

What Do Animals Think?

Temple Grandin says animals think like autistic humans. She should know

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Photography by William Wegman

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If you live with animals, the real question isn't whether they can think or not. It's "What do they think of humans?" I often find myself mulling that over when I go out to gather eggs or feed the pigs. It isn't a personal question—Have I earned the horses' respect?—it's a philosophical one. Living with animals means coming to terms with who they are and what makes them tick.

That's what you want to know when you train a dog or ride a horse or try to catch a barnyard goose. At least that's what I want to know. I live and write on a small farm in New York State, and since my work, most days, means asking questions about the world around me, I find myself wondering about the animals I live with. I take it for granted that they also wonder about me. I can see the questions in their eyes, in the tilt of their ears: Who are these humans? Why do they behave the way they do?

There's no point asking these questions of the cattle staring at me on this warm November Sunday. They won't answer, not in so many words. But if I ask the woman standing beside me—the cattle are staring at her too—I'm likely to find some answers. That's because the woman is Temple Grandin.

The cattle were dozing, perhaps a hundred of them in several long pens a few minutes north of Fort Collins, Colorado. Then we showed up. The steers roused and strode toward us, following their curiosity. They would have walked right up to us, as near as their caution allowed, if they could have. They stand at the fence, head-on, impassive, like the Charolais they are—patient, buff-colored animals.

Say the words *cattle*, *autistic*, and *woman*, and a surprising number of Americans will come up with the name of Temple Grandin. Thanks to her writings, and those of Oliver Sacks, she is perhaps the best-known autistic person in America.

And if you eat at fast-food restaurants—McDonald's, Wendy's, Kentucky Fried Chicken—you're eating meat that's been slaughtered in plants audited to Grandin's standards, meat from cattle and pigs that walked calmly to their fate through handling systems she designed. In the human scheme of things, those animals are economic units whose death is inevitable. By designing chutes and alleys that respect a cow's sensibilities—reducing its fear and uncertainty—Grandin has done more to improve animal welfare than almost any human alive. Increasing a cow's comfort as it nears death may seem like a futile subtlety to many humans. But fear is



TOUCH SENSITIVE

Isaac Ohring, an autistic 10-year-old from New Fairfield, Connecticut, tentatively pets Bobbin, photographer William Wegman's dog. Perceptions of sight, sound, and touch are amplified for autistic people and animals. Because of Isaac's sensitivity to touch, he is hesitant in the way he strokes the dog. In turn, Bobbin may be startled by a light, unexpected touch.



[Enlarge \(158k\)](#) Drawing courtesy of Temple Grandin

Grandin's designs for the humane treatment of cows have revolutionized the beef industry. She drew this blueprint for the "stairway to heaven"—the section of a meat-packing plant where cows climb to their slaughter. The cows enter at lower left. The walls throughout are solid so that the cows will not be disturbed by outside noises or movements. The entire pathway is softly lit, because cows balk at darkness or bright light. Every element is designed to keep them calm and impel them to move forward. Before Grandin's innovations, cows would panic, bellow, and refuse to move on their way to their deaths. Now they walk silently and contentedly.

—*Susan Kruglinski*

HUMAN BYWAYS

Catwalks built above cows' heads will startle them, so walkways that allow workers to guide the animals are built low and against the walls. Because cows sometimes spook when people come up behind them, workers are instructed to walk against the traffic flow.

ONE-WAY CHUTES

Two narrow chutes separate the cows into single-file lines, where they make a gradual ascent. Cows will refuse to walk on slippery surfaces, so Grandin designed grooved steps that rise gently.

SLAUGHTER SITE

Cows walk onto a conveyor belt where they are quickly killed by a six-inch bolt shot into the head.

CROWDING PEN

In an unfamiliar place, cows are inclined to head back to their point of entry. Grandin designed a circular junction that causes them to turn their direction completely, as if they were returning to the yards.

