HARLOW PRIMATE LABORATORY, UW-MADISON

DE·CON·STRUCT·ING HARRY

When UW psychology professor Harry Harlow began exploring the social behavior of monkeys in the 1950s, he sent science in a novel and — even today — controversial direction. In her new book, Professor Deborah Blum writes that it was love that led Harlow down that path.

By Deborah Blum MA'82

Harry Harlow did not step directly into studying love; there was no triumphant flourish of research trumpets. In 1955, he had an entirely different problem, more pragmatic, more urgent. It had to do with importing monkeys. He was beginning to hate it.

The monkeys that Harry studied in his UW lab were hard to get. They were expensive. They were often in terrible shape. Monkeys routinely turned up starving, battered in passage, seething with "ghastly diseases." The hot-tempered, tropical viruses spread easily. The incoming macaques infected cage-mates. Playmates sickened alongside monkey playmates. Macaque mothers passed diseases to their infants. A laboratory with a new shipment of monkeys could more easily resemble a hospital than a research laboratory.

So Harry was thinking about raising his own animals. It was this decision that would, indirectly, lead him into the science of affection. When it did — when he first started wondering if you can raise a healthy child, even a monkey child, without love — the people working with him would think he'd gone crazy.

Of course, they were used to Harry Harlow's crazy ideas. Starting a breeding colony in Madison struck plenty of people as evidence enough of lunacy. The Midwestern climate, almost the polar opposite of the balmy Indian seasons, seemed an unlikely place to start raising tropical species. But Harry had been accommodating monkeys for years. He figured that they'd just continue bundling the monkeys inside. That would keep the colony compact, no more than he could house indoors. He could live with that.

There was another, bigger hitch. No one really knew how to do what he wanted. There were no self-sustaining colonies of monkeys in the United States. Domestic breeding of primates was a brand-new, barely simmering idea. Other people were talking about it; researchers from California to Connecticut were equally frustrated. But no one had any experience at breeding monkeys on the scale he imagined. Only a few American scientists had even tried hand-raising the animals in any systematic way, and that had been on a monkey-by-monkey kind of scale. Did this faze Harry? Not really.

Harry and his university colleagues decided to approach the problem like the scientists they were. What to feed a baby monkey? William Stone, from the university's biochemistry department, spent countless hours testing formulas. Years later, he would remark that "I can still smell the monkeys as I recall sleeping at the primate lab on a four-hour schedule" in order to try out different recipes on the baby monkeys. Stone eventually had so much data that he published a paper on the immune effects of feeding cattle serum to newborn monkeys. Stone began with a baby formula of sugar, evaporated milk, and water. He recruited students to hold doll-sized bottles to feed the monkeys. Every bottle was sterilized. The monkeys got vitamins every day. Their daily dose included iron extracts, penicillin and other antibiotics, glucose, and "constant, tender, loving care." The baby

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monkeys were washed, weighed, and watched over constantly. As the monkeys grew older, lab caretakers mixed fresh fruit and bread into their diet. And always, always, the caretakers kept the animals apart from each other. Every monkey in a separate cage. Every baby taken from its mother, which is why someone needed to hold those baby bottles. Harry wanted no chances taken on the spread of those ghastly diseases. Everything was polished and cleaned and disinfected and wiped to a glittering cleanliness.

There was a model for such practices, of course, in human medicine, in the frantic efforts of early pediatricians to control disease in orphanages and hospitals. The Wisconsin researchers mimicked perfectly, had they realized it, the very hospital policies that Harry Bakwin had been so furiously trying to undo in the 1940s. Harry and his colleagues were inadvertently recreating those isolationist pediatric wards.

All the little monkeys, including those in the Stone family, were absolutely, fanatically attached to those diapers. They hugged the diapers fiercely. They would sit wrapped in the white cloth, clutch it desperately if someone picked them up. Around the lab, an observer might be struck by the appearance of baby monkeys, in transit, with cloth streaming out behind them like a kite's tail.

By the end of 1956, the lab managers had taken more than sixty baby monkeys away from their mothers, tucked them into a neatly kept nursery, usually within six to twelve hours after a monkey's birth. Lab staffers fed the infant animals meticulously, every two hours, with the carefully researched formula from the tiny doll bottles. And the monkeys looked good. The little animals gained weight on that formula. They were bigger than usual, heftier and healthier-looking. And they were purified of infection, "disease free without any doubt," wrote Harry. But their appearance, he added, turned out to be deceptive. "In many other ways they were not free at all."

The monkeys seemed dumbfounded by loneliness. They would sit rocking, staring into the air, sucking their thumbs. When the monkeys were older and the scientists tried to bring them together for breeding, the animals simply backed away. They might stare at each other. They might even make a few tentative gestures, as if each primate vaguely wished for friendship. But the nursery-raised monkeys had no idea what to do with each other. They seemed startled by the appearance of another animal, intimidated by the sight of such odd, furry strangers. The monkeys were so unnerved by each other that many of them would simply stare at the floor of the cage, refusing to look up. "We had created a brooding, not a breeding, colony," Harry once said.

How could the monkeys look so healthy and be so completely unhealthy in their behavior? They had a growing number of sturdy, bright-eyed, bizarre animals in their cages. Not all of the animals were so unstable. But enough were to keep the researchers up at night. Harry was driven to making lists of possibilities. What was he doing wrong? Could it be the light cycle; was the lab not dark enough at night? The antibiotics? Perhaps the medicines were skewing normal development. The formula? It might be that evaporated milk wasn't such a good thing. Maybe the baby monkeys were getting too much sugar — or not enough.

He and students and colleagues were talking it over as the coffee steamed, the bridge cards shuffled, and the nights burned away in the lab. Harry's research crew was still growing and, on the recommendation of his old professor, Calvin Stone, he'd brought another Stanford graduate into his lab. His Stanford PhD barely off the presses, William Mason found himself immediately plunged into the problem of the not-quite-right baby monkeys.

Shortly after arriving, Mason was put in charge of raising six newborn animals. These were all lab-made orphans, taken away from their mothers some two hours after birth. In Harry's lab, the monkeys often had names instead of the numbers that are standard in primate labs today. The oldest of Mason's orphans was Millstone, named by a lab tech because the little monkey was such a noisy, clingy pest. The other five infants also joined the Stone family: Grindstone, Rhinestone, Loadstone, Brimstone, and Earthstone. A research assistant at the lab, Nancy Blazek, had feeding duties. Exhausted by the two-hour schedule, she took to bringing the little monkeys home with her for their nighttime bottles.

Mason and Blazek spent hours with those monkeys and they really got to know them. They wanted the babies to grow strong and healthy. Mason planned to continue some of the earlier studies on curiosity. Harry had established that monkeys were naturally curious. Mason wondered how early that trait showed up. When did monkeys start to wonder about the world around them? Were they born asking

questions or did they pick up it up later? When it came to puzzles, at least, Mason and Blazek found that the Stone babies were naturals. As soon as they were coordinated enough to work a puzzle, the little creatures were busy trying to solve it. The results reinforced a strong suspicion that curiosity was fundamental to the way these small primates approached the world.

There was something else about the Stone monkeys that caught the lab workers' attention. The researchers had been lining the cages with cloth diapers, to provide a little softness and warmth against the floor. All the little monkeys, including those in the Stone family, were absolutely, fanatically attached to those diapers. They hugged the diapers fiercely. They would sit wrapped in the white cloth, clutch it desperately if someone picked them up. Around the lab, an observer might be struck by the appearance of baby monkeys, in transit, with cloth streaming out behind them like a kite's tail.

So, if Harry was right, if they were looking at an odd, pathetic kind of mother substitute in these blankets, then they were also looking at raising a revolution in psychology. If the baby monkeys were telling them that there was something critical in being touched, being held, and holding back, then they could start rewriting the psychology books.

There was already a hint about this cloth-obsession from the nineteenth century, out of the diaries of a British naturalist named Alfred Russel Wallace. The adventurous Wallace is best remembered now because he so nearly published a theory of evolution before Charles Darwin. As with Darwin, it was traveling that made the theory come to life. Exploring the oddly different and beautifully adapted species of each country also made Wallace think about the way nature tucks us into our niches. During a visit to Indonesia, Wallace had been given an orphaned baby orangutan. He wrote in his journal that the little animal seemed to be constantly reaching for and cuddling soft material, including (painfully) Wallace's beard. Trying to help the baby and himself, Wallace made what he called a "stuffed mother" out of a roll of buffalo skin. He noted that the little ape clung happily to the fat, fuzzy roll, no longer grabbing for other material. The baby orangutan became frustrated only when he tried to nurse.

And there was another more recent clue from a Yale University researcher famed for her meticulous comparisons of monkey and human anatomy. To do detailed analysis, Gertrude Van Wagenen had needed a reliable supply of monkeys. She'd created a small nursery and written an insightful chapter on her technique for raising baby monkeys. Van Wagenen had found that her nursery-raised monkeys bonded almost compulsively to the soft blankets lining their baskets. She described their tight clutch as emotional dependency, noting that if the infant monkeys couldn't cuddle, some of them didn't even develop proper feeding responses. "You know of the debt I owe to you for the creation of the rhesus baby in the basket," Harry wrote her, late in his career. "The early research, which I conducted according to your directions, started me off in the field of primate affection."

And, indeed, the psychologists in his primate lab were beginning to wonder if there was a real message in the behavior of their baby monkeys. Perhaps the small animals had something to tell them about the needs of children. After all, it wasn't monkeys alone who clung to soft cloth. It was orangutans, too, and other labs reported that baby chimpanzees desperately hugged blankets. Nancy Blazek and Bill Mason, watching the monkeys cling to the cloth, started wondering about that need to hold on. There was that other primate to consider in this idea. All of them knew that human babies, left alone in a crib, also clutched their quilts and pillows and fluffy stuffed toys. But what did that mean? No one really knew.

Mason suggested to Harry that they run a test. He was thinking of a simple comparison between, say, a fat bundle of cloth and something hard — wood or wire. The researchers could see what the babies preferred — if it was just the need to hold onto something, anything, or if there was something especially meaningful about a soft touch.

And the idea just clicked for Harry. He liked it immediately. He also thought there might be something even bigger lurking there. Perhaps the differences between cloth and wood only touched on part of the underlying question. After all, babies don't prefer to hold onto pieces of cloth to all else. They hold onto them when there's no human — or monkey — available for cuddling. The soft bits of cloth might be a substitute for something that mothers do that's missing. Today, of course, we would include fathers but this *was* the 1950s and at this moment, in science and society

alike, it was mother who represented what parents had to give a child.

So, if Harry was right, if they were looking at an odd, pathetic kind of mother substitute in these blankets, then they were also looking at raising a revolution in psychology. If the baby monkeys were telling them that there was something critical in being touched, being held, and holding back, then they could start rewriting the psychology books. And the first new sentence in that book might say that mothers themselves — with their soft arms and inclination to hold a baby close — were desperately important, and if that was right, then the Watsonian, Skinnerian, Hullian view of the world could be nothing less than wrong.

Harry used to say that the idea for a lab-built mother occurred to him on a Northwest Airlines flight between Detroit and Madison, looking out at the puffy, deceptively soft clouds blowing on the other side of the glass: "As I turned to look out the window, I suddenly saw a vision of the cloth surrogate mother sitting beside me." A lab-created doll of a mother, as deceptively soft as those floating clouds, could be used as a way to see what a baby really wanted. It would be a comparison, as Bill Mason suggested, but it would be a comparison using a mother figure, one that looked like a mother obviously enough that anyone could see that this was not only about monkeys.

Harry Harlow had encouraged the students and employees in his lab to think for themselves. They didn't hesitate in this case. They thought he was wrong. As far as Harry could tell, his students thought that their major professor had left his head in the clouds: "My enthusiastic descent upon the laboratory was met by skepticism or lack of interest from one graduate student after another." He was finally able, he said, to convince one of his newer graduate students, Robert Zimmerman, to give it a try. "But I'll tell you one thing about those damn airplane rides when we were on the surrogate project," says Bob Zimmerman, now retired in Lansing, Michigan. "Every time Harry would fly somewhere — and he went away every week because he was on all kinds of committees — he'd run into some shrink or somebody, and he would come back with some new idea about what we should be doing with the surrogate. He'd always wonder when he came back, 'Why don't we have this? So and so said we should have rocking, why don't we have rocking?'"

Zimmerman is laughing when he tells this story. He agrees that Harry was right about one thing — most of the students fled from getting sucked into a project as mushy, as un-Wisconsin, as mother love. "In all honesty, nobody, no grad student, wanted to touch the mother surrogate project with a ten-foot pole. This was Wisconsin, and Harry could be of some help, but you had to get your thesis or dissertation past a committee, and to talk about love at the University of Wisconsin, where everything was numbers and statistics — I think the first assumption was that if you took that one you'd never graduate.

