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# Part Bear, Part Bird, Part Monkey, Part Lizard: On the Deep Weirdness of Beavers

# Leila Philip on the Evolutionary Puzzles and Unfathomable Intelligence of the Rodent-Engineers

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By Leila Philip

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I think there is an element of the sacred in the beaver, if only in its deep weirdness. One million years ago, beavers the size of bears roamed North America. They pose an evolutionary puzzle, the platypus, or birds, which share some DNA with dinosaurs. When they dive, they seem more like marine mammals than terrestrial species, more seal than rodent. Their dexterous forepaws look startlingly human with their five nimble fingers and naked palms. They groom their lusty fur with catlike fastidiousness. Their mammalian beauty ends abruptly in the gooselike hind feet, each as wide as the beaver's head. The feet are followed by a reptilian tail, which, it has been observed, looks like the result of some terrible accident, run over by a tractor tire, the treads leaving a pattern of indentations that resemble scales.

Part bear, part bird, part monkey, part lizard, humanoid hands, an aquatic tail. Is it any surprise that beavers have fired the human imagination in every continent that they are found?

Pulpit Rock Road, named for a large boulder that sits on the roadside half covered in fern and half from the beaver dam, is an old dirt road in my hometown of Woodstock, Connecticut, founded in 1686, population 7,862. We have six dairy and beef farms in Woodstock, a bison herd, a commercial fruit orchard, and a multitude of backyard vegetable gardens. Forty percent of the woodland is wetland, which keeps the developers at bay. It's the quiet corner of Connecticut, the last corridor of dark night sky between Washington and Boston.

Pulpit Rock Road is the oldest road in town, one of the oldest in the state. Long before it was used by the first Europeans, it was one of the main paths of the Indigenous people who lived here, the Nipmuc, the Pequot, and the Mashantucket. The twelve Native tribes who lived in modern-day Rhode Island, western Massachusetts, and Connecticut sometimes met in the meadow just up from the beaver pond. The meadow is a glacial escarpment, with a rocky high spot safe from ambush, and the stream below brought game to hunt. Pulpit Rock Road is one of the last dirt roads in Woodstock. The highway department wishes to pave it over. The residents resist. We love it the way it is.

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The road connects to the path that brought the colonists here from Boston sixty-eight years after the Pilgrims landed at Plymouth Rock. Thirty English families with names like Child, Taylor, and Eliot walked sixty-seven miles here from what was then Roxbury, just outside Boston. They first called the settlement New Roxbury, then renamed it Woodstock. John Eliot, the pastor of

the First Church of Roxbury, Massachusetts, had heard that there were Native American Christians living in this area, early converts who might be thus amenable to having European neighbors.

Soon after he arrived, Eliot walked down the then much narrower road a mile from the bridge stood on the large glacial erratic along the pathway, and preached Christian values to the Native people who gathered, his new converts. What happened next is the old tragic history of death, displacement, and erasure. Within a few years, the land was divided into twenty-acre lots, and new inhabitants went to work eradicating the forests. Today the woods have mostly grown back and many of those first farming families have moved on, but the old stone walls of the early farms still stand. Walk twenty feet into the woods anywhere near where I live and you will run into poetic ruins of stone, usually studded with ferns and colored with fantastic spreads of lichens. Animals know the walls by heart; they are the Mass Pike of the woods, providing runways in all directions, or places for hiding and nesting.

The beaver dam by Pulpit Rock incorporates three large flat boulders laid out centuries ago to enable people to cross the small stream that had been named Taylor Brook. The stones were set apart so that the brook could pass through. When the beavers started damming up the brook they made use of the crude stone crossing, a keystone from which they extended walls of mud, rock, and stick. The beavers moved in, their dam would flood the woods, and a pond would grow. Then a few years later they would move out and flood another area, letting the first one subside.

The beavers I had begun watching as they moved into the woods by my house were the most recent colony to live here, in a location that their ancestors might well have lived in for hundreds of years, if not far longer.

Across the continent, Native Americans hunted beavers with spears, destroying their lodges, killing them as they tried to flee, eating their flesh, and using their fur. But Native American cultures as a rule upheld strong taboos against not hunting more *amiskw* than could be used (that use was never enough to drive the beavers toward extinction). Beavers belonged to an *anishinabe* nation and had to be honored after death. Most of the Indigenous peoples of North America ended up participating extensively in the fur trade, aiding European traders by bringing furs to swap for axes, iron kettles, blankets, trinkets, alcohol, and guns.

This trade, and the ways it brought new technologies to Indigenous communities, is emphasized in much early American settlement history to justify the American fur trade. But it wasn't long before many Native Americans began to understand the ways in which overhunting could extinguish their own culture. Early French Jesuits in Michigan recount the Native practice of gouging out the eyes of a trapped beaver—an attempt to keep the animal from witnessing the desecration of its own death, and perhaps to protect the hunter from the wrath of the Great Spirit for his role in breaking a sacred taboo.