Grandin and I came to the cattle yard to inspect one of her handling facilities: gathering pens, a crowding pen, a curving single-file alley with solid sides leading to a squeeze chute, where cows are restrained, one by one, and given their shots. All of this is arrayed in a sinuous curve whose beauty is readily discernible in Grandin's detailed drawings (see "Stairway to Heaven," below). The layout looks baffling at first, until you realize how simple it really is—a conduit for cows the way a hose is a conduit for water. Behind that simplicity lies a profound perception of a cow's world order. What moves the cattle through the welded steel chutes isn't fear or force or pressure. It's simply the desire to stay with the herd.



Photograph by Sage Sohler

COW'S-EYE VIEW

A farm lab milking parlor at Virginia Polytechnic Institute in Blacksburg, Virginia, offers a case study in cow perception. Soft lighting and a skid-proof floor help cows

of what she can see and most people can't. For her, sight is more than a metaphor. She thinks in pictures, one slide, one video, after another. The pictures are both memories and thoughts, and they occur in a nonverbal isolation that's hard for a normal person to imagine. At breakfast Grandin explained to me how easy it is for autistic people to find a figure hidden in a complex picture—a test called the Embedded Figure Task. Normal people have trouble seeing it, but it jumps right out at an autistic person. When she lectures, Grandin uses a slide to illustrate what the brain scan of an autistic person looks like during a hidden-figure test. She says that slide is as close as she comes to abstract thinking.

"It's a little bright cabin out in the snowy wilderness," she explains.

feel secure. But Grandin says that a cow entering the area would stop dead in its tracks because of the discarded soda bottle (foreground). Although barely noticeable to most people, a stray bit of litter can be frightening to a cow. The slow movement of the blades in the ceiling fans could also startle a cow not familiar with this facility.

“Everything else is shut off, but the visual center is turned on really bright.” In contrast, the brain of a normal person doing that test resembles a lamp store. “There’s so much stuff turned on,” Grandin says, “that the visual stuff gets obscured.” The difference between a normal person’s mental clutter and the intense, detailed absorption of an autistic person’s visual concentration closely resembles the difference between humans and animals.

When Grandin teaches people how to handle livestock, the subtext isn’t so much what she notices—she takes that for granted, after all. It’s what ordinary people don’t notice and, especially, *how* they don’t notice. The surprise that normal people feel when they realize how much Grandin sees has been more than matched over the years by her surprise at how much ordinary people fail to see. The difference can be summed up in a relatively simple manner, though the underlying biology is complex. A cow sees everything in detail and responds to details. Like an autistic person, its fears are hyperspecific because its perception is hyperspecific. But normal humans tend to see only what they expect to see.

We’re used to the idea that human thought is abstract. But what Grandin points out is that even the sensory perception of ordinary humans is abstract as well. “Normal people,” she writes, “see and hear schemas, not raw sensory data.” It’s a refrain I hear several times that day. At lunch with her assistant, Mark Deesing, Grandin talked, for instance, about how badly designed airport concourses and parking lots tend to be. Some of this she blames on the shift to computerized drafting programs and the loss of manual drafting skills. But the underlying fault is a lack of visual perception.

“They don’t see it,” she says of the designers. “They just don’t see it—things that are obvious to me. I remember watching this monster movie when I was a kid, and they had this monster locked in this box in a lab. Couldn’t they see he would reach the latch and open it? It was just a stupid movie, but now I’m finding people do these same kinds of stupid things in real situations.”

It’s easy to imagine an engineer not being able to visualize a design flaw in a complex structure. What’s harder to take in is the everyday blindness of ordinary people. Humans, Grandin writes, “are built to see what they’re expecting to see, and it’s hard to expect to see something you’ve never seen. New things just don’t register.” Animals, on the other hand, “definitely act like they see everything.” New things not only register to cows, they positively throb with significance. The solid-sided chutes on Grandin’s cattle-handling facilities are intended to prevent cattle from seeing new things. Cattle handlers have to learn two things from Grandin. They have to learn that a Styrofoam cup, for example, lying in an alleyway will stop cow traffic dead because it worries the cattle. But first the handlers have to learn to see the cup.



Photograph by Sage Sohler

TEMPLE GRANDIN

Born: August 29, 1947, in Boston, Massachusetts.

Childhood: Diagnosed as autistic in 1950; parents rejected advice to have her institutionalized and later sent her to private schools.