"Well, I was already working with neonatal learning, and nothing much was being done with the babies in the first ninety days of life, before they were ready for those experiments, and I thought, well, I have an investment in these monkeys, so I made a deal with Harry. I would be the ramrod for the mother surrogate project if he would let me have the baby monkeys for my dissertation. And he thought that would be a fair trade."

The airplane birth of the surrogate mother — the way Harry would tell it, full of drama and imagery — says a lot about Harry's vision for the project. Here was science at its most provocative — mother love at a time when British psychiatrist John Bowlby could barely persuade his colleagues to join the words *mother* and *love* together. Here also was science with real potential to make a difference, to make people see families and relationships in a different way, a closer way. The first challenge would be getting people to take it seriously.

That was going to take both solid research and, Harry suspected, all the skills at making an idea compelling that he had acquired over the years, all the unflinching stubbornness he had learned while he wangled a laboratory from the University of Wisconsin and persuaded his colleagues that maybe, just maybe, monkeys were smarter than they thought. If he wanted an attentive audience — and, oh, he really did — the surrogate mother was going to be a Harry Harlow production.

His newly minted Stanford researcher, Bill Mason, was stunned by how rapidly his small, neat idea became a showstopper. "I didn't see it as a breakthrough or something really sensational," Mason says. "It was a kind of demonstration with a foregone conclusion." There was Wallace, after all, there was Van Wagenen; everyone in the lab expected the monkeys to prefer the cloth. They worked out a kind of trial balloon. Zimmerman teamed with another graduate student, Lorna Benjamin, and the two of them did a simple first test with two baby monkeys. Both the little animals flatly rejected

a wire object in favor of a cloth bundle. "It was unbelievably clear, amazing," Zimmerman says, and suddenly the lab crew began to wonder if Harry Harlow was going to pull this love stuff off after all.

From that first experiment, Harry wanted everything nailed, every detail noted, every possible criticism identified and answered. He insisted on two observers for every experiment with the little animals, one student double-checking the other. He devised careful charts to score the monkeys' behavior. Harry and his students filmed the experiments and then spent hours scrutinizing each frame, right down to the clasp of the fingers on the cloth. "He was concerned it would be rejected out of hand if we didn't nail it to the floor," Zimmerman said.

Mason still remembers, with admiration, Harry's skill at taking a long-dismissed idea — that mother love was a crucial part of a child's development — and persuading his colleagues to listen to him. "The dominant position was that babies didn't love their mothers or need them, that the only relationship was based on being fed," Mason says. "It sounds silly now but that's what people thought. Harlow sensed people were beginning to ask questions. And it was damn right to ask questions, because the dominant position wasn't true. These are facts — monkeys don't just explore for food, they do it because they are curious, they have a drive to know. And they are social and they need to interact. Harlow had a great sense of when he could get away with challenging the field. If he had misjudged that — if he had been younger, less skillful — it would have been a disaster. People would have laughed."

Skillful or not, there was no doubt that Harry was yet again on the wrong side of behaviorist psychology. B.F. Skinner was now experimenting with boxes in which to raise not just rats but young children. Skinner had built the first demonstration model for his younger daughter, Debbie. It was a crib-sized "living space" with sound-absorbing walls — a baby-tender, Skinner called it — with a large window and a canvas floor. The air in the box was filtered and humidified, and the baby stayed so clean in there that Skinner said she only needed bathing twice a week. The partial soundproofing meant that the child was undisturbed by doorbells and ringing phones — or the voices of her parents and sister. Debbie came out for scheduled playtimes and meals: "One whole side of the compartment is safety glass, through which we all talk and gesture to her during the day. She greets us with a big smile when we look at her through the window," Skinner wrote in a letter to a friend, emphasizing the advantages of raising your baby in a box. He hoped that every mother would one day use a baby-tender. Skinner wrote once of being surprised when a pediatrician suggested the box might be better used in hospitals, where it could save nurses much work. It could save mothers work, too, Skinner replied. The doctor laughed. Mothers didn't care so much about the saved labor, he assured the psychologist. Mothers labored out of love.

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"The universal reaction, was, 'What is this love?' " recalls former grad student Leonard Rosenblum. "The only emotions studied in animals were negative — fear, loathing, pain. The idea that animals were motivated by love, what vague notion was this?" Rosenblum makes a dismissive gesture, indicating the disdain of the time. It's been a long time since he was a fledgling psychologist himself. He recently retired as director of a primate laboratory in Brooklyn, part of the State University of New York system. Today Rosenblum is an internationally known expert in developmental biology, an angular man with bright blue eyes and a slightly shaggy, silvery beard. He retains, though, the same intensity and lively humor and flair for a dramatic turn of phrase that he had as a student in Harry's laboratory.

"Remember," Rosenblum says, "that behaviorism's beginnings, with John Watson, suggested that it was a great thing to dig holes in the backyard and let your kids fall in and learn about life. So in psychology, love was smoke, mirrors, bullshit, and that was exactly what everyone was telling Harry." Of course, Harry was used to being told he was on the wrong side of an issue, the backside of the fence. He'd come to kind of enjoy needling the smugness of the mainstream position. He simply began assembling his evidence.

Beyond that, he started thinking about how to make that evidence look really, really good. Bill Mason had proposed that they look at how monkeys might hold onto a bundle of cloth. And that was a start, said Harry, but they needed their surrogate to look like more than a bundle. It needed to have some personality. It needed a head and a face. If monkeys were going to look at this substitute mother, it needed to look back at them. And it needed to look back at the human observers, too — it needed to mean something real to people, as well. Harry wanted them all — not just psychologists, but mothers and fathers and aunts and uncles and stepparents and grandparents — to think about connection and affection. He wanted them to believe that emotions and relationships were the proper purview of research.

Harry's students still sometimes argue about the decision to put a head on the cloth mother. Mason considers the head merely showmanship rather than necessary to testing monkeys, who after all would happily cuddle with a diaper. Others consider it strategy. One such former student, Steve Suomi, now head of primate behavioral research at the National Institutes of Health, still thinks of the head as a kind of brilliant tactical move. "So it might not have been relevant to monkeys," Suomi says. "But it was to the outside world, because once people looked at the surrogate like a mother — made a connection to human mothers as well — then you could start talking about things like mother love."

And despite the fears by Mason, and even Bob Zimmerman, that the head was going to get them laughed out of psychology, Harry was absolutely determined. He had suddenly been given a first-class platform for his arguments. He'd finally been elected president of the American Psychological Association. And he was going use that, he decided, to pound the podium and make his argument. He was absolutely sure of what he was going to argue. He even had a title. He was going to call his talk "The Nature of Love." And as Zimmerman still remembers, "He came back into the laboratory and said to me, 'Bob, I have written one of the finest speeches ever delivered to the APA as president. Go get me the data.' "

So they put a plain wooden ball on top of the bundled body. Harry still wasn't satisfied. "It doesn't have a face," he said. By this time, Bob Zimmerman had fully taken over the project, and he was willing, if he had to, to put a face on the surrogate mother. Harry had recruited Zimmerman from Lehigh University in Pennsylvania. Zimmerman was a tall, lanky man with dark hair trimmed into a ruthless crewcut. He was a promising and ambitious young psychologist. Zimmerman had gotten three offers from graduate schools, but Harry had written "the most beautiful letter" about Wisconsin and the land and support the school could offer. After Zimmerman was properly seduced, he remembers, Harry wanted the letter back. It had worked so well, he wanted to try it on the next year's crop of recruits.

Oh, that head was a challenge. "First, it had to be designed to be pretty nondestructive," Zimmerman says. "Monkeys are very destructive creatures." And then it had to have eyes. Mothers have eyes, Harry said. So what are we going to do for eyes? So I go to these dolls' hospitals and stuff, looking for eyes. If you've ever seen dolls' eyes, they're so fragile. And I said, 'Well, we need something that's a little stronger, that can take a knocking around.'

"So this woman at the doll store says, 'Well, they're pretty expensive.'

"I said, 'Price is no object.' "

Zimmerman is grinning again as he tells this story, dark eyes crinkling at the corners. "So she says, 'You must work for the state.' "

They kept shopping. They didn't just want indestructible eyes. They wanted eyes that were also repulsive to monkeys. Harry had warned Art Schmidt, the resident equipment-building genius, and Zimmerman that the cloth mothers could not have faces that monkeys obviously found attractive. "Because then someone could say, hey, your experiment had nothing to do with touch or being held — it's just that it's an attractive stimulus," Zimmerman said. Critics might dismiss the cuddle effect and argue that the babies liked the way the face looked, and that was why they clung to the softer body. "So we started fooling around with different configurations of faces, and then we would see how the monkeys reacted." They decided on bicycle reflectors for the eyes, which gave the face a bug-like stare. "Those are red bicycle reflectors. The mouth was green plastic, curved in a half moon smile. And the ears were a very hard black plastic that Art Schmidt had hanging around the lab. The nose was maple, painted black."

Schmidt and Zimmerman had even labored over what kind of wood to use for the heads. They'd tried pine wood balls. But the energetic monkeys chewed the soft wood into splinters. Zimmerman remembers complaining to Harry, saying "Dr. Harlow, the monkeys are destroying the heads. As fast as we make them, they're chewing 'em up."

And he remembers Harry looking at him, completely deadpan, and replying, "Children have been destroying their

parents for years." The researchers decided to use hardwood for the heads. They settled on maple croquet balls, near rock-like in their construction.

In point of fact, babies do chew on their parents, pull their hair, gnaw on their ears, drool on their shoulders, and throw up all over their shirts. Zimmerman points out that if you watch a baby monkey with its natural mother, the little guy will tug on fur, nibble on ears, yank and pull — all in affection. They'll do the same thing to a father monkey, given a chance. And this is not destruction at all — it's curiosity, touch, feel, and the infinite security of being held by someone who will put up with all that tugging and chewing. But monkeys and babies — as Bowlby had been trying to say — indulge in those behaviors only with someone they love and trust.

One of the surrogate mothers in Harry's lab had a head but no face. The head was just a blank ball of wood. A baby monkey arrived a month early. Schmidt and Zimmerman had not yet perfected the smiling mother face. So they put the animal in with the faceless cloth mother. "To the baby monkey, this featureless face became beautiful, and she frequently caressed it with hands and legs," Harry said. That lasted for about three months. "By the time the baby had reached ninety days, we had constructed an appropriate ornamental cloth-mother face, and we proudly mounted it on the surrogate's body. The baby took one look and screamed."

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The little monkey huddled in the back of the cage, rocking in dismay. After several days, the infant solved the problem. She marched up and rotated the head 180 degrees so that the blank back of the ball faced forward. The scientists turned it back. She turned it again. They turned it. She turned it. "We could rotate the maternal face dozens of times and within an hour or so, the infant would turn it around 180 degrees." Within a week, the baby resolved the problem entirely. She took the head off and rolled it into a corner of the cage and ignored it. And she was willing to repeat this; calmly, Harry said, and with infinite patience. He knew exactly what such behavior represented. Bowlby's theory predicted that one of the ways that a baby bonds to a particular mother comes from its recognition of "the particular mother's face." It's that absolute sureness that this is *my* mother, that she's here, that makes everything all right.

The baby doesn't attach to just anyone, and John Bowlby and Harry Harlow and a growing army of others were going to make that undeniably clear. There's an actual relationship here that matters; the baby recognizes this one special person as *the* one. Later studies at Wisconsin showed that monkeys definitely did not admire the face dreamed up by Zimmerman and built by Schmidt. They preferred a dog's face to the bug-eyed, green-smiled version of a mother. But to Harry, the antipathy also made a critical point. The infants might not like the mother's face, he said, but they loved the mother. She could have a blank face, a bug face, any face that they knew well — as long as she had mom's face. To a baby, mother's face is always beautiful, he said: "A mother's face that will stop a clock will not stop a baby."

The nature of love project was absolutely, beautifully straightforward in its design.

Art Schmidt built — as Bill Mason had first proposed — not one but two, "surrogate mothers." The first was a cloth mother. She had that smiling face on a round head and a cylindrical body. The cloth mother was made from a block of wood, covered with sponge rubber, and sheathed in tan cotton terrycloth. A light bulb behind her back radiated heat. You could call her an ideal mother, Harry said, "soft, warm, and tender, a mother with infinite patience, a mother available twenty-four hours a day, a mother that never scolded her infant and never struck or hit her baby in error." The other mother had a squared, flattish face with two dark holes for eyes and a frowning mouth. Beneath that scowling visage was another cylindrical body, also warmed by a light bulb, but this time made of wire mesh. It was perfect for climbing, but wire mother had not a cuddly angle to her. She was metallic all the way through.

There were eight baby monkeys in the study. Each was caged alone except for its surrogate mothers. The monkeys were allowed to choose their parent. Every monkey was watched over by cloth mom and wire mom. It would have been a simple preference test except for one twist. For four of the monkeys, there was a milk-bottle attached to the cloth

mother. The other four had a "barren" cloth mother. It was wire mom who held the bottle. This made each monkey's choice a test of the prevailing theories of motherhood. If touch was nothing special, if the infant-mother relationship was based on food, then the bottle-holding surrogate should be chosen whenever she had the food advantage. Neither wire mom's stiff body nor cloth's mom's pillowy one should make a difference. The infant monkeys should go for the bottle-holding mother. And if they did? Well, that would have been the end of Harry Harlow's love studies.