In the Bodleian Library at Oxford, a medieval bestiary dating from the early thirteenth century displays two beavers, meticulously drawn with long wolflike bodies, canine faces, and coats of silvery blue. Medieval depictions of beavers in Europe render them with serpentine necks, lor canine legs, leonine paws, bushy tails, and removable testicles, flung at hunters to distract them. The Roman Catholic Church decreed that they could be eaten like fish as penance on holy days. For wealthy Catholics, the flesh did double duty—it was both delicious and a coveted aphrodisiac. Beavers appeared on heraldry in Great Britain from the Middle Ages onward; on the coat of arms of the city of Oxford, a robust beaver with a flashy blue-and-white-checked tail leans opposite an elephant. In one of the earliest Dutch maps of the New Netherlands, a beaver is a symbol of industry, holding a stick in its paws like a rabbit.

By 1715, the most famous of London cartographers, Herman Moll, rendered beavers on his maps of the new British colonies by drawing them as a column of dispirited factory workers trudging toward a dam near Niagara Falls. Each walks upright on its hind legs, carrying its allotted bundle of wood across its shoulder, single file. As if capturing the mercantile fantasies of Europe, many maps and pamphlets soon began appearing in which New World beavers are drawn living in condominiums—dozens of future pelts crowded into separate apartments within one lodge. The beaver is the most prominent feature of the first seal of New York City, the seventeenth-century seal for New Amsterdam. When the British took over, the seal was revised to include a Pilgrim and an Indigenous man, but the beaver remained, right smack in the middle between the two. Canada's first postage stamp featured a beaver, and the state of Oregon, founded in 1859, too. The beaver for its state animal. The Massachusetts Institute of Technology, established in 1861, made a beaver its mascot. So did at least one sports team in every state of the Union. More roads, cutoffs, boat launchings, towns, and developments are named after beavers than any other North American animal.

Some of the oldest animal effigies to have been found are of beavers, and the Shigir Idol, the earliest wooden carving in the world, was sculpted using a beaver's lower jawbone. Throughout the ancient Middle East, beaver castor was used for medicinal purposes. In Iran, where beavers were called "water dogs" and considered sacred, they were protected by a system of fines; harming a beaver in ancient Persia could cost you 60,000 darics, although you could get out of it by killing one thousand snakes.

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Yet the beaver's ubiquity is matched only by its weirdness. Indeed, beavers are considered "behaviorally weird," which means no one really knows when they started building dams. No one really understands how much intelligence, as opposed to instinct, is involved in that unique activity. Animal intelligence is measured by comparing the size of the animal's brain to the animal's overall body weight, something called the encephalization quotient, or EQ. Based on that simple ratio, beavers appear less cunning than rats or squirrels (though far better off than the bony-eared assfish, which has the smallest brain-to-body ratio of any vertebrate on the planet).

But they have evolved in an intelligent way. Their eyes, ears, and nose are aligned, so that they swim like alligators, head barely visible, body submerged; yet unlike alligators, they do so not to hunt but to avoid becoming prey. Beavers can't see well. Their primary sense is smell. A beaver uses its nose to locate the cinnamon smell of birch and the licorice tang of aspen. They communicate through scent, depositing the castor oil that they produce in two internal glands.

mark territory and introduce themselves to potential mates. While the visual area of a beaver's brain is small, a large area of their neocortex is dedicated to processing somatic sensory and auditory stimuli.

But are beavers intelligent creatures? It's a mystery. Throughout history, humans have studied their lodges and dams and canals, their skills at felling and transporting trees, their expertise in engineering. When three or four work together, they can roll a hundred-pound boulder and use it in their dam. Perhaps, like ants and bees, they have a kind of intelligence that we as humans simply cannot fathom.

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A quiver on the surface, twitch of grass, and she is frozen. She turns one great webbed foot and grabs the pond's water, slowly turning as if she were a wooden top. Her small brown head with bearlike ears lifts ever so slightly, the short blunt nose level with the water's surface, black eyes peering. The pond shimmers with insects; green wafts of algae thrum, each cell an engine of chemical reactions; photosynthesis turning sunlight to sugar, energy into biomass. She waits, floating in the sun-warmed water, senses flaring. Her nostrils widen, taking in the sweet stink of waterlogged weed and wood. Then a new smell: acrid, metallic. Her brain flashes danger, muscle pulse. She flings her head forward, thrusting her back out of the water, and dives. On the way down, her tail slams the surface, a paddle crack, a warning. Her head cleaves the water, clear



nictitating membranes shielding her eyes like swimming goggles. She sees through the murk. is not the predator, here she is prey. She dives and dives, her life a question answered by the splash of her flight.

