Everett.

Floyd Francis Dodge ('57 Mech. Engr.), 78, June 22, 2007, Edmonds.

Keith E. Ahola ('58 Civ. Engr.), 74, May 27, 2007, Vancouver.

Mel Hagwood x'58, 85, September 10, 2007, Corvallis, Oregon.

Donald Nieland ('58 Bus. Admin.), Spokane.

1960s

Jim Kent ('61 Bus.), 67, April 30, 2007, Bremerton.

Gretchen Mathers ('62 Home Ec.), 66, August 7, 2007, Seattle.

John V. "Jack" Sibole Jr. ('62 D.V.M.), 72, May 30, 2007, Lodi, California.

Richard A. Wendt ('62 Premed.), 67, August 2, 2007, Seattle.

Dennis Cearlock ('63 M.A. Civ. Engr.), 65, July 9, 2007, Thailand.

Dale G. Hamreus ('63 Ed.D. Ed.), 83, June 2007.

Paul P. McCurley ('64 Ed.D. Ed.), 87, May 20, 2007, Anacortes.

Carl G. Kretschmar ('65 Bus. Admin.), 64, July 11, 2007, Columbia, South Carolina.

1970s

John Alton McIlhattan ('70 D.V.M.), 61, May 6, 2007, Bozeman, Montana.

James E. Ragland Jr. ('72 Comm.), 56, January 31, 2007, Oroville, California.

Thomas Harvey Gibbs ('74 Bact. & Pub. Health), 59, June 27, 2007, Olympia.

Leon P. Wray ('74 D.V.M.), 63, March 22, 2007, Kirkland.

Thomas A. Coleman ('76 Bus.), 54, April 23, 2007, Las Vegas, Nevada.

Richard Alwin Gutheil ('78 Bact.), 55, January 17, 2007, Columbus, Ohio.

Richard Allen Reding ('78 Ag. Ed.), 56, June 22, 2007, Seattle.

1980s

Wanda Fleischman ('80 Civ. Engr.), 49, March 17, 2007, Seattle.

Randy Gibbons ('82 Comp. Sci.), 54, April 2, 2007, Seattle.

Keith Belsby ('83 An. Sci.), 47, March 18, 2007, Spokane.

Kathy Loizeaux ('84 Crim. J.), 45, May 19, 2007, Harleysville, Pennsylvania.

Jill (Johnson) Meinecke ('86 El. Ed.), 46, May 31, 2007, Richland.

Kenneth Eugene Johnson ('88 Hist.), 44, March 15, 2007, South Dakota.

Patricia M. Campbell ('89 Bus. Admin.), 60, June 20, 2007, Pullman.

1990s

Paul McGeady ('90 M.S. Biochem., '92 Ph.D. Biochem.), 45, June 14, 2007, New Orleans, Louisiana.

Philip Matthew Snowdon ('91 Ed.D. Ed.), 57, March 21, 2007, Spokane.

Marla Jan Shaffer-Eddrief ('93 Psych.), 45, June 6, 2007, Federal Way.

Faculty & Staff

Eugene (Gene) Bruce Allen, 58, facilities staff, June 3, 2007, Albion.

Esther Anderson-Spencer ('68 M.A. Engl. Lit.), 91, retired Holland Library supervisor, January 6, 1916, Pullman.

Betty J. Brewer, 82, retired housing services staff, August 27, 2007, Pullman.

Henry J. Butherus, 98, retired ROTC instructor, August 13, 2007, Walla Walla.

John Crane, 72, biology and zoology professor, June 18, 2007, Spokane.

Crystal Hamilton, 30, School of Communication staff, May 19, 2007, Moscow, Idaho.

Andrew Hofmeister ('47 M.F.A.), 94, former faculty, September 1, 2007, Olympia.

Stanley P. Holloway, 87, retired stores clerk, April 5, 2007, Pullman.

Gordon Keown, 95, professor of large-animal surgery, May 12, 2007, Los Gatos, California.

Stanford Kitterman, 91, retired wheat researcher, June 6, 2007, American Fork, Utah.

George Leary, 85, retired psychology professor, August 24, 2007, Carson City, Nevada.

Eber Marsh, 84, retired staff, July 19, 2007, Clarkston.

Edith Alvina-Mae Maycumber, 79, Holland librarian, March 15, 2007, Republic.

Margaret McNew, 87, retired administrative assistant to president, April 1, 2007, Yakima.

Winona P. Nilan, 82, retired medical lab technologist, June 21, 2007, Pullman.