Instead, it was clear to Harry — hell, it was clear to everyone — that being fed formed no relationship at all for these baby monkeys. The mother love study suggested that the wire mother could have been dripping with milk, standing in puddles of the stuff, and the baby monkeys wouldn't have cared for her. Cloth mom, on the other hand, was a baby monkey magnet.

In the published paper that followed, there are two small, neat, astonishingly clear graphs labeled "Fed on Cloth Mother" and "Fed on Wire Mother." The graphs track how much time the baby monkeys spent with each mother in a typical twenty-four-hour period. What makes the charts so remarkable is how alike they are. By the age of six months, both groups are spending pretty much all their time, about eighteen hours a day, with the cloth mom. The wire-fed monkeys hustle back to the other mother for food but they eat fast. The charts show that they spend no more than an hour a day on wire mom. Mostly the baby monkeys, each and every one, are sleeping on cloth mom. Or cuddling. Or tucking their bodies close against her when they are startled. Or just stroking her. The graphs seem to have invisible writing running through them, saying that food is sustenance but a good hug is life itself.

Deborah Blum, a professor of journalism and mass communication, won the Pulitzer Prize in 1992 for her coverage of primate research as a reporter for the *Sacramento Bee*. Her previous books are *The Monkey Wars* and *Sex on the Brain*.

A Conversation with the Author

Because the process of writing a book can be as fascinating as the book itself, Michael Penn, senior editor for *On Wisconsin*, talked to Deborah Blum about researching Harry Harlow. In a candid discussion, the UW journalism professor acknowledges mixed feelings about Harlow — and the mixed reception she fully expects her book will receive. For the full text of the interview, visit www.uwalumni.com/onwisconsin.

MP: *What drew you to Harry as a subject?*
DB: If you've spent a lot of time talking to scientists and living in science, really complicated, fascinating, kind of hypnotic, mesmerizing personalities are rare. And he was all of those things. A completely challenging person. Completely fascinating.

But what really brought me back to him was that I started thinking about writing a book about kids — how do we parent, what are the mechanics of giving your children what they need, so that they turn out whole and happy and strong, which is what every parent wants. And when I started looking at the research on parenting, I started seeing Harry in there. It was like his shadows were in all this modern research. One day, I said to myself, you know, Harry Harlow's all over this, and no one knows it. He's disappeared. And wouldn't it be interesting to combine the two — to take the story of someone I thought was a genuinely fascinating person with something that I thought was genuinely fascinating science?

MP: *Do you see it, as much as it is a book about monkeys and primate research, as a book about human behavior?*
DB: I don't think there's any doubt that Harry Harlow felt that was all that it was about. Early on, he did some really beautiful work on intelligence and curiosity in monkeys. But he saw that as leading him, I think, where he wanted to go, which was that these animals are wonderful models for human beings. And when you get into the love and connection and relationship part of his work — which is really what my book is about — you see that he's working with monkeys only to hold that mirror up to us.

MP: *The research with the cloth mother was really the launching point into that area for him, wasn't it?*
DB: Yeah, it really was. It really began there. In his early curiosity and intelligence work, he had found that monkeys that didn't do well socially didn't do as well on the lab intelligence tests. There were some odd, mysterious connections between being socially grounded and having a foundation of security and looking smart. And in a funny way,

that's one of the things that pushed him toward his cloth mother work.

With the cloth mother work, he showed that babies — and to him they were babies, not just baby monkeys — need to be touched, and they need to cuddle, and they need all of that security and warmth that being cuddled gives you. You could stand here in the twenty-first century and say, "Yeah, so, don't we all know that?" But in fact, that was a revolutionary study. When I talked to his students, a lot of them talked about how much guts it took for Harry to do that study. He thought it was fascinating science, but it took a lot of courage. It went absolutely against the established psychology of the time.

MP: *Love wasn't considered science?*
DB: Love wasn't science. Scientists didn't use the word. I tell stories of him arguing with psychologists that love should legitimately be part of what they study.

MP: *Where did his experiments with the cloth mother take him?*
DB: The cloth mother studies said that babies need to be hugged; they showed that a baby who's hugged is more secure, more curious, more social, more adept. But after Harry showed that, he went on to say that the cloth mother, for all those warm, cuddly moments — she was just a statue. She didn't teach; she didn't interact. And in the end, although touch was important, it turned out to be only part of what you needed to grow up whole and healthy and strong.

So he just went to the logical next step. Well, what else do you need? Do you need an interactive mother? Do you need the company of others? Will the company of others compensate for a mother who rejected you? Will a mother who gives you everything compensate for the friends you don't have? If you're Harry Harlow, and you're interested in all of those questions and where they take you in relationships, eventually you're going to want to look not only at the positive part of relationships, but the bad part, too.

HARLOW PRIMATE LABORATORY, UW-MADISON

"Harry used to say that for each of those two dozen monkeys — probably in the whole history of the lab there were two dozen monkeys that went into his more extreme experiments — there were a hundred kids or a thousand kids who needed help, and that's where he had his eyes. That was the prize. He knew some people hated those experiments. I don't think he ever said that he saw them as animal cruelty, but he acknowledged that some people would see them as cruel. But he would say, 'Here's why I think it's worth it.' "

MP: *And that's one of the things that makes him problematic for people today. Why was he willing to push the envelope with damaging relationships?*
DB: To some people — especially people who don't like animal research — it's unjustifiable research. These were such smart, social animals, and Harry Harlow did something that many scientists don't do, which was that he was completely forthright about what he did and what he found. He never fudged. He never used jargon. He wrote very straightforwardly when monkeys suffered. And so there was no missing the consequences.

Just to give you an example of what people hate — people who love animals hate this work — he built a series of rejecting mothers. These were surrogate mothers like the cloth moms, except that they were very ill-tempered surrogate mothers. They would shake the baby really hard until its teeth would chatter. Baby monkeys don't like to be cold, and some of these mothers were [rigged to be] really cold. Or they would throw the baby across the cage; they would be spring-loaded and would bounce the monkey off when it came close. Or there was one that had blunt-tipped brass knobs that would bump hard enough against the baby that the baby would let go. What they found when they built those models was that there was nothing

that would make the baby not come back. No matter how hard the mothers rejected the baby monkeys physically, the baby monkeys always came back.

Those experiments made people go back and look again at abused kids, and instead of saying, as they had been, that children who keep going back to abusive parents were self-destructive, they started to say, "This is a trap for this child." They started to understand that children have this bond, heart to heart, that pulls them back. A mother who slaps her child around is what that child has, and the child will always choose her. Always.

MP: *So Harry helped define unconditional love.*
DB: Harry helped define unconditional love. To understand how to help those children, you first have to have that definition. You have to understand just how strong love is. His work just got right in people's faces and forced them to see it. It forced psychology to change.

Harry used to say that for each of those two dozen monkeys — probably in the whole history of the lab there were two dozen monkeys that went into his more extreme experiments — there were a hundred kids or a thousand kids who needed help, and that's where he had his eyes. That was the prize. He knew some people hated those experiments. I don't think he ever said that he saw them as animal cruelty, but he acknowledged that some people would see them as cruel. But he would say, "Here's why I think it's worth it."

MP: *You make the point in the book that, because he did these experiments, we don't ever have to do them again.*
DB: We shouldn't. You can't read his studies without seeing his baby monkeys as children in trouble. You really can't. He forces you to see it that way. Which, of course, didn't do him a lot of good in terms of his relationship with the animal rights community, but it did make a lot of the people he was working with look at it and say, "Now wait a minute. This is crossing my personal comfort line. I didn't even know I had a personal comfort line. But this crossed it."

MP: *Did he pay a price for his stance on animal research?*
DB: Huge. And that was one of the reasons I became more and more intrigued with writing the book.

When I started writing the book, I would say to people, "I'm writing a biography of Harry Harlow," and they would say, "Who?" That began to be really intriguing to me — how could someone who died only twenty years ago have fallen off the radar screen so fast when his work was so important?

I asked a lot of people about this. I think some of it was because of the animal rights issue and because he was as unpolitically correct as it gets. He had a tin ear for social change. He believed in saying what he thought, no matter what. He loved to provoke and bait people — that was part of his personality. He attracted animal activists to [other researchers]. There are people who would say, "Animal activists came hunting me down, and I know that's because they connected me with Harry Harlow."

People started backing away from him. They wouldn't cite him, they wouldn't mention him, and they didn't want to be connected to him. So he starts disappearing [from the scientific literature]. While scientists are really stepping back from him, the only people really describing him loudly and publicly are the animal activists. They're perfectly comfortable trashing him. And so it has become a spin thing — the whole image of him was that of this psychologist who went gunning for baby monkeys, instead of the psychologist who helped drive this enormous and influential revolution about who we are and how we feel.

MP: *So what you're saying is that the story that's out there about Harry is largely being dictated by the animal rights activists who burn him in effigy?*
DB: Right.

MP: *That story isn't necessarily wrong, but it's just one-sided?*
DB: It's just one-sided. Because I wouldn't deny that there are ethical issues, and I won't tell you that I look at his experiments and say, "Oh, I love reading about this. Bring on more!" I'm a parent, and the first time I read the rejecting mother study, it made me cry. I'm reading it, and I'm going, "How could anyone do this? It feels so cruel."

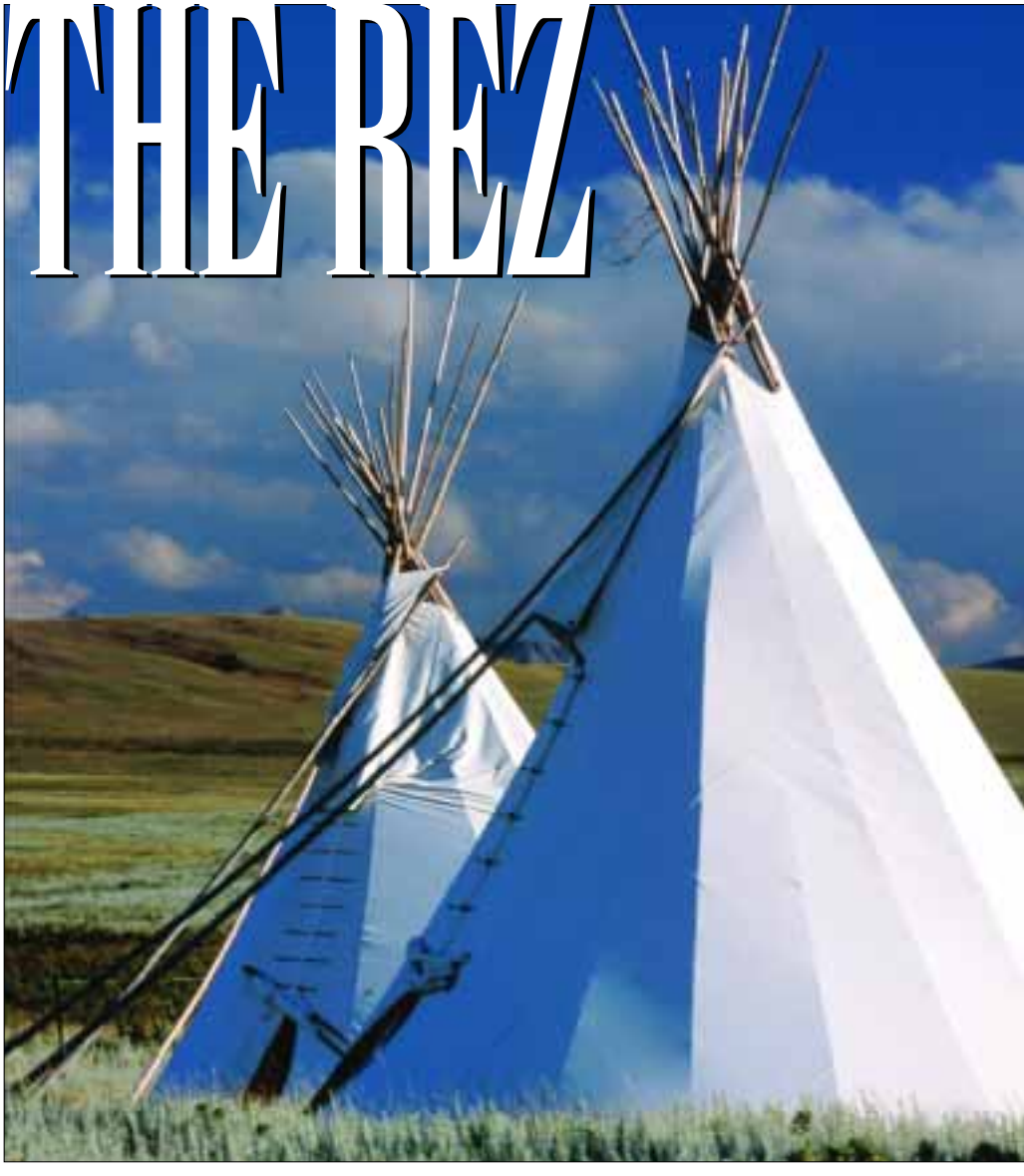
There's no way to look at Harry Harlow without acknowledging these ethical issues. I think that they speak to who we are and the decisions we make about species we have power over. He made decisions that I think did wonderful things for the rest of us. He helped produce a more enlightened generation of parenting, helped redefine the way we study connection and relationships. All of those things — they're great for us. Were they great for monkeys? No, they weren't great for monkeys. You have to accept those shadows in his work because they're there.

