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Molly Miller

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1. Awakening

I suppose it all started with leeches. It may have started before then, but if it did, I certainly don't remember it. I expect that as a baby I had looked at the usual things—the dancing shapes of the hickory branches that rocked in my windows, the stark colors of carrots and peas, the scuttling of a bug over a stone on our lawn in Minneapolis, where I sat plopped and staring. I may have even eaten a few bugs in my time, as babies will do, but it wasn't until late in my third year that I suddenly opened my eyes to the world with a jolt and started to see things—to really *see* things—not just with the sort of passive but tolerably appreciative eye of the self-absorbed, but with the passion of an artist or a scientist.

I do not mean to say that I was an artist or a scientist. My drawings from that time suggest no such thing, nor do my experiments with our two Siamese cats, whom I would imprison in my doll's frocks and then follow around the house, excitedly observing their behavior as they tried to stagger free of the hideous flounces. No, I cannot claim any precociousness in the arts or sciences. It was simply that as I neared age four, my eyes seem to have awakened from a pleasant slumber. And what first drew them—what first grabbed them and held them still in the grip of a breathless beauty—were those leeches.

A leech is truly a vision of loveliness. During the

summers of my childhood, my mother took my two brothers and me, along with assorted aunts and uncles and cousins, up to the island that my grandparents owned on Whitetail Lake in northern Minnesota. On days when the sun shone and the water warmed up past freezing, I toddled back and forth through the shallows that lined the island's shores, parting the smooth green reeds that dangled over my head like an inverted curtain falling from the floor of the lake upwards to the sky. I peered into the water, watching for nervous, gasping minnows; for the crawfish, with their claws like tiny lawn clippers and their scalloped tails; for the frogs and tadpoles with their ballooned eyes; for the striped perch always with the stupid expressions on their faces; and for the magnificent leeches.

I remember all those creatures fondly, but I remember the leeches as one remembers one's first love—the thrill, the intensity, the steady, rapturous gazes. Colored a warm, chocolate brown spotted with black, they oozed across the sandy lake bottom like dark leopards. When startled by a puff of sand or the swipe of scooping fingers, they took off through the water at a dead wriggle, their supple bodies stretched thin and rippling smoothly as a ribbon off a girl's hat caught by the wind. When cupped in my hand, the leeches transformed themselves into fatted blobs, creamy with slime and soft as butter to the touch. I caught them and carried them around with me.

While I scouted the shallows, my mother and her sisters lay stretched out on the dock, reading books and sunning themselves, rousing from their individual reveries every now and then to discuss the pitfalls of married life or to exchange a bit of gossip. Cradling a leech, I would sneak over to where they lay, slip under the dock, and curl a plump arm up over the dock's edge to place the slimy prize on one

or the other of their bellies or thighs. If it happened to be one of my aunts, the afflicted invariably screamed and flailed her limbs, then threw dark glances at my mother who pretended to be absorbed in her reading. If it were my mother, she didn't skip a beat. She tilted her book forward, slid her gaze down the length of her body until it stopped at the leech, and then flicked the creature away without so much as a how-do-you-do. That was the sort of woman she was.

After the leeches, things seemed to explode outwards. Or perhaps they imploded—it's hard to say which it was. I began to see; I began to notice things; I began to pay attention. I saw patterns—the raised veins in a leaf, animal shapes in clouds, the delicate imprint of mice feet in snow like necklaces slung over white winter meadows, the pale mosaics on the skin of the chameleon I kept in a glass box on my windowsill. My eyes were telescopes; I had bionic vision. I saw smoky black trees lining the tops of hills, spread like Spanish fans and burning into the edge of sky. I saw fiery prairie grasses tossing their tasseled heads in the bright sun, and the blood-red berries of the sumac thick as clusters of bees clinging to the tangled branches. My limpid gaze could crystallize the world. Riding my pony through the woods, I lay back with my head pillowed on his furry rump to gape at the trees bobbing, the branches splayed and swerving like black tentacles against a blue sea of sky.

And then, somewhere along the way, all that changed.