Down she goes, hell-bent for the bottom of the pond. Her body swoops, all muscle now, propelling her through the pond as if following a groove. Her webbed toes spread like sails, gripping the water, push. She dodges hazy shapes—sticks and branches, boulders and stones, water lily stalks and thick pond grass. The pond's surface now just memory, a distant lid.

She seems more fish than mammal now, her tail a rudder, her ears and windpipe sealed from water. Though the dive slows her heart rate, electric currents of fear zing through her body. Her short front paws scramble, the surprising fingers ripping through the thick strands of water lily. On the surface, the lilies bloom in elegant profusions of yellow and white. Down here they are a dark maze through which she must maneuver.

She swims deeper, into layers of welcoming silt, her inner lips closed behind her teeth, keeping water from her lungs. The mud-filled water ruffles her mouth while along her back the dark slurry curries her fur. She feels its weight and pushes harder still; she knows she is almost there. Then that sudden coolness like absolution and she parts the dark curtain. She slows, turns, glides along the canal. Only there, moving along the intricate highway she and others have clawed through the mud on the bottom of the pond, can she rest, swimming slowly through the

underwater pathways. Ahead she senses a rising darkness. She dives once more, then swims up through a tunnel and breaks the surface. She fills her lungs and climbs quickly out into the daylight of the lodge, safely home.

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I stand on the bridge and wait. Eventually I know the beaver will surface and swim back here under the dam. I wonder if I spooked her with my shadow or my scent. Beavers can stay underwater as long as fifteen minutes before their lungs need air, and in that time can swim over two hundred yards without needing to come back up. I scan the pond's surface. She could pop back up anywhere.

Coda sits by my side, leashed, her retriever head cocked toward the pond, pensive, her upper lip slightly curled in concentration. Her long-distance eyesight isn't great, but it's better than a beaver's. Her sense of smell is two hundred times greater than mine. I have learned to follow her when she suddenly leaps off the trail, because chances are she has discovered something. Once a ten-point buck, shot and left in the woods. Once a headless coyote, legs bent as if still running through the tall meadow grass. Once the body of a wood duck, the jeweled head ripped off by an owl, scattering of red drops of blood and the brilliant-colored feathers on white snow.

As I look over the pond, I run my fingers through the soft fur of Coda's head. She sighs, leaning into my leg. We wait, the sun just a flare. Birds are settling down into whistles and chirps and that one achingly beautiful flute sound that seems to echo through the trees. Time passes. The

surface of the water turns orange, then hot pink, almost crimson. Now Coda is restless and jumps my leg, pointing her head very decidedly away from the water toward the road. The pond is just a three-minute walk from our front door, but it feels like a world apart. Okay, I say, scanning the pond one last time. The beaver won't return until night. Beavers are crepuscular, most active when the sun begins to sink. I let Coda lead me back up the road toward home.

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A small tug of water, a pulse down deep and she can feel it, movement where there should be stillness. She lifts her head from the water, bringing up a green frond of water lily draped over her head like a towel. She flicks an ear, turning it toward the new sound. She lifts her nose, taking in the dusky sweet pond scents, now twirled with something new. What? Coolness, silt, and she begins to sense it now, the outer layer of cells on the thick skin of her tail registering a change in water pressure. The sound is moving water, a subtle current flowing.

Something is wrong at the dam. The beaver whips around and dives. Once again she is swimming hard through the channels at the bottom of the pond, those dark lifelines, but this time heading away from the lodge to the dam. She rises up and breaks the surface, moving fast now along the top. At the dam she quickly finds the source of that tug and pulse, a hole through which water is flowing. She dives again and comes back up with handfuls of mud, which she presses quickly against the sides of the dam. Again she dives, now with a stick in her mouth. The next dive brings up

rock carried between her front paws and her chin. Mud, sticks, rocks are jammed into the hole. The beaver will not stop until the hole is plugged, the wretched sound of trickling water gone. This quick repair was done in the dangerous light of morning.

Later, when darkness covers the pond, reducing the risk of predators, she will be back with ot bringing more sticks and freshly cut saplings to reinforce the dam. Beavers can fell a five-inch willow in six minutes; whittling down a trunk like an enormous sharpened pencil, a full-grown beaver can fell and then tow a hundred-pound sapling, swimming against the current.

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LEILA PHILIP

# BEAVER LAND

How One  
*Weird Rodent*  
Made America



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**Leila Philip**

Leila Philip is the author of award-winning books of nonfiction that have received national glowing reviews. A Guggenheim Fellow, she has also been awarded fellowships from the National Endowment for the Arts and the National Endowment for the Humanities. Philip was a contributing columnist at the *Boston Globe* and teaches in the Environmental Studies Program at the College of the Holy Cross, where she is a professor in the English Department. *Beaverland* is her latest book.