MP: *Are you prepared for the fact that this book could be a fire starter, reinvigorating all those debates about Harry?*
DB: Yeah, I thought about that in a real cowardly way. I have thought to myself, there's not a single animal activist who is going to like this book. This book, in the end, acknowledges that there's this ethical cloud associated with Harry Harlow, but that once you move through the cloud, there are still these great results. I'm comfortable with that position, but I do expect people to be angry.

I also think I'm right. I've worked my way through this issue, read ten thousand Harry Harlow papers, talked to lots of people, sat up too many nights, and I'm perfectly comfortable sort of planting my heels here and saying, "This is where I stand."

MP: *You sound like Harry.*
DB: Yeah, I do. So I guess he did influence me.

SEVEN DAYS ON THE REZ



Last summer a team of University of Wisconsin-Madison student and alumni volunteers spent a week in Browning, Montana, on the Blackfeet reservation. They endeavored to make a difference — both on the reservation and in their own lives.

By John Allen

Photos by Michael Forster Rothbart

In the tiny village of Heart Butte, in northwestern Montana, stands a rare example of a metaphor made literal.

Tucked in an out-of-the way corner of the Blackfeet reservation, Heart Butte is one of the sites where UW-Madison sent a SALA — Service and Learning Adventure — team last summer. The students and alumni who took part in this journey had come to mend fences — to learn about the Blackfeet and themselves, and to give aid where it's deeply needed. And mending fences is just what they did, digging eighteen-inch-deep holes in the rocky soil (or, as John Vasudevan x'02 puts it, "more like soily rock") so they could string chain link fence around a playground.

They spent a week on the reservation, and in that time they learned a little of the physical strain of construction. They learned some of the difficulties that

the Blackfeet face in life. And they gained insight into their own preconceptions about themselves and others.

"It was," says Sarah Baker-Siroty x'02, "a different kind of education."

The fence-menders were one of three teams that SALA sent out in its inaugural year. Sponsored by several UW-Madison organizations, including University Communications, the Wisconsin Alumni Association, the Wisconsin Union, the Morgridge Center for Public Service, and the Office of the Chancellor, the program aims to give travelers something more than sightseeing. Offering a combination of volunteer service and educational programming, it creates teams out of people who have little in common except a present or past connection with the UW, teams that work together and learn about the genuine lives of their hosts.

"What defines this as unique to UW-Madison," says Patrick Strickler, director of University Communications, "is that connection of alumni and students. SALA brings together people who have the freedom to travel with younger people in the student body. Both groups can learn from the exposure."

SALA organizers worked with a service travel company called Global Volunteers to put together three trips in 2002 — two to Blackfeet country and one overseas, to Ireland's Glencree Centre for Reconciliation. The Centre works to heal the rifts caused by the conflict in Northern Ireland, and the SALA volunteers painted and did maintenance work so that those who run the facility could be free to focus on their mission.

The teams that worked with the Blackfeet stayed in Browning, Montana, the reservation's largest town. Global Volunteers has extensive contacts in the Browning area — the company's cofounder, Michele Gran, spent ten summers of her childhood living and working in the nearby community of Saint Mary. With the aid of Gran and her company, the SALA team stayed at the local Head Start facility, camping out more or less on the floor and performing manual labor at a variety of locations, including tiny Heart Butte.

The SALA team I joined was the largest of the 2002 groups — the one that strung fence in Heart Butte. It included six students and fourteen graduates, as well as faculty adviser Gary Sandefur and his spouse, Kathy. Though Sandefur isn't an expert on the Blackfeet, he is a professor of sociology and American Indian studies, and he's a registered member of the Chickasaw Nation. He knows more than a few things about reservations, and could add context to what volunteers saw and heard.

As organizers hoped, chemistry developed between students and alumni. "The energy of the young folks is infectious," said Lindalea Ludwick '67. And Hannah Baker-Siroty x'02 found inspiration in working beside those she would usually think of as "professors, coaches, parents — people who would be so distant in another setting, but here they are friends, partners.

"People did such fabulous things, and by doing them, we all helped each other become better people," she says. "I was so moved watching Elinor [Gbede MS'73]. She is so hard core."

Through the course of their week on the reservation beginning in late July, members of the SALA team found more than lessons about history and culture. "Interacting with this wonderfully unique culture," says Vasudevan, "has helped me redirect my focus and concentrate less on the details that separate and aggravate, and more on the needs and feelings that strengthen common human bonds."

The team had seven full days on the reservation, and the following seven stories explore a little of what the volunteers discovered.

The Blackfeet reservation sits on the High Plains, where the Rockies meet the prairie, creating a striking backdrop. While driving near Browning, Kathy Sandefur saw a small cloud dissipate in the bright sun. "It took just a few seconds and it had vanished," she says. "The mountains are so dramatic, so solid, so intimidating. The cloud, like Browning, is so delicate, so precarious, so fragile."

Peaks and Valleys

Sometimes the earth plays tricks on us. Sometimes the surface is so beautiful that there are no words for the view. Glacier [National Park] is one of those places. There is serenity there. Peace. And mountain goats.

From the journal of Sarah Baker-Siroty x'02

On Monday evening, after the volunteers had put in their first day of work, Michele Gran took several of them hiking on a tumbled pyramid of blasted stone called Divide Mountain. Divide stands on the eastern edge of the Rockies, a dozen or so miles from Browning and just visible on the horizon on a clear day. If you were to stand on Divide's peak and look to the

west, you'd see Glacier National Park. To the east, sloping away on the Great Plains, you'd see the Blackfeet reservation. The real estate to the west, all deeply cut valleys and everlasting snow fields, is some of the most beautiful and highly valued in America. The real estate to the east isn't.

Standing on Divide showed many of the volunteers Montana at its best. "It's the closest thing to heaven I've ever experienced in my life," says Jennifer Cinelli x'04. "My breath was deep, my brain alert, my body like a feather."

But 196 years earlier, when the Blackfeet made their entry into U.S. history, the scene was far from heavenly. Meriwether Lewis, the first official American representative to make contact with the Blackfeet, thought of those "irregular and broken" mountains as an obstacle, not a destination.

Lewis was tramping through Blackfeet country on his way home from seeing the Pacific, and he was having a bad time of it. His partner, William Clark, had taken a different route, and now rivers weren't flowing the way Lewis wanted them to. His chronometer had broken. It was raining. And, having come with his own preconceived notions about the Blackfeet, he was desperately anxious not to meet any. "A vicious, lawless, and rather an abandoned set of wretches," he called them, believing "they would steal our horses if they have it in their power and ... will most probably attempt to rob us of our arms and baggage."

He and several companions stopped at a site they called Camp Disappointment, and they were soon bitterly disappointed indeed. Very shortly, Lewis and company ran across a small Blackfeet hunting party. Diplomatically, they all decided to share a campsite for a night. Undiplomatically, a scuffle broke out over weapons. Two Blackfeet ended up dead, one shot through the stomach by Lewis himself.

Two centuries later, Browning now lies just a few miles from the spot Lewis had named Camp Disappointment. The camp isn't a major tourist attraction. But Browning's Museum of the Plains Indian is, and it features a map showing the diminishing lands held by Native Americans. The Blackfeet once ranged over all the land east of the Great Divide, from the Yellowstone River north well into Canada. Now their U.S. reservation stretches for only about two million acres, bordered on the west by Glacier National Park and on the north by Canada.

Life in Blackfeet country, even without Meriwether Lewis and his guns, can be harsh. According to members of the Blackfeet Tribal Business Council, the reservation's governing authority, unemployment stands at 71 percent, though some residents put the rate as high as 80. Alcohol and substance abuse are a deeply destructive force in the community — in just the first half of 2002, alcohol-related auto accidents took the lives of thirteen of the reservation's teenagers: the reservation's total population is 8,500.

In only one week, the SALA team couldn't hope to make even a dent in any of these problems. The goal, rather, was for volunteers to provide a little community service, to learn about themselves and others, and to experience the world outside of middle-class, Midwestern Madison. Or, in the words of Gary Sandefur, simply "to help, to learn, and to have fun."

Labor Pains

There just isn't a lot you can control on an Indian reservation.

Michele Gran

The day we arrived in Browning, our Global Volunteers representative, Michele Gran, gave one very clear warning: be wary of expectations. No matter how good our volunteer intentions were, we were under the direction of our Blackfeet hosts and should respect their goals and follow their decisions — even if we'd like things done more aggressively.

"There's a different style of organization around here," she said. "There will be times when keeping a sense of humor might be really useful."

For the most part, the SALA team found the physical labor "extremely rewarding," in the words of Elinor Gbede, who spent much of the week doing manual labor at different Head Start facilities around the reservation. "You could see immediate results."

Over the course of the week, volunteers did landscaping, painting, maintenance, and food service. They dug postholes, set up fences, tore out weeds, shoveled, and hauled gravel. At a local senior center, they pulled up potentially hazardous tile in anticipation of a federal inspector's arrival. They traveled as far

"However small an impact we made in the community, we know they'll never forget those rocks," says Jennifer Cinelli (left). "I mean, the paint wouldn't come off the kids for days. It's definitely not coming off those rocks."

Left: Gary Sandefur, a professor of sociology and American Indian studies, provided not only cultural and historical background, he also gave the group its mission: "To help, to learn, and to have fun." Above: Sunrise in the foothills — even at the end of July, the mornings are cold enough to put frost on a car's windshield.

away as Babb, near the Canadian border, to tear down a swing set that a safety inspector said was too large for its playground.

When they were working together, says John Vasudevan, tasks "that appeared to be futile and difficult slowly changed to possible and rewarding."

When there were too many volunteers and not enough work, two of the students, Jennifer Cinelli and Caty Patton x'05, created their own activity, encouraging local children to paint rocks as a beautification project.

It was "a pivotal point in some kind of self-realization," says Patton. "I wanted to do it all day — sit there and play, laugh, and make a mess. And when we announced we had to leave, [the kids] all reluctantly groaned and looked at the pile of colored rocks that were drying in the sun with little faces of total happiness."

But Gran's warning wasn't entirely in vain, as Alex Barton '98, a Chicago marketing executive, and Jen Imm, a pharmacy graduate student, discovered. They went to the Browning diabetes clinic to help draw up marketing plans. Diabetes, particularly Type II, is a widespread problem on the reservation, affecting perhaps a thousand residents. And yet at the clinic, there are only four regulars who show up consistently for treatment.

"We have to get people in before they need amputations," said one clinic worker. "Because once we start chopping, they've only got about two years left."

Barton and Imm expected that they'd be targeting various populations in need of service, planning a mailing campaign, or drawing up some sort of time line.

"Very quickly, we had to lower our expectations," says Imm. "All we got accomplished was to type up a protocol for making a form letter on Microsoft Word from an Excel spreadsheet. And then the outreach worker didn't even want to try it. Comparatively, the manual labor was gratifying. You could see the results of your labor. But at the clinic, sometimes it seemed like we were spinning our wheels."

Found Lessons

You cannot be disappointed by something you didn't expect. Even if you don't reach your expectations or goals, chances are you'll end up better off than you started.

From the journal of John Vasudevan x'02

Sometimes the most frustrating work can lead to unexpected discoveries. One of the projects that Michele Gran had been most enthusiastic about stalled, but it offered an education in modern reservation politics nonetheless.

Gran had hoped to use the UW's highly educated, professional volunteers as an example of the sort of long-term benefits that her company and SALA could offer the Blackfeet.

"We can continue to send teams to dig holes," she says, "but little by little, we want to build up our competencies in other areas." And so she asked Gary Sandefur to speak to the members of the Blackfeet Tribal Business Council and to their influential vice chair, Jimmy St. Goddard. St. Goddard's authority had expanded considerably after recent tribal elections in which he and like-minded candidates had swept the old administration out of office. The former chair, Earl Old Person, had presided nearly continuously since the 1940s, and now St. Goddard and the new chair, William Talks About, promised big changes.

At first the council was receptive. They listened to Sandefur and asked him to return for a more formal discussion. Gran asked Sheryl Facktor '85, an attorney and investment banker, and me to accompany him. Beginning on a Tuesday, Sandefur, Facktor, and I staked out St. Goddard and the council. We sat outside their chambers in Browning. We chased them to a meeting in Heart Butte. From one day to the next we waited, but always we were deflected — the council was either in closed session or St. Goddard was deep in meetings. Gran would have to court the council without us.