2. Structure and Function

I was a shy child; I didn't talk much. I watched. When I imagine myself now back in my child's body, I picture a small creature with eyes like saucers, like

moons, easily startled and easily rapt.

Now, at thirty, I am again often startled by what I see: snow thawing on the spring hills, the white breast feathers of the woodpecker hammering on the pear tree, the pale blue petals of the crocus that appear one day at the foot of the porch. What is this vision, that roused me to the glories of leeches and rouses me still? What are these eyes? Lumps of strange matter, lodged in my skull, oddly shaped, strangely patterned. How do they work? How did they happen?

There are three basic kinds of eye known to exist in the world—pinhole eyes, compound eyes, and lens eyes. Pinhole eyes are the sort favored by mollusks—a group of some 100,000 marine species including snails, oysters, octopi, squid, and the chambered nautilus, a strange, squid-like creature that lives within a fat, coiled and striped shell. In the pinhole eyes of the nautilus, light enters the eyeball through a small hole in the front of the eye, as though the eyeball were a ping-pong ball that had been pricked with the point of a pencil. The light travels through the interior of the eye directly to the back where it hits receptors which send messages to the nautilus' brain. Lo, the nautilus sees—sort of. It's a nice, simple eye, but the wearer receives only a narrow shaft of light through the hole, and the lack of a lens severely limits the clarity of vision. To the nautilus, the world is likely to be a murky, blurry place.

Compound eyes are the sort most bugs have—literally eyes on stalks, or clusters of stalks, like bunches of telescopes poking up from the mound of the bug's eyeball launching pad and scanning the world for visual information. The eye on the end of each stalk provides the bug with an image; the common housefly, for example, receives hundreds of images at once. Scientists disagree whether these images are perceived separately, a view similar to

watching several hundred television sets, each turned to a slightly different channel, or whether the images are integrated into a single looming and bulbous picture. Either way, the compound eye is great for detecting motion but leaves a lot to be desired as far as identifying what you're looking at. To help compensate, a tiny lens in each stalk increases resolution. Resolution is the ability of the eye to produce a clear picture by separating and defining objects in its visual field. The lens also works to control the diffraction of light through the opening of the eye. Diffraction is the ability of light to bend around corners.

Despite these advances, the compound eye falls far short in terms of resolution when compared to the human eye. Basically, it's too small to do the work. Another price of such minute apparatus is paid in the limited scope of the color spectrum that the bug is able to perceive. In order to maximize their performance, honeybees ignore red.

Lens eyes such as ours have their own structural and functional limitations. Light enters the lens eye through a comparatively larger opening in the eyeball: the pupil, from the Latin *pupilla,* meaning "little doll," for the tiny reflection of ourselves we see when we look into another's eyes. The pretty iris we lavish so much attention on is actually a group of tiny muscles that expand and contract to alter the size of the pupil and control the amount of light that enters the eye. Under the iris, a rubbery lens fits neatly like a monocle. The lens actually changes shape to compensate for diffraction and to focus on objects seen at different distances. It flattens to focus on distant objects, thickens to focus on near ones.

Overall, this is the most efficient visual system of the three, best at controlling diffraction and creating good resolution, but a lens eye is developmentally and physically expensive: it takes a lot of muscles,

nerves, and brain space to operate. Yet, with all that, we see only thirty percent of the range of light that comes from the sun; the other seventy percent—infrared and a bit of ultraviolet—is invisible to us. It was also presumably invisible to the sheep whose eye I carved up in my seventh-grade science class.

That poor old sheep's eye was like a gob of greasy cheese sitting on my desk. When we cut the eye open the lens popped out like a prize—a lump of hard rubber the roundness of a quarter, the thickness of a finger, and the color of dull amber. "How can a sheep see through this thing?" I wanted to know, to which my science teacher replied that the lens only becomes that way after death. He said the words "after death" the way one would say "after lunch" or "after art class." I think "opaque" was the word he used to describe the after-death lens of a sheep. I figured opaque meant yellow, and I held that lens up to my own eye and tried to look through it. But all I saw was the grainy yellow of a dead sheep's eye.

