AND SO SHE DANCES

KIMBERLY MOYNAHAN

For a creature who weighs some 350 kilograms, Aurora dances lightly. Granted, it is a water ballet, but still she is more graceful than her lumbering body would imply.

As always, it is damp and cool down here in Toronto Zoo's underwater polar bear viewing area. This cement subterranean cave with tall windows gives visitors a full view of the bears' swimming pool. The water is deep blue green and usually when I come here, a few discarded polar bear toys are all I see. But today Aurora is putting on a show.

Swimming in from below the tall narrow window, she pushes off the bottom, rising vertically in the green water, her face inches from the glass. Bubbles stream off her nose and flattened ears as she slowly rises to full height in front of us. Her torso fills the window, thick creamy-yellow coat waving dreamily in the water. She plants a giant forepaw on the glass and looks directly at us. She is enormous, beautiful, deadly and she's *right there.* It's an intoxicating combination and even the adults, standing well behind the crowd of children at the glass, gasp.

Now the great bear rises above us to the surface and swims laconically towards the far end of her pool. Out in open water she rolls onto her back and executes a languid flip turn against the distant wall, then paddles back towards the window. The children in the front stand up, hopping in anticipation. The adults, myself included, grin broadly, cameras poised.

This time coming in from the top of the window, the white bear's great cloud-like body drifts in over the children's heads, forepaws paddling gently, hind legs with knees bent trailing behind. She pauses, nose to the window, looking down to where the children grin and press their hands to the glass. I wonder if she can see them.

This time she does a front roll with a quarter turn and, placing her enormous hind foot against the glass, she pushes off hard in a cloud of bubbles. And thus begins her figure eight dance ~ off the far wall, down to the bottom, up the window, across the pool, a flip turn, in from the top, and final push off the glass.

Her pattern becomes so regular that adults begin putting their palms on the glass where they know her foot will land. Cameras snap shots of hands dwarfed against

her great paw. Children begin a mantra, 'Here she comes! Here she comes!' As she again rises to full spectacular height merely feet away, a man turns to me. 'It doesn't get any better than this, does it?'

For zoo visitors, no it really doesn't. But for Aurora, well that's another story.

Aurora seems to be performing for us, always pausing long enough to peer through the glass, as if to check that we're still here before pushing off for her next round. But isn't that just like us, to think that we are the center of her attention? This is not a performance and it is certainly not for us. This kind of repetitive action in a captive animal is the sign of an unhealthy mind. It is a tic, an abnormal behavior born of years of captivity and sameness.

The problem of repetitive behaviors, or 'stereotypies', is well recognized in domestic animals. In horses, these are called 'stable vices' and they carry descriptive names like wind sucking, cribbing and weaving. In dogs stereotypies manifest in compulsive licking or tail chasing; in pet birds, feather pulling and rocking.

In captive wild animals, stereotypy frequently takes the form of pacing (or in Aurora's case, swimming) that is so exacting in its choreography, an animal may literally walk in its own footsteps for hours, days, and eventually years. Bears – polar bears in particular – are extremely prone to stereotypy. The behavior is so common that the Dutch verb for pacing is *ijsberen* or 'to polar bear'.

So it was no accident that Aurora's giant paw had met the glass in the identical spot every time. Her mind, in a state of *zoochosis,* or captivity-induced mental illness, wouldn't allow her to place it any other way.

Within the standards for captive wildlife, Aurora is well cared for. She is fed a diet that keeps her coat healthy and her eyes bright. Her recently enlarged enclosure includes not only the cement pool in which she swims, but several acres of grass and dirt dotted with boulders and shrubbery. Tucked behind a hill away from the crowds she has a waterfall and a private wading pond. She enjoys the occasional company of other polar bears and a steady stream of enrichment items and zookeeper interactions designed to keep her mind and body busy.

As zoo visitors we hold in our minds that this is sufficient; that as long as Aurora is well-fed and cared for, she is fine – in fact better off than in the wild where life would be an ongoing struggle for survival. And besides, we tell ourselves, her life may not be perfect, but Aurora is an 'ambassador for her species' – a phrase we use to conjure an image of an animal gladly traveling zoo-to-zoo bringing us greetings from her kind. This outreach is important, we say, so that people may experience wild creatures first-hand; that putting animals like Aurora on display is the only way to foster appreciation and build support for protecting her wild kin and their habitat. But what does Aurora hold in her mind?

We can't know what she thinks but we do know this: Aurora has one of the finest noses in the animal kingdom. If she were in her natural arctic habitat she would pick up the scent of a seal forty miles distant and follow that scent to its delectable source. She would be able to sniff an opening in the ice and know if a seal has recently used it as a breathing hole. And she would smell other bears.

From our visually-biased perspective wild polar bears appear to be solitary creatures. As a wild bear, Aurora would spend much of her life in the sole company of her cubs and only occasionally in the company of a male bear. Male bears keep even less company, roaming the great ice sheets and swimming arctic seas in perpetual solitude. Or so it seems.

Polar bear scientist Andrew Derocher writes, 'A polar bear is never really alone if it can smell another polar bear.' Indeed, in the wild, Aurora would be continuously awash in the scents of other bears; bears she seldom, if ever sees but who form her social network – her offspring, now independent adults; their fathers and rival males; perhaps her own mother and siblings; newcomers and newborns.