But though we never got in to speak to the councilors, we found something else, instead. We found a chance to talk informally with others who were also waiting in hope of seeing the council. One of these was Pat Schildt, a Blackfeet entrepreneur who operates a convenience store in Browning. He told us about the way the council works, the rise and fall of various tribal enterprises, and the difficulties of running a business in Browning these days. Even with such high unemployment, worker turnover remains a problem. One of the first things Schildt does for new employees, he says, is to give them an alarm clock, maintaining that many of them may have difficulties adapting to a fixed schedule.

"You can learn a lot talking to people like this," says Sandefur. "They'll tell you all sorts of things that you'd never hear from official sources. It's a real education about the way things work on a reservation."

Rodeo

Stopped at the Western Curio Store and I got a cowboy hat, all in preparation for the rodeo in East Glacier.

From the journal of Lindalea Ludwick '67

The Montana trip may have been dedicated to service and learning, but adventure played more than a small part. One evening, many of us drove to East Glacier to take in one of Montana's great traditions: the rodeo.

In the rural West, rodeos are about as commonplace as high school football games in the Midwest. The one in East Glacier was nothing out of the ordinary — local kids rode various surly beasts for an audience of their parents, friends, neighbors, and us. We tried to blend in.

"It was obvious that we were tourists from Wisconsin," says John Vasudevan x'02, "because of our absolute obnoxiousness."

Still, it was a friendly sort of obnoxiousness. We simply tried to play along. When little children were auctioned off, we bought one, even before we learned exactly what we were buying. The small boys and girls rode sheep in the night's opening event. Winning children would split their earnings with their "owners," sixty-forty. We took a bath on the deal.

"We bought a boy named Alonzo Skunkcap," says Sarah Baker-Siroty x'02. "I knew he wouldn't win. But who ever heard of such a thing as buying a little boy?"

Rain sent most of the volunteers home early, but those who stayed saw the full range of rodeo experiences: barrel racing, hog tying, and riding sheep, steers, and broncos. And tragedy. "One bucking bronco bucked so hard that finally his rider fell off," says Elinor Gbede. "Then the horse fell over."

The response of the rodeo crew was swift and professional. They huddled over the rider, and after a tense pause, he stood up, to a round of relieved applause. Then it became apparent that the horse wasn't able to get up. The crew drugged it and quickly dismantled a gate to use as a travois. Then they dragged it out of the arena to await a vet. Rumor had it the horse had broken its back.

That's rodeo life. One Blackfeet woman we met, Maria Wagner, cataloged the injuries her sixteen-year-old son had received riding steers a month earlier: stepped on, gored, dragged, stunned, fifteen stitches in the face. He

At an area rodeo, the volunteers experienced a little local culture, including "buying" a young sheep rider. "I knew he wouldn't win," says Sarah Baker-Siroty, "but who ever heard of such a thing as buying a little boy?"

was back in the arena that night.

"Well," she says, "is he a boy?"

By Any Other Name

"Indians" are who white people were looking for when they found us.

Margaret Yellow Kidney

If you asked Browning residents what the best thing about their town is, they'd likely say it's the Indians.

The Indians are the boys basketball team at Browning High School. Actually, every team at Browning High is called the Indians, but the boys basketball team is special. The squad has won Montana's Class A state tournament for two years running, which makes them a hot ticket.

In politically correct Madison, having an Indian for a mascot would be unthinkable. Some of the volunteers, like Lauralyn Schellin '61, MS'62, who's seen Native American names removed from many places near her home in Oregon, were surprised to see "Browning Indians" plastered on walls and T-shirts. But in Browning, the term Indian is used almost universally, and it doesn't seem to bother anybody.

Not much. But then there's Margaret Yellow Kidney, a nurse at Browning's Head Start, who has a different take on the issue. Though not Blackfeet herself — she was born to a white father and a Chilcotin mother on a reserve in British Columbia — she is deeply involved in the traditional life of the Blackfeet. Her father-in-law, Buster Yellow Kidney, was a renowned figure in the Native American traditional spiritual community until his death in 2000. Margaret and her spouse still carry on his work at sun dances and sweat lodges, and she came to discuss traditional practices with the volunteers one morning. The details of native culture are important to her.

"I'm what's called a 'breed,' " she says. "With my father's people, I'm a squaw. With my mother's, I'm a white man's child." So she's clear on her terminology, and she prefers the term "native" to refer to the people whose ancestors predate Columbus. "Sometimes I say Indian myself, but we're native."

Indian Time

With Indian time, the day is taken at a leisurely pace, appointments and deadlines have less urgency, and people rarely question a sudden change in plans.

From the journal of John Vasudevan x'02

Indian time is one of those concepts that I'd heard a lot about. It had often been mentioned by both Gran and Sandefur in the meetings before the SALA team left for Montana. But I didn't really understand it — I hadn't really experienced it — until I spent a morning in the lobby of Browning's Bureau of Indian Affairs (BIA) office.

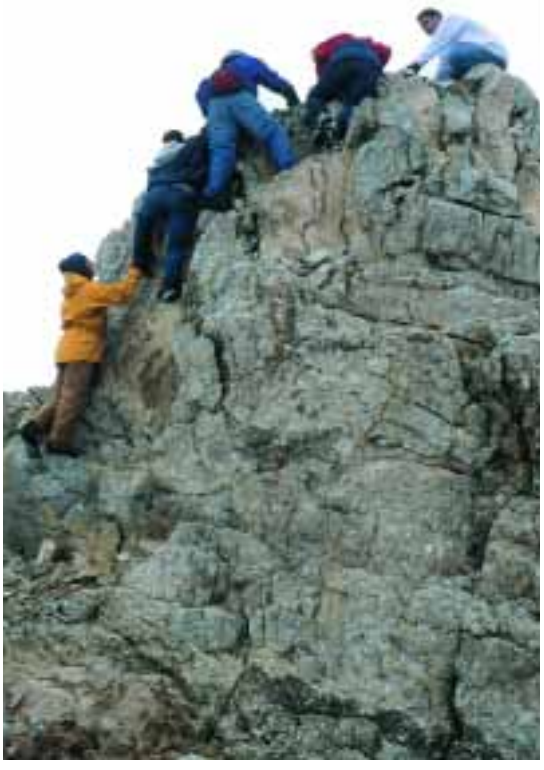
I — along with the rest of the SALA team — was supposed to hear a lecture from the BIA supervisor, Cliff Hall, on the history of relations between the Blackfeet and the federal government. We had an appointment with Hall at 9:30, but when we arrived — after an eight- or ten-block walk through the Montana morning chill — we found he was out, possibly inspecting irrigation works. The receptionist told us he'd be back soon, or maybe in the afternoon, and we could wait if we wanted. We did, for twenty minutes or so, before deciding to head back to the Head Start facility.

A couple of us stayed behind to help photographer Michael Forster Rothbart pack up his camera and equipment. By the time we were ready to go, news arrived: Hall was in the building. We sent word to Head Start to tell everyone to turn around. Michael began replacing photographic equipment, and I stood around in the BIA lobby, waiting so I could conduct the team back to Hall's office.

As I stood there, contemplating my shoes, a Fed Ex driver bumped into me. I felt guilty, because he was overloaded with packages, and I was basically just an obstacle. So I jumped out of the way, opened a door for him, and said: "Sorry about that — I know you absolutely, positively have to be somewhere before 10:30."

He looked at me, shrugged, and said, "Not in this town, I don't."

That's Indian time.



Climbing on Divide Mountain offered volunteers a solid lesson in team-building. "I have everyone here to thank for motivating me to be a better person," says Caty Patton, "to strive to that next pointy rock."

Dog Days

We found a dog. He's beautiful.

From the journal of Hannah Baker-Siroty x'02

Blackfeet country is a perilous place. There are many natural hazards: there are bears and coyotes and very cold nights — on mornings even at the height of summer, you might find frost on a car's windshield. There are mountains to fall off of and canyons to fall into. And, too, there are unnatural predators: vandals, aggressive panhandlers, and the drunk drivers who make the roads a terror.

These are scary enough, but they're nothing when it comes to real danger — the sort of thing that can catch you off guard, throw your whole life into turmoil

Continued on page 65

Seven Days on the Rez
Continued from page 35

and leave behind nothing but wreckage.

They're nothing, that is, compared to the dogs. There must be hundreds of them, wandering stray, some technically owned, others nomadic, abandoned, or completely feral. These animals are a menace, because dogs — and this has been proven by science — are cute. Especially to college students and alumni who think of themselves as socially responsible people. To a traveling group of such tender-hearted creatures, a stray puppy is an albatross, a barnacle, an implacable parasite. You'll never get rid of it. And Browning, Montana, is the capital of stray puppy country. The Blackfeet love dogs, and they don't like leash laws.

It took less than forty-eight hours for the SALA team to be captured by a local pup. The panhandler who introduced — then abandoned — him said his name was Ralph. Ralph looked healthy, though he had no tags or collar, and the panhandler's claim of ownership seemed noncommittal at best. So the team took Ralph in — and immediately changed his name to Montana, Monty for short.

As the days passed, the dog grew from a sort of mascot to a distraction. He chewed on Caty Patton's sleeping bag and devolved various socks into balls of yarn. His name changed again, first to Madison, then to Rusty, back to Madison, and then to Two Socks, after the eponymous beast in *Dances with Wolves*. Two of the students, Hannah and Sarah Baker-Siroty, phoned their parents to ask if they might bring him home with them.

But it soon became clear that no one on the SALA team could give Two Socks a permanent home, so we prevailed upon Darrell Wippert, a maintenance and security worker at the Head Start facility, to take him in. Wippert said he would, as a last resort.

At the end of the week, fate intervened. As Ralph-Montana-Monty-Madison-Rusty-Madison-Two Socks was playing outside of Wippert's trailer, a van pulled up. In the van was a little girl, and on that little girl's mind was her missing dog. It turns out that Two Socks was an imposter. He was actually named Cinnamon, and he came from Great Falls, though no one seemed to know how he'd traveled the 128 miles to Browning. He went home shortly before we did.

For many of the travelers, the attraction of SALA had been the opportunity to see life on a reservation, but what they took away was connections — and not just with canines. "This trip was an opportunity for me to extend myself beyond my classmates, to connect with people other than my peers," says Hannah Baker-Siroty. "It was amazing to be on a trip with such varying ages and life pursuits. We all have a great deal to teach each other."

John Allen is associate editor for *On Wisconsin*. In 2003, SALA will return to Browning and will also send a team to Beards Fork, West Virginia. For more information, call WAA's travel department at (888) WAA-TRAV (922-8728), or visit uwalumni.com/travel.

Your Opinion, *Please*

How do you know what people think — unless you ask?

By David Tenenbaum MA'86

SPENCER WALTS

You know the script. It's dinner. Your family members are gathered around the table, perhaps the only time they will be together all day. The salad is dressed, and the hot dish is being passed.

Ring. Ring.

Surprised? No. Everybody knows that dinnertime is telemarketing time.

The pitiless ringing of telemarketing phone calls has led Wisconsin, along with twenty-seven other states, to establish do-not-call lists. By the time the list goes into effect on January 1, 2003, the state expects that as many as one million people will have signed up via phone or Web site. Two agencies, the Federal Trade Commission and the Federal Communications Commission, are considering a national no-call list.

But even if you've joined the list, you may still get calls from strangers. Although telemarketers are prohibited from calling you, political pollsters, non-profit organizations, and legitimate survey researchers are exempt. So before you hang up on a researcher (or on this article), you may be curious to know why the work is so important.

Let's start with what these researchers are *not* doing. They are not selling anything. They are not gathering your personal information to sell it. They are not even trying to interrupt dinner. In fact, legitimate researchers will practically beg you to specify a better time to talk.

Essentially, they're trying to find out how Americans think and act — knowledge that ultimately can influence decisions that affect our daily lives.

James Sweet, an emeritus professor of sociology at UW-Madison, says public-opinion surveys have scientific and practical value: "To take one example, most people think it's useful to know what are the problems of health access — to sample the whole population and get a sense of what's going on."

The same applies to myriad other questions. How satisfied are people with public schools? Is government ignoring the health needs of the elderly? Do people believe what they read in the newspaper? Has the Enron scandal eroded trust in business? How many people favor war with Iraq over a diplomatic solution? Did candidate Slippery N. Slimey win due to slick ads, a clever choice of running mate, or popular positions on bread-and-butter issues?

Whether the subject is health or politics, surveys are the bedrock of social science.

Roadblock Ahead

And yet, survey research is getting tougher — do-not-call lists are only the latest hassle. Even though these lists exempt legitimate survey researchers, not everybody who signs up may know that. So when another call comes in from a university researcher, for example, the recipient of the call may feel especially frustrated. Then again, the lists could actually make life easier for researchers, explains G. Donald Ferree, associate director for public-opinion surveys at the University of Wisconsin Survey Center. Those who don't mind participating in surveys — and so have never bothered to sign up on the no-call lists — may be quite receptive to legitimate calls.