I set down the rubbery lump next to the now split-open ball of cheese and, after fastidiously wiping my fingers, touched my own eye. I won't go so far as to say that I thought about my own death, because I didn't. I was only twelve, and as I've said, I was not a precocious child. But as I looked down upon that sheep's mangled eyeball, I decided that the only way I could sensibly deal with the horror that lay before me on the desk was to become a doctor.

If I were a doctor, I thought to myself back then, I would understand everything about that sheep's eye—I would know that sheep's eye inside and out. The act of slicing it up would have no power to trouble me. I would survey it as coolly and lightly as one might survey a tricky piece of machinery. I would poke my scalpel into it and respond not with a horrified, "What have I done!" but instead with an interested and lilting, "Aha." This, at the time,

seemed like a comforting thought.

3. Feature Detectors

Sight first developed in ancient seas. At some point in their evolution, early creatures grew patches of skin that were sensitive to light, allowing them to tell the difference between light and dark and also to discern the direction of the sun. What began as a simple skill used to find sources of energy, food, and eventually mates has since evolved into a tool used in the creation and experience of art, an appreciation of nature, the accomplishment of work tasks, and the evolution of wide-ranging notions of beauty and goodness. These are somewhat more sophisticated skills used to find sources of energy, food, and mates.

Of course, not all animals use vision to locate themselves and others in the world. Dogs, for instance, rely more on smell than on sight. A professor once told me that if the nasal membrane were removed from a dog's nose and flattened like a sheet, it would be roughly as big as a football field. If the same were removed from a human being, it would be the size of a postage stamp.

There is a bizarre fish of the genus *Eigenmannia* that lives in the murky waters of the Amazon and its inlets. *Eigenmannia* has almost no sight, a sense which would be nearly useless in its turbid home. Instead, the fish produces a weakly electric field from an organ in its snout and "sees" using electroreceptors located in the pores of its skin throughout its body, a situation akin to our bodies being studded with fairly myopic eyes from head to toe. Objects that come into *Eigenmannia's* electrical field distort the fish's "view," either by concentrating the electrical flow (if the object is a better conductor of electricity than water)

or by dispersing it (if the object is a poorer conductor). Thus the fish perceives one or another kind of electric "shadow" to locate objects in its surroundings and to sense the edges of its surroundings.

Eigenmannia's system of perception seems peculiar and far removed from our own. Our own vision seems so natural to us that we often assume it is simply the mirror image of what's out there. But the eye is no blank slate. Our vision is a strategy for surviving in the world, and like all strategies, it is not infallible. Structures and functions have their limitations. Like *Eigenmannia*, we use what we've got—our eyes and brains—to collect information coming at us in the form of light, then selectively screen and process it, ignore some types of information and exaggerate others, all in a massive effort to interpret our environment and make decisions that will ensure survival.

Take toads. Their visual network is similar to our own, only simpler. Light from the sun travels to earth at 186,000 miles per second and enters a toad's eye replete with information about the toad's surroundings. The information is then sent, at a comparatively sluggish sixty miles per hour, through the optic nerve—more precisely, a bundle of nerves—to two separate places in the toad's brain: the optic tectum and the thalamus. In each of these destinations, visual information is screened and processed to provide the basis for decisions that the toad makes in responding to its environment.

Here's where things get simpler: if a toad is not moving, and there is nothing moving in the toad's scope of vision, the toad sees nothing. The neurons in the toad's eyes don't fire and the toad is utterly blind. For moving objects, the toad detects and analyzes them in roughly one of two ways: is the moving object a horizontal thing or a vertical thing? Feature detectors in the brain help the toad to ac-

complish this. Feature detectors work like keys fitting into keyholes: when an image passing over the toad's eye fits onto a corresponding imprint in the brain, a bell rings and the toad reacts. The thalamus of the toad's brain has a feature detector that detects vertical objects—like toadmongering storks—while the optic tectum has a feature detector that detects horizontal objects—like tasty worms. If the stork-detecting thalamus rings, the toad hunkers down into a crouch; if the worm-detecting optic tectum rings, the toad goes on the hunt.