Ruth Evelyn (Troeger) Olsen, 76, retired from the music department, August 17, 2007, Port Angeles.

Alice M. Rowland, 94, retired staff, June 26, 2007, Lacey.

Bill Tomaras, 85, retired instructor and wrestling coach, August 12, 2007.

Paul C. Wadleigh, 81, retired speech and theatre professor, April 9, 2007, Palouse.

Edith White, 92, retired staff, September 1, 2007, Fountain Hills, Arizona.

Raymond J. Young, 84, retired education professor, February 12, 2007, Norman, Oklahoma.

Brooke Randall

2002 Graduate (B.A. Business Administration, Finance)

Associate, Unitus, Inc. – Innovative Solutions to
Global Poverty, Redmond, WA

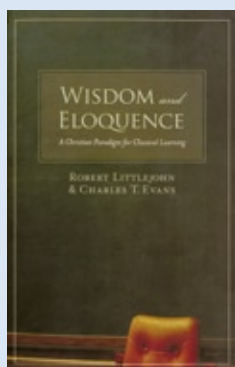
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Wisdom and Eloquence: A Christian Paradigm for Classical Learning

By Robert Littlejohn '83 and Charles
T. Evans
Crossway Books
Wheaton, Illinois, 2006

If you're a parent seeking a quality model for secondary education for your child, you will be intrigued and encouraged in reading Robert Littlejohn '83 and Charles T. Evans's *Wisdom and Eloquence: A Christian Paradigm for Classical Learning*. If you're a Washington State University grad, you'll want to see what a Cougar Ph.D. in botany-plant physiology (Littlejohn) contributes to the educational arena, specifically in providing a Christian paradigm for classical learning.

What makes this book valuable is the credibility it brings to a field often littered with well-meaning attempts at Christian education that lack either the faith dimension or the balanced educational dimension.

Littlejohn brings to the Christian and liberal-arts mixture his scientific training and flexible perspectives on the work of God in the world, and Evans's theological contributions complete the perspective. Commendably, Littlejohn is up front about the importance of modern science as he affirms the research-based benefits of such areas as genetics and medicine to humankind.

Seeking to prepare high school graduates not only to make a living, but also to "make a difference in the world," the authors lay out a pattern of classical Christian education which is part apology for a Christian approach to the liberal arts (and sciences), part historical overview of classical education, and part how-to manual for setting up such a school.

Rejecting our society's tendencies toward pervasive relativism, they make the case for a kind of education that emphasizes Christian worldview formation, character development, academic rigor, cultural relevance, and the development and implementation of the liberal arts and sciences for contemporary students.

The "recipe" for this Christian paradigm for classical learning includes an appreciation for and emendation to the "trivium" (grammar, rhetoric, and logic) and "quadrivium" (arithmetic, music, geometry, and astron-

omy) articulated by the scholar Dorothy Sayers. While Sayers was a powerful writer and thinker in her own right, Littlejohn and Evans feel she did not emphasize strongly enough the power of rhetoric, the mathematical arts, or the "true sciences" so important in today's world. Their curriculum seeks to correct those weaknesses.

By interweaving the Judeo-Christian scriptures with study of the liberal arts, classical Christian education encourages students to develop faith-based, value-based leadership skills, in part through an emphasis on "eloquence"—the learned ability to develop carefully constructed opinion, based on truth and factual evidence—in order to lead and persuade people to choose the right and the good.

I found this book to be a valuable resource for further exploration in the world of classical Christian education. Rich with references that reinforce the author's points, *Wisdom and Eloquence* provides parents, teachers, and other interested persons the big-picture look at what many feel is missing in today's American liberal education.

—John H. Doty

John H. Doty is completing a Ph.D. in literacy at Washington State University.



O Palouse!

Dan Walker Productions
Lewiston, Idaho, 2005

O Palouse!, a DVD about the area, obviously started as one of those absolutely great ideas. Take an area that's extraordinarily photogenic. Good geologic bones, good seasonal color. Unique personality. Add a rich history of relatively recent European settlement and a fairly well documented Native history. Throw in a few major conflicts between settlers and natives for drama. Then there's the two-universities-in-the-middle-of-nowhere angle. Then we'll get a lot of sponsors and work them into the story just a little, and bingo! *O Palouse!* Oh! Oh! Oh!

And for the most part, it works. *O Palouse!* is a fine general introduction, a perfect stocking stuffer, a great addition to the old recruitment package.