Nevertheless, other new obstacles arise from technology. A so-called "privacy manager," for example, allows only preselected numbers to ring through. The increasing use of cellular phones, unlisted numbers, and multiple numbers at one residence all undermine the notion that each household has one phone number — an assumption that, until now, has allowed survey researchers to rely on random-digit dialing.

Furthermore, surveys are growing more popular among market researchers, political parties, and interest groups — all of whom may be less interested in accuracy than in, say, moving merchandise or inventing support for parochial positions. The profusion of surveys and sales pitches disguised as surveys all reduce the public's willingness to answer legitimate researchers.

Survey researchers are uncertain how to assess their difficulties, but they are virtually unanimous in taking the problem seriously. "Response rates have declined," confirms Kenneth Goldstein, a professor of political science who is trying to learn about people who do not respond to political polls.

Nora Cate Schaeffer, a professor of sociology who teaches survey design, agrees that response rates are going down, but says, "It's a hard problem to study because you have to hold so many things constant: the study design and the sampling method." Many people blame growing public cynicism, but Schaeffer says that's not been proven.

One tactic that is gaining approval for improving response rates, Schaeffer says, is paying respondents. Fortunately for budgets, payments must be moderate, since higher fees might coerce low-income people to cooperate against their better judgment.

More commonly, however, researchers mount a "sales pitch" during the initial thirty seconds of a call. The goal is to gain the respondent's trust, by explaining that the only way to know how people really think and act is to contact random samples and ask.

Reaching randomly chosen individuals or households is the only basis for reliable survey research. If the sample is too small, richer or poorer, whiter or more female than the group as a whole, results will be misleading. If rich people have more call-blocking gadgets, they will be underrepresented in a survey that dials phone numbers at random.

Equally important is a good response rate. If fewer than roughly 60 percent of

randomly chosen subjects actually complete the survey, researchers will be forced to guess the opinions of the rest of the sample. There may be systematic reasons why people do not respond: If all Republicrats are irate at the press, they may not answer a newspaper's political survey. If all Demicans are incensed at the federal government, they may reject a government health survey.

Surveys commonly inquire about economics, politics, and feelings. In Wisconsin, the university's Badger Poll, which was established last March, examines all three realms simultaneously. Residents are asked how they think things are going now, and how they expect them to be going in the future. "It's intended to examine every facet of life in Wisconsin, to be the poll of record for the state," says Ferree, the poll's director.

Ferree says the poll will assess optimism and pessimism. Once similar surveys are carried out elsewhere, it will be used to compare the attitudes and feelings of Badgers to residents of other states. The first three polls have shown that Wisconsinites are high on their state: 24 percent say it's one of the best or a very good place to raise a family, and another 38 percent consider it better than most states.

Making Cold Calls

To get an idea of how university researchers are dealing with these challenges, I visited the UW Survey Center, which employs about 180 interviewers (mainly part-timers), and eavesdropped on the phone. The center contracts with university and government researchers to perform dozens of surveys each year.

Deep into a long telephone interview, a woman from New York State is giving an odd series of answers. She "never" socializes with friends, family, neighbors, or church groups. Ditto for people from work. And all this even though she claims she's not disabled.

The interview is one of thousands for the National Survey of Families and Households, a groundbreaking effort to find out who we are and how our lives are changing. This is the woman's third interview. I ask Kris Hansen '96 if she could be kidding. Hansen, a veteran interviewer who supervises the phone room at the Survey Center, thinks she's being truthful, although some people do lie; several years back he talked to a kid who claimed to be an eight-hundred-pound amputee.

Hansen and I overhear other interviewers reaching wrong numbers, disconnected phones, and suspicious people. They encounter sudden hang ups or people who might want to talk — tomorrow. Sooner or later, one of the interviewers is bound to reach a "painter" or a "neighbor" who claims not to know the resident. This may be a tactic, Hansen suspects, to dodge bill collectors.

Again and again, the interviewers are flummoxed by caller ID, call waiting, or a privacy manager.

Against the wave of protective electronics and human skepticism, the center's main tool is human relations — smart, articulate interviewers (mumblers need not apply) who believe in their jobs and can explain the importance of survey research. John Stevenson, the Survey Center's associate director, says people tend to cooperate with a survey if they consider the topic interesting or important, and if they trust the researchers to do something useful with the information. This is simple "social exchange theory": if you treat people with respect, they feel a reciprocal obligation to be respectful. Those factors, he says, give a "huge advantage" to the academic researchers who are the center's clients, an advantage that is reflected in response rates that often exceed 70 percent.

Indeed, every so often, we hear the magic words: "Sure, I have time to answer your questions now."

The Rate of Response

The positive responses reflect not luck, but skill. Hansen says interviewer training focuses on getting response rates that meet the needs of university researchers. Other survey researchers have much lower requirements. For example, Goldstein says, the overnight polls that news organizations use to analyze the state of the electorate often get only a 10 to 15 percent response. "There is so much polling going on, so much direct marketing," he explains.

You might think pollsters could use statistical manipulations to compensate for low response rates, but Goldstein says that can't be done without knowing about those who did not respond. "You can be a smart statistician and take a good random sample, but you will have a problem if the 10, 20, or 50 percent of the population who talk to you are different from the sample as a whole," he says.

Goldstein's work embodies the significance of survey research. He has studied non-response in political polling — a major factor in the conflicting predictions over the Florida 2000 presidential ballot. He thinks exit polls may help compensate for difficulties with response rates. "One neat thing about exit polls is that you can see who you didn't talk to," he says. "If you hang up the phone, I know nothing about you. But if I see you in person, I know your approximate age, race, and sex." That data, he says, can adjust opinion polls. If exit polltakers find that 45 percent of voters in a certain district are African-American, but only 30 percent of poll respondents were African-American, they can weight their results to improve accuracy.

Foreign Lands

In China, a key challenge to survey researchers is avoiding government interference. Surveys by foreign universities require Chinese government approval, and sometimes the accompaniment of government minders. Zhongdang Pan PhD'90, an associate professor of communication arts who has surveyed in his native China, knew such an arrangement would discredit his results. "We didn't want the questionnaire to be censored by the government, and didn't want the government to supervise our field operations," he says.

SPENCER WALTS

Instead, he worked through contacts in three large Chinese cities to look at the correlation between participation in private leisure activities — once the exclusive province of the Communist government — and individualistic attitudes. Early results, he says, show "clear, statistically significant signs that those who participate more in market-sponsored leisure activity show a greater degree of endorsement of what I'd characterize as individualistic values," Pan says. They tend to agree, for example, that "pursuing individual happiness is the goal of life."

Meanwhile, journalism professor Sharon Dunwoody is researching a highly individualistic realm — the World Wide Web. Ever since UW-Madison initiated *The Why Files*, an online science magazine, seven years ago, Dunwoody has been trying to overcome the Web's "quick-click" mentality of instant gratification in her quest to understand Web users. Her surveys show that even regular *Why Files* users are willing to answer only a handful of simple questions. Eventually, Dunwoody expects to learn more about Web users "in the same way we find out who does a lot of other things: traditional surveys."

How's Your Family?

The World Wide Web is about the only subject absent from the National Survey of Families and Households, the big kahuna of survey research at UW-Madison. James Sweet and colleague Larry Bumpass, also a professor emeritus of sociology, initiated the survey in 1987, and they continue to direct it.

Members of thirteen thousand randomly chosen households were interviewed in person in 1987 and 1988, and again in 1992 through 1994. The third round, now under way, is the first to use phone interviews. Data from these extensive interviews, Bumpass says, "are being distributed with identifying information removed, to researchers all over the world. Hundreds of people are working with them, even as we speak."

Sweet and Bumpass, for example, have used the data to cast a new light on family structure, especially regarding marriage, divorce, and cohabitation. Many surveys indicate that people are marrying at older ages, but Sweet says they ignore how families actually form — and thus may mislead anyone trying to understand who is taking care of children. "We know that a large share of cohabiting relationships end in marriage, and that a large share of marriages are preceded by a period of cohabitation," Sweet says. Cohabitation, in other words, may substitute, at least temporarily, for marriage.

The implications for policymakers concerned with the state of the American family are complex, Bumpass says. While one-third of all children are born to unmarried mothers, 40 percent of unmarried mothers live with a man, meaning that a surprisingly large number of kids are living with two parents.

On the other hand, the start-and-stop nature of cohabitation may impose a higher number of stressful transitions on these children. So despite the fact that the divorce rate has been stable for a long time, family life has become increasingly unstable. By focusing on marriage, "we are missing these transitions in and out that are occurring in the real world," Bumpass says. "How we think about social policy with respect to familial change has to be informed by this reconceptualization of what family life is really like out there."

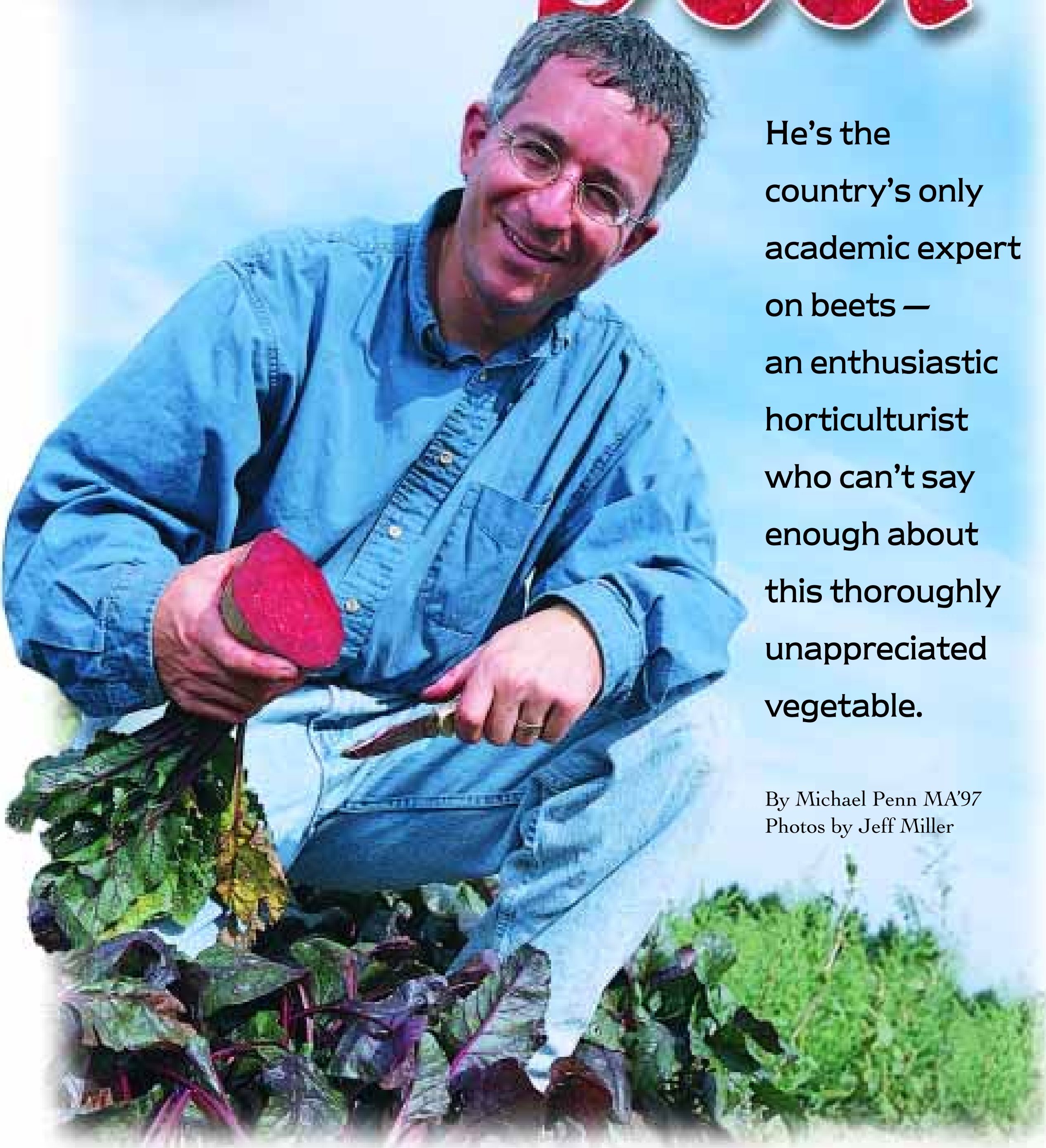
In this case, the research is producing an accurate picture of family life as the twenty-first century begins, and it's a vitally important picture in a world with do-not-call lists.

"The argument from our research is that the boundaries of family life have blurred, that you really misrepresent family life if you treat it as beginning at marriage," says Bumpass. "To argue that a mother and father living with a child become a family when they get married does not ring true. They already are a family."