Like a toad's, our eyes and brains have special feature detectors that "encourage" us to recognize and react to specific stimuli. Compared to toads, the feature detectors in our brains are infinitely more complex—the result of our comparatively hulking brains—and largely mysterious. I have read of brain-injured people who, as a result of damage done to a particular part of their temporal lobe, cannot recognize faces. They can see perfectly well, they can recognize objects, they can identify people by familiar clothing, but when shown a facial portrait of their friends, their spouses, even themselves, they are at a complete loss.

Once, eleven years ago, I, too, found myself at a complete loss.

It happened soon after the horse I was riding inadvertently flung himself onto the top of a three-and-a-half-foot bundle of logs. The logs had been lashed together to make a hogsback jump, the second of fifteen obstacles dotted throughout a three-mile cross-country course over which I was riding in competition. The jump was situated at the edge of a dark wood. Beyond lay a green field flooded with sunlight. Spectators thronged the boundaries of the course, lounging in clusters on either side of the bundle of logs.

My horse and I were on our way to leap out of

that dark wood into the bright field when it dawned on me that my horse was paying no attention to the logs directly in our path, but instead had locked his eyes upon the colorfully dressed spectators lining both sides. I slowed him down, attempted to direct his eyes toward the fence by pushing his head around with one hand, and when finally he caught sight of the logs, he panicked and leapt wildly into the air—a good two strides early—and instead of clearing the logs we landed smack on top of them, sending them flying apart while my horse pitched into a somersault and I was hurled helmet-first onto the ground.

A couple of the show officials helped me off the course and into a patch of shade, where I lay down and immediately sank into unconsciousness. When I awoke, a middle-aged woman in a droopy straw hat was seated beside me, watching me with interest. She looked vaguely familiar—as though we had met somewhere before but I couldn't quite put my finger on who she was. I couldn't have said who I was either, or what I was doing lying in a patch of shade in the countryside of some unknown landscape. I could detect objects all right, but I couldn't identify a thing. Suddenly I was gripped with panic, which included a fear that those around me might sense my total lack of cognizance.

Feigning nonchalance, I asked the woman in the straw hat a series of questions, alert for clues. Over the next thirty minutes, the details of my life returned in pieces, in fits and starts, and I came to realize—after studying her at some length—that the woman seated beside me was my mother. When I was fully returned to my senses, the woman in the straw hat who was my mother asked, "Are you feeling better?"

"Yes."

"Fine," she said. "Let's go home."

Visual memory and perception are inextricably linked. We use our thin retinas, each no bigger than a quarter, to continuously search out identifiable objects doing recognizable things. We locate ourselves in the world mainly by sight; we locate each other and all that surrounds us by storing up images in the temporal photo albums of our brains. Brains and eyes, sight and memory, structure and function—each half of a pair depends on the other. To see is to remember; to see is to know. Most of our metaphors for knowledge revolve around "seeing." That I could see my mother and not know her strikes me as unutterably strange.

4. Revelations

After a while, I stopped seeing the way I had when I was a child, scouring the lake bottom for leeches. It wasn't anything tragic or even dramatic. I can't say that I was particularly aware of it. It was like the sifting of dirt through my fingers. When the dirt was gone, I clapped my hands briskly together and thought, Ah, much better now! But how did I know that I wouldn't rather be holding a lovely handful of dirt than nothing at all?

But I went ahead and grew up, and there were more important things to think about than leeches, and trees like Spanish fans, and the blood-red berries of the sumac thick as clusters of bees. There was college to consider. There were careers. There was my future. There were heaps of thinking to do. Everything I did took on the aspect of intellectual probing. While writing papers on erudite subjects, I jotted down notes on slips of paper: "What does this mean to me? What has it meant for my life? Why is it important?" I tucked them briskly away. The dirt sifted.