In fact, it starts out as a strong documentary. Regional historian Richard Scheuerman '73 is a fine

storyteller and engaging talking head. Both he and the almost-as-engaging Alex McGregor come from pioneer stock and rich family histories.

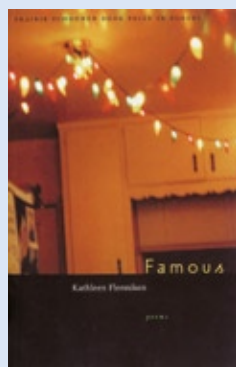
It's good to get another perspective from Scheuerman on the near-massacre of Colonel Step-toe's troops by a confederation of exasperated natives. It's good to know the rich (albeit European) diversity of the area's newest residents and the communities they settled. And it's good to hear how Orville Vogel, Harley Jacob, and others joined to boost wheat production from 40 bushels to the acre to over 100.

Unfortunately, by the time you get to the part about the universities and other obligatory recruitment pitches, what originally seemed like great ideas start to drag the whole thing down. The DVD suffers from an identity problem, trying to please all its sponsors and cover all the bases. This is a big playing field we're talking about.

Still, there's plenty to this comprehensive, if sketchy, picture of the Palouse to make it worth watching and sharing. Photographer John Clement talking about light and the landscape, for example, is a nice touch. And Kelly Quinnett (UI) and Reuben Mayes (WSU) give noble performances, as they try to lend some drama to the reeling off of facts and figures about their respective universities.

If you've lived in the Palouse for a long time and are reasonably informed about the area, you're not going to learn much from this telling. Still, it's pretty, and it does provide a good refresher. Newcomers will get a good overview of their new home, and non- or prospective residents will enjoy an attractive picture of what really is an exotic and enticing place.

—Tim Steury



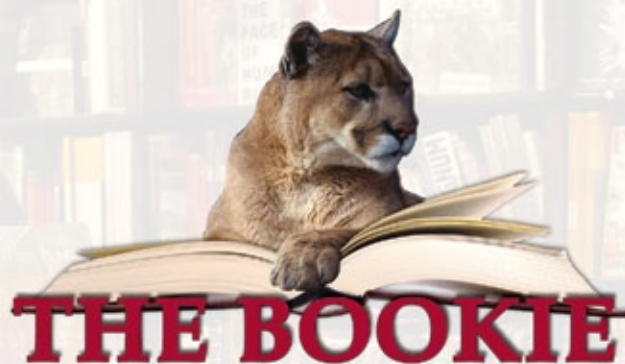
Famous

By Kathleen Flenniken '83
University of Nebraska Press
Lincoln, Nebraska, 2006

... Perhaps one might conclude that in postmodern America the sublime has been reduced to the ridiculous. Of course I employ the term "sublime" rather playfully here myself; we are far distant from Wordsworth's sense of that word. But Flenniken's poems do flirt with such moments: beauty, death, awe ...

Read the complete review of Kathleen Flenniken's *Famous* at *Washington State Magazine Online*, wsm.wsu.edu.

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This year's Fleischmann Scholarship recipient, Katie Appleton, is a junior health and fitness education major and a guard on the Cougar women's basketball team.

Thanks to their use of a flexible endowment, Fred ('56 Ag.) and Rose Marie ('57 Ed.) Fleischmann were able to direct a \$1,000 gift to a women's basketball scholarship today, while building a permanent scholarship for the future. In five years the endowment will fund the Fleischmanns' \$1,000 scholarship permanently.

To learn how a flexible endowment can work for you, contact the Washington State University Gift Planning Office at 800-448-2978.

WASHINGTON



THE VIEW FROM OZETTE. Cannonball, or Tskawahyah, Island, off Cape Alava. The village of Ozette was occupied for at least 2,000 years. The Spring 2008 issue of *Washington State Magazine* will examine the effect of the 1970s archaeological excavation of Ozette and other matters of place. *Photo by Zach Mazur.*



Hurry... Time is running out!

Temporary IRA Legislation Offers You a Unique Way to Support Washington State University

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- Benefit those who typically use the “Standard Deduction.”

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To learn how this or other gift planning opportunities might benefit you and Washington State University, contact the Gift Planning Office today at 800-448-2978 or e-mail gift-planning@wsu.edu.

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Chris Cabusao hopes to develop cures for terminal illnesses.

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As a bioengineering student at Washington State University, Chris Cabusao is passionate about innovative sciences and plans to pursue a career in medical research.

For more information about creating your WSU legacy, contact the Gift Planning Office at 800-448-2978 or gift-planning@wsu.edu.



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