As you listen to the phone ring, just remember this: that kind of insight is important. And it's something you can only learn with a well-designed survey.

David Tenenbaum is staff writer at *The Why Files* (http://whyfiles.org).

UPbeet



He's the country's only academic expert on beets — an enthusiastic horticulturist who can't say enough about this thoroughly unappreciated vegetable.

By Michael Penn MA'97
Photos by Jeff Miller

Tom Robbins once wrote that stories about beets lead inevitably to the devil. These days it's probably more true that stories about beets lead inevitably to Irwin Goldman.

Goldman PhD'91, an affable, forty-ish associate professor of horticulture with peppery brown hair and wire-rim glasses, is no Prince of Darkness, not even a close surrogate. But he does know a lot about beets. As part of his faculty research, he grows beets, breeds beets, and studies beets. Heck, he even eats beets. In fact, you won't find anyone in this country who can tell you more about the fleshy roots than Goldman.

No, really — you won't. Don't even bother trying. Goldman is not merely the nation's pre-eminent expert on beets, he's the only expert.

As far as anyone can tell, no other professor in the United States is currently working with the much-maligned vegetable (at least not the humanly edible version of it). "There are a few people in private industry," Goldman says. "But," he adds somewhat sheepishly, "I do have the only publicly supported table beet research program in the country."

In academia, where professors are often like wolves, traveling in packs and working collaboratively, that's pretty remarkable. Most food crops — everything from alfalfa to zucchini — draw a fair amount of research buzz. There are usually hybrids to test, genes to splice, and markets to explore. If you took all the people who research a crop such as corn, for instance, you could probably fill up a fleet of buses. But the nation's beet braintrust can't even use the carpool lane.

"There is very little interest out there," Goldman concedes. "It's a very underappreciated crop."

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Few vegetables have been as picked at and picked over, as picked on and ruthlessly pickled, as the beet. Beets give liver and Brussels sprouts a run for their money as the food most reviled by kids, and not many adults like them, either.

As a food crop, beets don't even make the list of 133 commodities tracked by the National Agricultural Statistics Service. Goldman estimates that table beets — the variety grown for human consumption, as opposed to those grown for animal fodder or sugar processing — are grown on only about eight thousand acres of land in all of the United States, an area that could fit inside the boundaries of Lake Mendota. Figs (14,000 acres), turnips (11,500), radishes (14,600), and macadamia nuts (17,800) are all more widely cultivated. Even the lowly lima bean lays as much claim to American soil.

About two-thirds of that paltry beet crop ends up processed, ultimately to appear in cans and jars. These are your grandmother's beets — the mushy stuff that wrinkles the noses of many a child — and the market for them, never huge to begin with, is steadily shrinking. In 1977, American farmers processed about two pounds of beets for every American, but now that figure is down to below seven-tenths of a pound.

Beets haven't always had such a sorry lot. They've been around for more than two millennia, and for most of that time, they've been considered a valuable food source, critical to the survival of many cultures through the ages. It's believed that ancient Greeks first cultivated wild beets, which grow throughout the Mediterranean region, for their green, leafy tops. Some historians relate anecdotes about Greeks offering beet greens to the god Apollo on a silver platter at the temple of Delphi, which must mean they didn't think beets were all that bad. Neither did the Romans, who collected beet greens for food and medicine.

For centuries, beets gave sustenance to both farm animals and farmers as they spread throughout Europe, especially in the northern and eastern parts of the continent, where the stored roots kept families fed during long winter freezes. In parts of Russia, Hungary, and Poland, beets were more than food — they were survival, the linchpin of existence. They became part of the culture. Some Russian women even used beet pigment to rouge their cheeks.

During Napoleonic times, beets took a significant detour. In 1812, France, while locked in war with England, was shut off from overseas sugar imports, and the whole country sunk into sugar withdrawal. Napoleon issued a challenge to French scientists to come up with a new way to produce the sweet stuff, and, because nothing galvanizes the French more than a threat to cuisine, they did. They turned to the forgotten work of a French botanist, who two hundred years earlier had derived a sticky, sweet syrup from beets. Now, all but a very few beets grown in the United States are destined to become sugar, not entrées.

It was a little more than a century later that a UW-Madison professor named Warren Gabelman turned his academic attention to the vegetable, forming UW's beet lab in 1949.

Gabelman, now an emeritus professor of horticulture, had been working on hybrid crops, which in post-World War II America were just starting to make their way onto the farm. Corn hybrids were doing wonders, increasing yields and profits for farmers, and Gabelman imagined that they would have the same advantages for other crops, too. Hardly anybody was breeding hybrid vegetables back then, and he had his choice of foods to work with. He selected three crops that he thought might be valuable to Wisconsin farmers — carrots, onions, and beets.

Influencing Gabelman's choice was the fact that Wisconsin already had a large canning industry, and beets were grown by many farmers who fed those factories with fresh produce. It's still true today that no state cans more beets than Wisconsin, and of those eight thousand acres of beet-growing land, about four thousand are in the square formed by Madison, Milwaukee, Lake Michigan, and the Illinois border.

The lab thrived, and Gabelman succeeded in releasing a series of commercially viable hybrids. One of the varieties — named, appropriately enough, Big Red — gave rise to the type of beet most widely grown around the world today. In fact, since virtually every table beet derives from some kind of hybrid, and since for decades Gabelman's lab was the only one making hybrids, you could say every beet, everywhere, has Wisconsin parentage. Even exotic varieties, such as new golden beets, are Badger red inside.

After Gabelman retired in 1991, the beet lab might have disappeared without much notice, given how few people paid attention to the crop. But researcher D. Nicholas Breitbach, who has worked with the lab for more than three decades, kept things going until Irwin Goldman arrived two years later. Then a fresh-faced assistant professor just two years past his doctoral studies, Goldman carried on the breeding work and launched new inquiries into the mystery of the beet. He now maintains beet plots at five different farms around the state, and he and his graduate students slice up enough beets in a year to keep a Russian restaurant in business. Every new hybrid they grow gets carted back to the lab, where it is carved apart and analyzed in an ongoing quest to unravel the secrets those scarlet juices conceal.

"It's interesting — here we are with all the tools of modern science," Goldman says, "and we still don't really know what happens when you eat something as basic as a beet."

In 1997, Goldman was the first researcher to quantify folic acid in red beets, demonstrating that breeding and harvesting can increase amounts of the valuable nutrient, which is found in both beet greens and their roots. He has also helped show that the pigment of a red beet, betalain, is rich in the antioxidants that battle the effects of aging.

In one of the UW's beet fields, Goldman gives his two-year-old daughter, Aviv, a beet that he has carved into the shape of a flower. The professor dismisses the notion that kids and beets don't mix. In fact, he says his two young children actually enjoy them, both as food and as art.

The lab still runs by Gabelman's tripartite mission, and there's plenty of work being done on carrots and onions, as well. But Goldman doesn't mind playing favorites. "When students come in, they catch on to the fact that I like beets the best," he says. "And it's true. I love onion and carrot, too, but beet — there's something very compelling about working with it."

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Goldman didn't set out to become an ambassador of beets. He did his doctoral work on pea breeding, and initially, he was mostly interested in the relationship between vegetables and nutrition. But he was born to the job, if for no other reason than for the simple fact that he liked beets even before he studied them.

Beets, admittedly, are an acquired taste. Their high sucrose content makes them powerfully sweet, but that sweetness comes with an earthy bite — a soil-like flavor caused by concentrations of geosmins, chemicals that leach into beets from the soil. You can find the same chemical influences in spinach (a close relative of beets) or some types of corn. Fans love that flavor, and extol its virtues of solidity and connectedness to the earth. Detractors say beets just taste like dirt.

There's also the bleeding. Red beets (there are gold and even candy-striped beets, as well) contain reservoirs of inky pigment, which is legendary for its ability to spill at the slightest provocation. Many cooks complain that a kitchen where beets have been prepared ends up resembling a crime scene, with red stains on just about every surface. (Goldman hastens to add that the pigment is water soluble and washes off easily.)

And let's not forget the coolness deficit. The beet is often portrayed as a relic of a bygone era of huddled masses and winter stews. In the modern day of year-round produce markets, where fresh vegetables can be flown in from Chile, no one needs root cellars or their hearty stock. "They're perceived as old-fashioned," Goldman says.

Students who come to work in Goldman's lab are often hesitant to embrace the beet. They may love studying it, but many still won't eat it. Goldman tries to win them over, teaching them how to get past their can-based beet phobia and sample newer and more creative ways of preparing beets. He shows them how to roast beets in the oven, which he says seals in their natural sweetness and nicely complements their earthiness.

"They're just fantastic. The flavors and colors are just intense," he says. "It takes a while to cook — you have to put a little bit of time into it, but it's the best way to do it."

In fact, Goldman may spend more time beating the drum for beets than breeding them. But he doesn't mind. "I have a research role, but I also like to

popularize these things as much as I can," he says. "I'd love to see more people grow to appreciate them."

There are signs that beet perceptions are coming around. Farmers' markets and community-supported agriculture arrangements are beginning to reintroduce consumers to vegetables they may have forgotten, Goldman says. "People are rediscovering them," he says. "Their connections with vegetables are changing."

A staple of ethnic foods and salads for years, beets are making a comeback as a nutritious spike of flavor for many dishes. *Saveur* magazine has done a full-color spread. NBC's *Today Show* recently featured a beet bruschetta. And at Madison restaurant L'Etoile — where proprietor Odessa Piper is described as a "beet queen" — the frequently changing menu often features beets prominently.

"Beets are very hot right now," says John Navazio PhD'94, a beet breeder and manager of Seed Movement, a seed company in Iowa City. "They fly under the radar. The mainstream population doesn't necessarily eat beets. But there is a significant subset of Americans who really embrace them. Anyone who sells beets at a farmers' market can tell you it's a very popular vegetable with that subset of people who are very food-conscious and very health-conscious."

Suddenly, Goldman is hip. His phone is ringing. A few weeks ago, he received a message from a *Los Angeles Times* reporter, asking to interview the professor about his favorite subject. He responded within five minutes. "I'd love to!" he told her, cheerily. "There aren't enough people who want to talk about beets!"

Later, he explained to me why he appeared so eager. "Beets are a rare treasure," he said, "and nothing makes me happier than being able to tell people about them."

Michael Penn, senior editor of *On Wisconsin*, refrained from sampling any beets during the writing of this story, and continues to do so, purely in the name of objective journalism.

Color Me Red

The supercharged red of a Wisconsin high-pigment beet stands out in comparison to one of the golden beets grown by UW researchers. The pigment from beets developed at the UW has been used to color Kool-Aid, Jell-O, yogurt, and ice cream.

The compelling nature of a beet begins — and some would say, ends — with color, and color is at the root of Wisconsin's connection to beets.

Beet red is a profound, unapologetic red. While cheery people get apple red or rosy red, we only get beet red in the hottest of moods. It takes the fire of anger or embarrassment or frustration to bring us to beet. That reddest of red was the muse for Tom Robbins's 1984 book *Jitterbug Perfume*, which contains the most convincing literary paean to a beet ever crafted. "The beet is the most intense of vegetables," he begins. "The radish, admittedly, is more feverish, but the fire of the radish is a cold fire, the fire of discontent, not of passion. Tomatoes are lusty enough, yet there runs through tomatoes an undercurrent of frivolity. Beets are deadly serious."

If Robbins liked beets eighteen years ago, he'd love them today. Thanks to UW horticulture professor Irwin Goldman, they're getting redder by the day. Wisconsin's lab now breeds beets that have as much as five times the pigment of normal red beets and are so deeply saturated with dye that they look black.

The experiment began in the late 1970s, when food science professor Joachim von Elbe '59, MS'60, PhD'64 visited a beet canning facility. An expert in food colorings, von Elbe was called in to help the plant figure out a problem with its beets. Because of its tendency to spill out when sliced, natural beet color doesn't hold up well to the canning process. It goes running out all over when the raw vegetables go through the cutting machines. Most canners today use artificial coloring to re-create beet red in the can, and von Elbe had been assisting with getting the color right. As he walked around the plant, von Elbe saw ruby rivers everywhere, flows of deep-hued beet juice running away from all the machinery and down the drain. He thought, "My God, this is red! Maybe we ought to be using this!"

Von Elbe went to colleague Warren Gabelman, and the two began a program to breed beets exclusively for pigment. Now, von Elbe has retired from the university and runs a company marketing high-pigment beets for use as natural dye.

Back in Goldman's lab, Veronica Gaertner '01, a master's degree candidate in horticulture, works at a countertop stained thoroughly scarlet, collecting and analyzing the dye from the increasingly purplish beets they've raised. She holds out a jar of beet dye and instructs me to smell it. There is no beety odor. She assures me that there's no lingering taste, either.