During that time, I was still toying with the idea of becoming a doctor. My father, who was himself a doctor, kept his medical textbooks in the basement of our house. When I was in high school, and later on breaks from college, I descended into the murky gloom of the basement, dragged the damp, heavy volumes out from their boxes, sat on the basement stairs and forced myself to pore over them, in order to prepare for my future in medicine. There were innumerable pictures of people with a staggering variety of diseases and deformities; there were close-ups of abnormal tissues and festering sores, and all those anatomical drawings that make people look like machines. I made myself look at all of it. I figured it would be good for me; it would prepare me for real life. Above ground, the trees and hills and animals that had once grabbed my eyes and held them were seeming increasingly dull in comparison. I stopped noticing things; I no longer paid much attention.

Our culture puts a high value on pragmatism. We are taught as children to be rational, to be objective, to be hardworking and ambitious. This was the direction in which I was steadfastly headed. But how is one to be rational with a bird? To be objective with a painting? To be hardworking and ambitious with a flower?

I don't mean to sound melodramatic. It's just that when it came to the physical senses, I became somewhat complacent. I learned to expect what I saw; I learned to see what I expected. I learned to be smug. But the one thing about true seeing is that it swiftly removes all smugness. Consider the sifting dirt. Almost two-thirds of the total vegetation of the grasslands upon which I grew up is underground. If placed end to end, the roots and root hairs that grow beneath one measly square yard of tallgrass prairie would stretch for twenty miles. A square foot of that

prairie soil holds about half a million nematodes, little crawling creatures, which has led ecologists to conclude that nematodes, not bison, have probably always been the dominant plant-eaters of the prairie.

Of course, that's not much of a surprise, these days. There aren't many bison left. There isn't much prairie left, either. Practically everyone knows that; I won't bore you with the gory details. Suffice to say that because of these facts and others, somewhere along the line I decided not to become a doctor. It just wasn't for me. I realized that underneath my pragmatic composure, the pictures in those medical texts were making me sick.

Then somewhere along the line, I started to see again.

It didn't come easy; it took a concerted effort on my part, and on the part of the things that were trying to get me to pry apart my stubborn eyes and brain. I was twenty-one and visiting the National Gallery in London. Rounding a corner, I came upon a painting by van Gogh—a crude wooden chair with a rush seat: an object altogether ordinary, yet so extraordinary that the experience of seeing it was like walking face-first into a brick wall. It was as though van Gogh had stripped away all the dullness, all the complacency, had shaved and shivered all of life down to the heat and light and matter contained in a single trembling chair, and then had painted it as though his very soul depended on it. Perhaps it did. He was a somewhat unhinged individual. In *A Natural History of the Senses,* Diane Ackerman writes that van Gogh may have suffered from temporal lobe epilepsy, poisoning by the digitalis administered to treat the epilepsy, cerebral tumor, syphilis, magnesium deficiency, and severe depression; he also drank kerosene and ate paint—any or all of which could have afflicted his personality as well as vision, exaggerating yellows and causing him to see halos around lights.

But that chair! The wood glowed and glowered with light, the rushes in the seat burned with an inner fire—the same fire I saw inside those prairie grasses as a child. There lay absolute color, pure light, distilled emotion. There lay the painter's soul and there stood mine before it, fully present and fully lit in the twin beauties of light and color.

People see in color partly because we evolved as fruit-eaters, an evolution that enabled us to easily pick out fruit against a green background. Color vision also helped alert us to the dangers of poisonous plants and animals, which often wear bright warning colors like yellow, orange, and red. There are two types of photosensitive receptors found in the thin retina that lines the back of our eyeballs like a skin: rods and cones. We perceive color with the cones of our eyes, and only in moderate to bright light. Three types of cones—each containing different forms of visual pigments—respond differently to red, green, and blue wavelengths. About seven million of these cones are clustered on the central fovea, a small hollow in the middle of the retina. Outside of the fovea, one hundred and twenty-five million rods are distributed throughout the rest of the retina to detect luminosity—shades of white and black, but no color—useful for night vision, when there isn't enough light to make the cones fire their colored messages to the brain. At night we don't see in color. And since rods are located outside of the central fovea, to see objects well at night we must look slightly away from them.