CALMING INFLUENCE

Grandin believes her autism makes her uniquely empathetic toward cows and other agricultural animals. On a visit to Virginia Tech, she gets up close and personal with a dairy cow. "Pressure is calming to the nervous system of a cow or an autistic person," Grandin says. "She was such a nice, soft, beautiful cow, I wanted to put my face on her."

Education: B.A. (psychology), Franklin Pierce College, 1970; M.S. (animal science), Arizona State University (part time), 1975; Ph.D. (animal science), University of Illinois, 1989.

Current jobs: Associate professor of animal science, Colorado State University, Fort

Collins; consultant and designer of livestock handling facilities.

Publications: *Animals in Translation: Using the Mysteries of Autism to Decode Animal Behavior* (Scribner, 2005); *Thinking in Pictures* (Vintage Books, 1996); *Emergence: Labeled Autistic* (Warner Books, 1986); *Genetics and the Behavior of Domestic Animals* (Academic Press, 1998); *Livestock Handling and Transport* (Cabi Publishing, 2000); and more than 300 articles in scientific journals and livestock periodicals on animal handling, welfare, and facility design.

This may sound paradoxical or exaggerated. Of course humans can see the cup, you may be thinking. But there's plenty of scientific evidence to suggest that Grandin's right. Normal humans are good at seeing the big picture but bad at what Grandin calls "all the tiny little details that go into that picture." For normal humans, the big picture isn't created by accumulating lots of sensory details. It's created by filtering out detail. "The price human beings pay for having such big, fat frontal lobes," Grandin writes, "is that normal people become oblivious in a way animals and autistic people aren't. Normal people stop seeing the details that make up the big picture and see only the big picture instead." The result, as she puts it, is that "normal human beings are blind to anything they're not paying attention to." And the parameters of our attention can be incredibly narrow.

Like autistic people—and unlike normal humans—animals have direct access to the raw sensory data that an ordinary human brain sifts out. Grandin argues that animals and autistic people are specialists, masters of individual skills and individual senses, whereas ordinary people are generalists. What normal humans specialize in is mental association. The principal difference between a human brain and the brain of a pig, for instance, is an immensely larger neocortex in the human. Humans appear to have evolved that layer of the brain to handle the interconnections and associations that produce what we happily call thought and the conscious mind. The only way to keep the association area of the human brain from becoming overloaded is to strictly limit our access to raw sensory data. Like animals, we see everything. But unlike animals, we process only a fraction of what we see.

One of the most striking things in Grandin's account of her mental life is the question of an unconscious. She says, quite simply, that she doesn't have one. Every visual image that enters her thoughts—every visual impression of the world around her—remains accessible in her conscious mind. One of the corollaries of possessing a powerful and detailed visual memory and not possessing an unconscious, it seems, is that animals and autistic people don't display classic Freudian defense mechanisms, like repression. Without an unconscious, Grandin has, so to speak, no place to repress to.

"Denial's an emotion I don't have," she told me. "I don't understand denial." It isn't hard to believe her. She's a blunt talker, with all the directness of a person who has had to learn, consciously, the meaning of the social cues that normal humans pick up automatically. And, as she points out, animals don't understand denial either. They live in a simpler but vastly clearer emotional world than humans do. It may be possible to argue, in fact, that the clarity of social structures—and simpler emotions—in the animal

world offsets any need for defense mechanisms. Compared with the sharp definition of animal social structures, humans live in an amorphous, misty sea of interrelations, not to mention the inner stew that Grandin calls psychodrama. Meanwhile, most of what we see around us lies hidden from ourselves, obscured by language, obscured by our ability to generalize, obscured by the looming presence of our forebrains.

Grandin uses an awkward but powerful word to describe the perceptual fog that normal humans live in. She calls it "abstractification." It means the ability to live in our thoughts, surrounded by "our ideas of things." "Normal human beings," she writes, "are abstractified in their sensory perceptions as well as their thoughts." This is partly what makes us human. But one of the things Grandin worries about is the increasing tendency of humans to live utterly abstractified lives, cut off from tactile participation in the real, physical world. She laments the way schools have dropped classes like wood shop and metal shop and drafting—the kinds of classes that saved her when she was going to school and failing classes like algebra.