Gaertner says there are drawbacks to studying something as unusual as beets. "There aren't many papers about them. As a student, it's a little harder to find concrete research that's not from 1970," she says. But the intrigue of the overlooked beet — and its potential uses — outweighs the struggles. "Breeding for pigment is really only thought about [at Wisconsin]. I don't think any other place is breeding beets, let alone breeding them for pigment," she says. "I think it's neat to be working on something with such Wisconsin history."

So far, the converted beet juice has been used to color Kool-Aid, Jell-O, Yoplait yogurt, and Ben and Jerry's ice cream. Although the dye is about twice as expensive as synthetics, the professors are hopeful that further breeding will make it an economical choice.

— M.P.


Meredith Gardner


Joseph Sullivan

THE Code-breaker AND THE G-Man

BY CANDICE GAUKEL ANDREWS '77

Decoding messages to decipher threats to our national security from outside sources and finding the dangers already here, living insidiously among us: these endeavors now make up the headlines of our daily lives. Meredith Gardner and Joseph Sullivan were heroes of these kinds of battles, but their work did not involve modern-day terrorists. Instead, one fought enemies from without in the 1940s; the other, a generation later, fought enemies within. Both died during the same week in August.

Meredith Gardner and Joseph Sullivan used their UW education to expose Soviet spies and bring criminals to justice.

Spies, secret codes, and a highly protected anonymity: it's the stuff of a John Le Carré novel. Although there are no movies that chronicle the intriguing career of Meredith Knox Gardner MAx'40, he pulled off one of the greatest U.S. counterintelligence coups of the last century.

A native of Okolona, Mississippi, Gardner attended graduate classes in the German department at the University of Wisconsin and was a TA between 1938 and 1940. An exceptional linguist, he was fluent in German, Old High German, Middle High German, Sanskrit, Latin, Greek, Lithuanian, Slavonic, Spanish, French, Italian, and Russian. He moved to Washington, D.C., early in World War II to work as a civilian for the Army Signal Intelligence Service (ASIS), a predecessor of the National Security Agency (NSA). He was first assigned to decode intercepted German telegrams, but then amazed his colleagues when he also mastered Japanese in a few months.

At the same time that Gardner was beginning his career at ASIS, a young UW-Madison graduate student named Blanche Hatfield MA'42 was hearing about Gardner's expert reputation in her German classes. After graduating, she, too, went to work for ASIS to help decode German messages. Gardner's son and daughter say that their mother knew Gardner worked there, sought him out, and promptly approached him with what she thought was a clever pickup line — *"Ich dachte, Sie wären eine Legende!"* ("I thought you were just a legend!") They married in 1943.

That same year, Gardner received a surprising order: he was reassigned to examine telegraphic traffic involving the Soviet Union, America's ally. The U.S. government, concerned that Stalin might make a deal with Hitler and get out of the war, began to monitor Soviet diplomatic communications. The Soviets were aware of the situation, but because their cables were in code, security did not concern them.

Gardner began his task by studying out-of-date Soviet code books, probably stolen by FBI agents, to try to figure out the current codes. In the fall of 1946, he made an important breakthrough. He determined the ciphers used for English letters, allowing him to spell out proper names.

In a telegraphic message sent two years earlier, Gardner found a list of names: Hans Bethe, Niels Bohr, Enrico Fermi, Edward Teller, and others — the scientists who worked on the atomic bomb inside America's most secret location, Los Alamos, New Mexico. The message was the first hint that there might be Soviet spies working at the atomic weapons plant. It was time to call in the FBI.

A few months later, Gardner came upon a reference to an agent in six separate messages with the code name "Liberal." The only clue to his identity lay in the name of his twenty-nine-year-old wife. Gardner determined that the name contained three groups of letters, the first representing *E* and the third *L*. "I had never come across a three-letter meaning in the spell code," he later recalled, according to an obituary in the London *Telegraph*. "Then I said, 'Ah, but they anticipate sending a lot of English text, and the most common word in the English language is *the*."

The name of Liberal's wife was "Ethel," one of the key clues that led to the uncovering of Julius and Ethel Rosenberg, who were arrested in the summer of 1950 and were charged with conspiracy to commit espionage. At their trial, the prosecutor implied that they had stolen the secret of the atom bomb and given it to the Russians.

In fact, while the Rosenberg trial was unfolding, Gardner broke into the most explicit message he would ever read. It pointed to two Los Alamos physicists as the ones who had given away the blueprints for the bomb: nineteen-year-old Harvard graduate Theodore Hall and a refugee from Hitler, Klaus Fuchs. Neither knew the other was a Russian spy.

This evidence was kept out of court, however, because it would have revealed the fact that the United States had managed to break the Soviet code.

Gardner had supported the death penalty for Julius, but not for Ethel. Unbeknownst to the court, Gardner had decoded another KGB message that indicated that Ethel was not a spy like Julius. Gardner said, in an interview broadcast on *NOVA* in February 2002, "[The message said] she knows about her husband's work. In view of her delicate health, does not work." The word *work* was KGB jargon for *espionage*, which would explain why Ethel was not given a cover name.


When Blanche Hatfield went to work for the agency that employed Meredith Gardner, she introduced herself to the linguistic legend. They were married a few years later.

Julius and Ethel were executed in the electric chair at Sing Sing Prison on June 19, 1953. Michael Meeropol PhD'73, one of the Rosenbergs' two sons, says that "Mr. Gardner was convinced that my mother was wrongfully convicted and executed, but because what he did was super-secret, he could not speak out. As I understand it, he expressed tremendous remorse for this."

Gardner and the other code breakers ultimately found cover names for more than three hundred Americans who spied for the Soviets in World War II. American counterintelligence was able to identify only about one hundred of these Soviet agents. But even that accomplishment was remarkable. There wasn't a single agency of the American government that the Soviets hadn't infiltrated.

In 1972, Gardner retired from the NSA, and his work remained unknown for years. According to his son, Arthur Gardner MA'70, "I had no idea of his job when I was growing up. He took his promise of secrecy very seriously. I didn't know until much later what he did." Word got out in 1987, when former agent Peter Wright referred to Gardner in his autobiography, *Spycatcher*.

But no one paid much attention. It wasn't until 1996 that Senator Daniel Patrick Moynihan, as chair of a U.S. commission on government secrecy, became aware of the cryptography and campaigned for it to be revealed. Fifty years after their labors, Gardner and his colleagues were honored at a formal ceremony in Washington sponsored by the NSA, the CIA, and the Center for Democracy. Senator Moynihan introduced Meredith Gardner as an unsung hero of the Cold War.

Gardner told the *Washington Post* in 1996 that he attributed his success to his logic, linguistic skills, and "a sort of magpie attitude to facts, the habit of storing things away that did not seem to have any connection at all." Son Arthur says, "He had a love of detail and a love of knowledge in general."

Karen Fischer, who works at the UW-Madison Division of Continuing Studies, is the sister of Gardner's daughter-in-law and met Gardner in his later years. "If he heard a word pronounced differently," she says, "he'd trace the roots of the word and how the different

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pronunciation came about. He had an endless curiosity and a quick mind."

Gardner spent his retirement doing the most difficult crossword puzzles he could find, in the *London Times*, and traced his Scottish ancestry "almost back to the Bible," says Fischer. He died on August 9, 2002, in Chevy Chase, Maryland. In his obituary, the *Washington Post* gave him the credit he so long deserved when it stated, "Within the intelligence community, Mr. Gardner was said to have been a living legend."

Joseph Aloysius Sullivan '38, LLB'41 seems to have been on the scene at every defining event of the turbulent sixties and seventies. Whether it was the search in 1964 for three missing civil rights workers depicted in the film *Mississippi Burning* (Gene Hackman's character was loosely based on Sullivan in the 1988 movie); the Martin Luther King, Jr. assassination in 1968; the murder of United Mine Workers reformer Jock Yablonski in 1969; the Kent State killings in May 1970; or the bombing of the Army Math Research Center in Sterling Hall at UW-Madison in August 1970, he was there — almost a real-life Forrest Gump.

The character that Gene Hackman (second from left, above) played in *Mississippi Burning* was loosely based on Sullivan (left). Author Tom Clancy called Sullivan "the greatest lawman America ever produced."

Throughout his thirty-year FBI career, he was the man the bureau sent when there was pressure to solve a case, and solve it soon. Author Tom Clancy refers to Joseph Sullivan as "the greatest lawman America ever produced."

Sullivan was born in Montreal, Wisconsin, and raised in nearby Hurley. According to his brother Gerald Sullivan '41, to finance his UW-Madison education, Joseph worked summers in a Montreal iron ore mine. "It was there that he learned about explosives," says Gerald.

Little did Joseph know that this knowledge would play a large role some thirty years later in solving what was until then one of the most destructive acts of domestic terrorism in U.S. history — the Sterling Hall bombing. "He easily figured out how they [the bombers] blew it up — how the explosives worked — and solved the case in no time," says Gerald.

Sullivan played football for Wisconsin for a time, but quit when he decided to enter law school. After graduation, he got a job with Standard Oil in Green Bay. When a fellow alum suggested that Sullivan join the FBI, which offered a starting salary well above what he was making, he jumped at the chance.

The FBI put Sullivan to work tracking down Nazis in Venezuela. "No one was supposed to know he was an FBI agent," Gerald says. "He had to get a day job with an oil company down there and then do his spy work at night. He was sent to find the Nazis, but he found the Communists were a bigger problem."

In the early fifties, Sullivan joined the FBI's Domestic Intelligence Division, which kept an eye on the KKK and other violent organizations. After heading bureau offices in Houston and Alaska, Sullivan was promoted in 1963 to the position of major case inspector.

In June 1964, he received word that the FBI had been authorized to investigate the disappearance of three civil rights workers near Philadelphia, Mississippi. Sullivan flew to Meridian and made it his home for the next nine months.

In the tense social climate of the 1960s, the Johnson Administration was determined to track down the murderers. Within weeks of arriving in Mississippi, Sullivan was visited by FBI Assistant Director Al Rosen, then by FBI Director J. Edgar Hoover. Sullivan's investigation even received full assistance from the military, which sent busloads of sailors from the Meridian Naval Station to aid in the search for bodies in the insect-infested swamps of east-central Mississippi.

According to the "Famous Trials" Web site maintained by the University of Missouri-Kansas City, when the attempt to recover the bodies failed, Sullivan concluded that he "would ultimately solve this case by an investigation rather than a search." But residents of the

Continued on page 64

The Code-breaker and the G-Man

Continued from page 46

Mississippi town of Philadelphia were tight-lipped. "They [the Klan] owned the place. In spirit, everyone belonged to the Klan," Sullivan said. The local residents even took sport in sending the FBI agents on wild goose chases.

Eventually, the site continues, Sullivan developed informants who led him to uncover the facts. The key informants were members of a neighboring Klan, causing Sullivan to observe that if the Philadelphia Klan had "carried out the murders on their own, they would have almost certainly gotten away with it."

By 1970, Sullivan's reputation in the FBI could be summed up in two words: effective and incorruptible. When, at 3:40 a.m. on August 24, Madison was rocked by an explosion so powerful that it damaged twenty-six buildings, awakened residents thirty miles away, and killed thirty-three-year-old graduate student Robert Fassnacht, the FBI sent the man they knew they could count on to get the answers.

Sullivan returned to Madison, where he had started his own life's journey more than thirty years before. Less than a week and a half after the act, his investigation had pieced together what had happened. Sullivan believed the bombers had filled a Ford van with about two thousand pounds of ammonium nitrate soaked in aviation fuel. He put four people on the FBI's most wanted list.

"People in Madison knew Joseph was there to investigate the bombing," says Gerald. "When my brother walked down the street, students would yell things at him and throw things. But Joseph never reacted. He kept calm."

Although he dealt with danger for most of his career, Sullivan was most proud of his nonviolent approach to his work. "Here he was — this big man who had played football and who had worked in Wisconsin iron mines," says his brother. "He was very authoritative. He never struck anyone, he never fought with anyone, and he never pulled his gun out. No one argued with him — not even the mobsters." In fact, when asked if

When Sterling Hall was bombed in 1970, the FBI sent Sullivan to investigate. It took him less than a week and a half to solve the case.

Joseph liked the way he was portrayed in the film *Mississippi Burning*, Gerald says, "He felt it was pretty accurate. But Gene Hackman's character was too violent. Joseph wasn't violent."

After retiring from the bureau in 1971, Sullivan worked in security for the airline industry and as a private security consultant. In 1995, he formed the World Training Institute in New York, a nonprofit organization that does consulting and training for the business community.

Sullivan died at age eighty-five on August 2, 2002. On August 9, the *Wall Street Journal* ran an obituary titled "The Gentle G-Man." It noted, "Most people who knew Joe Sullivan knew little of his heroics, however, because he never spoke of himself. The Reverend William M. Shelley of Manhattan's St. Agnes Parish, who said Sullivan's funeral Mass this week, said the homeless in his soup kitchen were astounded to learn that the gentle man who mopped their floors had been a top G-man."

Candice Andrews is an editorial associate for *On Wisconsin*. A former story analyst for Paramount Pictures, she has also written television scripts for a Hollywood production company.