Color itself comes from the bending of light. The white light from the sun is actually composed of an infinite number of wavelengths, or bundles of energy, that have varying amounts of pliability. Of this infinite number of wavelengths, we perceive about seven groups of colors: the seven colors of the spectrum. When light travels through a prism, such as a

water droplet suspended in air, the wavelengths each bend according to their individual abilities and separate into bands of reds, oranges, yellows, greens, blues, indigos, and violets. I know this and yet, in truth, I understand it no better. What trickery is this? I look at a rainbow—I have no idea why I see what I see. Or why I don't see what I don't see. At the age of eight, I asked my mother where God lived.

We were in the kitchen, baking a cake. For some reason, I was seized by the desire to see His Face, after all those church services that spoke so glibly of God and even had pictures of God, though for the life of me I had seen neither Hide nor Hair of Him. So I put the question to my mother.

"God is everywhere," she answered, matter-of-factly. My mother was raised Catholic, with Latin masses and black veils over the head. My question didn't strike her as particularly challenging.

"Everywhere?" I repeated. I glanced around. "Even in the oven?"

"Even in the oven," she said.

Now whenever I use an oven, I take a good long look. But I could swear I've never seen God there. So which do I doubt? The existence of God or the reliability of my senses? Senses can be deceiving; one must take care not to rely too heavily upon them. Last July, I took a day and hiked up into the mountains near where I now live in Montana. I had climbed to the top of a hill and was wandering about in the grasses, exploring for wildflowers and keeping an eye out for a good spot to lie down in the sun and read. As I stepped over a patch of purple-eyed mariposas, there was a sudden explosion of crashing brush—stalks of dry grasses hurtled into the air as a giant beast lurched up out of the very earth and lunged—which way, it was impossible to tell. It was so sudden and ferocious—it was so massive—it smashed into the light. It was a violent beast, a

spotted beast, a speckled fawn, a tiny thing that I had scared up from its small, curled nest in the thick grasses, where it would have lain with its tiny hooves folded like buds against its white belly, holding perfectly still but for the flick of eyelashes, the faint pulse of breath on its sides, until I came along and nearly trampled it. After a few hops over the top of the hill, the fawn dropped back down into the grasses and was still. And I stood there, feeling ridiculous.

5. Predation

Up until about twenty million years ago, our prehuman ancestors lived in the woods. Over the five million years that followed, climatic changes and fire shrank the forests and jungles, forcing us out onto the plains and grasslands. It was then that our vision really took off and left the other senses in the dust: while our eyes make up less than one percent of the weight of our heads, a full seventy percent of our body's sense receptors are located there. So, in the Book of Revelations, when the four horsemen of the Apocalypse coax the slain lamb to preview the horrors that signal the end of the world, they offer him the strangely quaint entreaty, "Come and see."

Our ancestors came to depend on their eyes in those wide open spaces of the early plains, using their vision both to locate prey and to keep an eye out for other predators. Predators like us have their eyes set on the front of flattened faces, creating a narrow, binocular, forward-directed field of view that's useful for sighting and tracking prey. The two overlapping images—one from each eye—that we get with our binocular vision are integrated in our brains to provide us with important information about distance, which we perceive as three dimensions, or depth. To maximize depth perception, you have to

maximize overlap from the two eyes, which means they both have to be pointed in the same direction (forward), leaving predators with little in the way of lateral view—a drawback that's compensated for with necks that swivel.

Prey, always vulnerable to being pounced on from any which way, have eyes set on the sides of their head. This gives prey animals little in the way of overlapping images, which leaves them with a rather flat picture of things.

The prey our early ancestors were after and the predators they were trying to avoid usually sported some combination of superior sense of smell or hearing, faster speed, larger size, and greater strength than they. Eyes and brains were our competitive edge. They appear to have worked, too. Mass extinctions of large mammals, especially large herd animals, occurred on a number of continents shortly after the arrival of humans thousands of years ago. This extraordinary coincidence has led scientists to formulate the Pleistocene overkill theory: in a nutshell, we killed them. Some 73% of the large mammals in North America went extinct soon after humans arrived over the ice bridge we call the Bering Strait around 12,000 years ago. South America lost 80% of its large mammals; in Australia, 86% disappeared. A little structure and a lot of function can get you into trouble.