Immersed in these scents Aurora would travel, letting her nose guide her between and among the other bears, constantly monitoring their locations, changes in weather, and sources of food. In the course of a year she might walk and swim a thousand miles over an area the size of Pennsylvania.

Most years she would do this with one or two growing cubs in tow; cubs she would first nurse then later teach to hunt; fidgety toddlers she would reprimand for foiling a critical seal stalk; playful siblings that would wrestle and clamber over her as she dozed in the northern sun; future generations she would protect from marauding male bears and rescue from all manner of childhood accidents. Each set of young would be her company, entertainment, and the focus of her decision-making for two and a half years.

We know that evolution in the arctic landscape has made Aurora wise and capable of complex decision-making. A polar bear must think flexibly and creatively to navigate and work a land of ice floes and open water; a place where landmarks are ephemeral and the ground perpetually moves below one's feet. Thriving in this changing environment is an indication of a polar bear's intelligence, considered to be on par with that of chimpanzees and gorillas.

And finally, we know that all of Aurora's behaviors, driven in part by instinct and in part by her own intelligent decision-making, would, in the wild, carry rewards – a meal, a mate, a den, or even just a curiosity satisfied.

How different Aurora's life is here at the zoo. Again, we cannot know her mind, but we do know that her nose is good enough to pick her keeper out of a crowd and that she recognizes the scent of the other polar bears. But we also know that most of the scents Aurora picks up on the wind hold no physical reality for her. What does she make of the day-and-night smell of burgers and pizza from the nearby snack bar? What urges are

triggered when she picks the odour of wolves, giraffe, howler monkeys, komodo dragons or kangaroos?

Do these scents arrive in an olfactory cacophony, no one odor rising to the top to be savored? Is picking out the smell of a nest of baby rabbits like trying to discern a songbird's melody in a football stadium? Or have her senses deadened over the years so that she can no longer detect the loamy earth of the surrounding Rouge Valley, the spring snowmelt in nearby streams, or the rotting fruit beneath a long-abandoned apple tree?

And what of her urges to travel? The seasons in Toronto are nothing like those in the Arctic, but shortening and lengthening of days must still carry messages that trigger hormones and urges deep within Aurora's body. Her days will be filled with impulses she will never be able to follow, scents she will never be able to investigate, decisions she will never have the choice to make. And so Aurora dances. Not with joy but with a compulsive regularity that to the initiated is suddenly more macabre than beautiful.

An enormous amount of research has gone into understanding and managing bear stereotypy. Researchers have teased out triggers that include boredom, anxiety and fear. They have shown that polar bear pacing is different from normal walking; that possibly the bear's mind is elsewhere, unaware of its surroundings. And they have

learned that the animals most likely to exhibit stereotypies in captivity are those, like polar bears, that have very large home ranges in the wild.

To combat stereotypy, zookeepers initiate enrichment and training programs. Zoos have enlarged exhibits to provide bears with more variation, privacy and better views. But still, most polar bear enclosures are on the order of one-millionth the size of the bears' natural home range. As a last resort, veterinarians administer anti-anxiety medications to calm bears, but in the end, the preventive measures are all temporary and the bears return to their compulsive behavior at the slightest trigger.

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Aurora finally tires of swimming and hauls herself out of water. From our vantage in the underwater viewing area there is nothing more to see. Parents and children begin to disperse and one child wails as he's pulled away from the window, 'It's not fair. I didn't get to see the polar bear.' And maybe that's what we all want to wail when we think about not having zoos and never seeing these animals up close. But there we go again, thinking it is about us.

Why are we doing this? What are we really accomplishing by putting these animals on display? Is there validity in the 'ambassador for their species' argument? Are we preserving a species that faces extinction in a warming world? Or are those simply excuses for putting our desire to see these animals before the animals' welfare? Perhaps it's time for polar bears to join orcas, elephants and chimpanzees on the list of animals that we have finally acknowledged as being unable to thrive, and thus cruel to keep, in captivity.

It seems zoos are not quite ready for that. Since 2011 Aurora has given birth to ten cubs. Of those, only three survived infancy. Two were shipped off to another zoo and, as of this writing, her daughter Juno, is still at Toronto Zoo drawing and delighting crowds.

Juno's genetic lineage will determine where she spends her adulthood, how frequently she is bred and with whom. She will be fed well and cared for her whole life. But, like her mother, Juno will never walk thousands of miles on arctic ice, taste the salt of northern waters or follow the scent of seal to its source – except perhaps in some ancient memory to be savoured while she dances.

KIMBERLY MOYNAHAN is a freelance science and nature writer. She blogs on the natural sciences, human-wildlife relationships, and the writing life at *Endless Forms Most Beautiful.* Several of her blog posts have attracted international attention and her post on the killing of Romeo, a famous Alaskan wolf, was published in *Scientific American's Best Science Writing Online Anthology*. Her work has also appeared in *Hakai, Zoomorphic, WOLVES,* and *Labrador Life* and she has contributed several pieces to the Center for Humans and Nature 'City Creatures' blog. To ensure her daily dose of nature, she and her husband live in a net-zero home they tucked in among the pines on a rugged lakeshore near Kingston, Ontario.

www.kimberlymoynahan.com
@Kim Moynahan