COMFORT ZONE

Physical displays of affection can make an autistic child uncomfortable, even when they come from family members or a beloved pet. "I was like that when I was a little kid. I wanted to feel the nice social feelings of being held, but it was just too overwhelming. It was like a tidal wave of sensation drowning me," says Grandin. "This child is initiating contact with the dog, and often that's easier."

Those changes directly affect autistic children. But normal humans are experiencing a similar loss. We surround ourselves with television and computer games. We practically live in our offices. We inhabit a cocoon of associations and representations of the world around us—increasingly a world divorced from nature. Grandin's battles in the slaughter industry have nearly all been waged with higher management, not with workers or floor managers, simply because they're office bound, their thinking determined more by the paper that surrounds them than by living animals and working plants.

The result, according to Grandin, is a pattern that might be called the radicalism of inexperience. "People," she says, "that live in offices—I don't care if they're to the right or the left of an issue—the more far removed they are from practical things, the more radical they get." This is what happens when humans cut the anchor and drift away from practical experience and, especially, from the experience of nature and the world of animals. We lose the comparative frame that helps us balance our lives.

There's a close analogy to that radicalism—abstractification abstractifying itself even further—in the business of breeding animals for industrialized agriculture. Grandin has inspected hundreds of packing plants and feedlots and seen hundreds of thousands—if not millions—of hogs. She tells me about a problem that crept up on breeders trying to create extralean pigs. She would walk through a yard, "shaking gates," as she puts it. "I noticed that these pigs were absolutely hyper. They slowly got more excitable. If the only pigs you see are those pigs, then you don't realize how bad they're getting. I call that bad becoming normal." The same thing has happened in chicken breeding.

That development pattern—bad becoming normal—is made possible by two things: human adaptability to shifting circumstances and cutting away a comparative frame of reference. If you see only the results of your own breeding program—never any fat, happy pigs with good conformation—it's easy to lose sight of how much their behavior has changed, especially if you're focusing exclusively on developing physical traits. Without a standard to refer back to—happy, healthy pigs and chickens—breeding programs easily sacrifice the whole animal—its emotions and well-being—for the profitability of the end product. Economic pressure is one reason, but so is human nature—our tolerance of the erosion that Grandin calls bad becoming normal.

Grandin is not a social critic, and bad becoming normal is not a moral concept. But she is a deeply discerning student of human behavior because, as an autistic person, she has had to study how normal humans behave in order to fit in. Trying to look at normal humans through her eyes—and, in a very different way, through the eyes of animals—I saw a disturbing vision. What I saw was an enormously flexible, adaptable species trapped by its own adaptability. Abstractification may be in our character, but it does not become truly worrisome—the basis for bad becoming normal—until we cut ourselves off from nature and the animal creation around us.

And that, of course, is exactly what we've done. In modern America, animals are either industrialized—raised in huge concentrations and in confinement—or sentimentalized, treated as persons. Meanwhile, species in the wild are under ever-growing pressure. One of the greatest risks humans face is living in an all-human environment. Driving through Fort Collins with Grandin, I found myself looking at a landscape that embodies a massive change in that direction. In the Rockies, there are the remnants of a wild world, and in the fields around Fort Collins itself, the patterns of an older, nonindustrialized agriculture. But to the south, reaching up from Denver, there lay an utterly abstractified landscape, humans living in suburbs and exurbs, surrounded only by themselves, lost in television and big-box retail and big-box religion.

Grandin reminds us, as almost no one else has been able to do, that humans are not human without animals. We do not have the ability to see what animals see, to notice what they notice, but we once had a vastly greater ability to see animals themselves because we lived in working partnerships with them. In *Animals in Translation*, Grandin quotes the Aboriginal saying “Dogs make us human.” This is a simple evolutionary truth. “People wouldn't have become who we are today,” she notes, “if we hadn't coevolved with dogs.” But humans need more than a shared history with animals. We need a coevolving present as well. We need their eyes upon us, asking us, if only implicitly, who we are.