Ours is a society of voyeurs. Where did curiosity go wrong and turn into something furtive and dangerous? Shopping for groceries with my mother at the age of four, sitting in the back of the cart with my legs dangling between the metal spokes, I would stare out at the hunched old ladies, at the sick, at the crippled, with a sort of fascination and horror. My mother told me it was hurtful to stare, so I stopped.

Or tried to. Sometimes I just became shamefully stealthy, peering at them through sidelong glances, or from behind the blind of my cupped hand or—when I was older and cleverer—a box of jello, a can of soup.

Later, in my tenth or eleventh year, I had a macabre desire to see an autopsy. I used to ask my father to tell me how it was done. He would describe for me how, if the pathologist wants to see the heart, he takes pruning shears to cut through the breast-bone, then grabs hold of it and pries the ribs apart as though he were opening a wardrobe. He would describe for me how, if the pathologist wants to see the brain, he carves a circle around the boney head with a little shop saw and lifts off the skull like it was a beanie. I asked my father if I could go along and watch this sometime, and he said sure.

I never did get around to it. At the time, it seemed that a lack of planning, logistical snags, perhaps an accident of conflicting schedules—my father's and mine—prevented me from taking part as an observer in these rites. Despite my early determination to adopt a cool, scientific demeanor when it came to split eyeballs, cloven skulls and gaping thoracic cavities, I was at heart an emotional kid.

You could say that we are curious for reasons that have to do with exploring the world outside of ourselves. You could say that we are interested in how others experience life, how they cope with difficulties, or that we long to gain some insight into avoiding other's misfortunes. You could say that our fascinations can be traced back to some ancient instinct to cast out the "unfit" or the "dangerous," and in so doing, save ourselves. Horses tend to dislike those of their kind that are light-colored: pale grey, or worse, white. In a herd of domestic horses, the dark horses will tend to hang together and drive out the white, responding instinctively to a circumstance

that historically would have attracted predators from afar—a bright white horse stands out like a lighthouse on a grassy plain—although about the only predator those domestic horses have to worry about now is us. Of course, we don't hunt down white horses and eat them, anymore. We put them in the circus.

At a dinner party several weeks ago, one of our guests told a story about her great-aunt who had been one of a pair of twins born five weeks premature back in the early part of this century. At birth, the great-aunt, who is now eighty-six and expresses herself by performing monologues as the character Mary Magdalene, weighed just two pounds—the size of two one-pound chunks of butter. She would have died (and sadly, her twin sister soon did) without an incubator. There were no incubators available in the town's hospitals at that time, or perhaps they were too few or too expensive for her parents to afford. So her parents carried their two babies down to the circus, the only place in town where you could get free access to an incubator, where those babies lived—and one died—during the first few months of their lives. You see, people back then would pay to see preemies, the same way they would pay to see other unusually shaped people and animals whom they called freaks.

I, too, have paid to see freaks. I would like to say that it happened a long time ago, but four years ago my friends and I were at the Minnesota State Fair. The night sky reeled with the fantastic lights of the rides and rang with the shrieks of riders and the awkward clink of organ music. We were loafing, exhausted, on the packed dirt of the midway while gusts of unnaturally warm air smelling of hot grease wafted over us, wanting to leave for home but with six tickets left over from the day and a dull-witted determination to spend them. And as we were stand-

ing right next to the World's Fattest Man—*880 Pounds, And Still Growing*—we thought it would be hilarious to take a peek, and so two of us went for three tickets apiece.

I had seen Big Bertha at this same fair when I was a child of seven. I remember walking up onto a boardwalk that was built alongside a trailer home—one section of it plate glass to accommodate viewers—where Big Bertha lived and ate, and it was all very tastefully done: I was outside, she was inside, behind the window; I could gape in comfort and relative unobtrusiveness, and she could watch T.V. and eat hamburgers in the air-conditioned comfort of her own home and workplace.

Not so with the World's Fattest Man. I was lured into a trailer, where I expected to view the World's Fattest Man lounging in some sort of makeshift living quarters (an identifiable object doing a recognizable thing), but what I found was quite the opposite. Once inside, the World's Fattest Man was not a finger's breadth away on my left, clad in shabby, foul-smelling clothes and seated in what can only be described as a tiny, whitewashed penalty box—the kind found in hockey arenas—only large enough to enclose his sad bulk and a minute, black and white T.V. set on a shelf, to which his eyes were dully transfixed. The walkway was not the spacious, tidy boardwalk I was expecting but a thin, peeling corridor bordered on the outside by plywood walls that followed exactly the perimeter of the penalty box, so that during my entire viewing time I was not more than seven or eight inches from the World's Fattest Man.

Embarrassed, I refrained from examining the World's Fattest Man's belly button. I averted my attention from the folds of his breasts, the magnitude of his thighs. I kept my eyes bolt forward, my breath shallow, and my expression polite, with a hint of

lightheartedness, as though it were all just a lark that I was there at all—as though I only bumbled in by accident and was not the least bit interested in the World's Fattest *Anything*—as though I had no intention of actually staring at him, of fastening my greedy little eyes on his ample carcass.

One day I was galloping my horse through the woods with my head thrown back, watching the branches sway and swerve like dark tentacles against a blue sea of sky, and the next I was laying down money to see a fat man watch T.V. in a box.

6. Glory

One night last summer, I sat with a friend on the granite edge of a pond in the Bitterroot mountains, cloaked in the light of a full moon. The moon shone down like a siren, its noisy light splashing in white patches on the black water. The patches of light fell over the pond like javelins of light. There was a puff of wind, and we watched the patches break apart and dance towards us. My friend observed that the light was pointing to us over the water.

"I think that no matter where we sat the light would point to us," I said.

"That's impossible," Christian said.

So we conducted an experiment. While I remained in our spot, she rose and trotted up the granite beach. Eighty feet away, she stopped to report that I was right. Amazed, she began walking back and forth, watching the light slide over the water, following her as she moved across the rock.

I remember knowing this about the moon, but I don't remember learning that it was so. What I recall is being a child in the cold nights of a northern summer, crossing Whitetail Lake from the mainland to our island. I remember sitting crouched against the cold on the plank seat of the ten-horse, peering

over the rough orange canvas of the life preserver that bulged around my neck to watch the tail of the moon race over the water with me—a glittering icicle of light that pierced the boat exactly at my body.

Above, the blue-black sky was strewn with a riot of stars—more stars than I imagined possible. When I stared round-eyed into that northern night sky, I felt the stars pull me towards them with spidery threads of something clear and mysterious. It was almost grace—or mercy. I couldn't name it then, and I still can't, except to say that it reminds me of some words I once heard spoken by a physicist trying to explain concepts about how the universe works. What he said was, "Eternity is now."

Eternity was back then, too. Making snow angels at night with my little brother, I glimpsed it. Bound up in snowsuits, we had run out into the front yard late after a heavy snow. The sky had cleared; a warmer wind had started to blow. We jumped to a spot deep in the drifts, lay down, flapped our arms and legs vigorously, and then carefully rose and leapt back out of the depression, so as not to leave any footprints that might connect our angels to this world. We did this over and over, until there was a whole choir of angels in the yard. The light of the moon bent through the vapor that curled up from the snow angels, splintering into colors that glittered darkly on the snow. Standing there looking at the angels, something inside of me rose, leapt from the dry grasses of daily existence, crashed upwards into the light of my round, moonlit eyes. The angels on the snow quivered and sang, while the live thing inside of me hovered there for a few moments in the light of my eyes, then took a few short hops and lay back down again. A snowplow lumbered up the

street, neighbors began straggling out of their houses pulling shovels, and my brother trampled the choir.

But in my soul, I can still see those smoldering colors. I can hear those angels sing.