Research Zoologist George Durner looks into a polar bear den. Note the hair on the ceiling and the claw marks.

Maternity Matrix

The complexities of polar bear denning

BY **MICHAEL ENGELHARD**

DENNING—A GRAVID POLAR BEAR'S MOST IMPORTANT behavioral adaptation to Arctic conditions—fascinated early naturalists, surrounded, as it was, by mystery. Such cyclical disappearances and emergences of the bears likewise shaped Inupiaq ideas of the animal's regenerative and other magical powers.

Often seen in its vacated state, a snow cave comforts bear and human alike, one 19th-century savant found: "The substance in which it is hollowed is a very imperfect conductor of heat, so that the traveler finds the caloric exhaled from his body is no longer swept off by the wind, but is conserved around him and restores warmth and sensation to his limbs…There is no fear now of perishing by frost, for the snow-cell is rather too hot than too cold." A bear so hidden "may be discovered by means of the little hole which is made by the warm breath, and is rendered more distinguishable by the hoarfrost which collects around it." (Historically, Eskimos and their dogs ambushed polar bears in their hideouts.) The bear's engineering feat may well have inspired Inuit igloos; it certainly suggested kinship between the two kinds of dwelling.

Unlike grizzlies or black bears dormant in winter, polar bears are most active when seals, seal pups, and sea ice are at a maximum. Pregnant ones *do* hibernate, rationing fat reserves needed for nursing. Dens shelter the young, born blind and furred sparsely, from the elements and roaming cannibal males or wolves.

Expecting bears excavate birthing lairs sometimes miles inland, in compacted snow above well-drained ground. In search of the perfect spot, some sink test pits or refurbish old abodes. On the North Slope and seaward barrier islands, they occupy nurseries from roughly November until the end of March. In the southern Beaufort Sea region, fewer mothers-to-be burrow into drifts atop sea ice, up to dozens of miles from the coast. Prime real estate on terra firma attracts multiple females, which cluster in subdivisions. Of one survey's 53 dens located along northern Alaska's mainland with the help of radio-collared bears, 22 lay within the Arctic National Wildlife Refuge's endangered 1002 Area (a 1.5-million-acre section that harbors oil and gas resources).

Prompted by her body and seasonal clues, a she-bear paws horizontally into a snowy bluff, perhaps in the lee of prevailing winds or on a south face, taking advantage of the returning sun's

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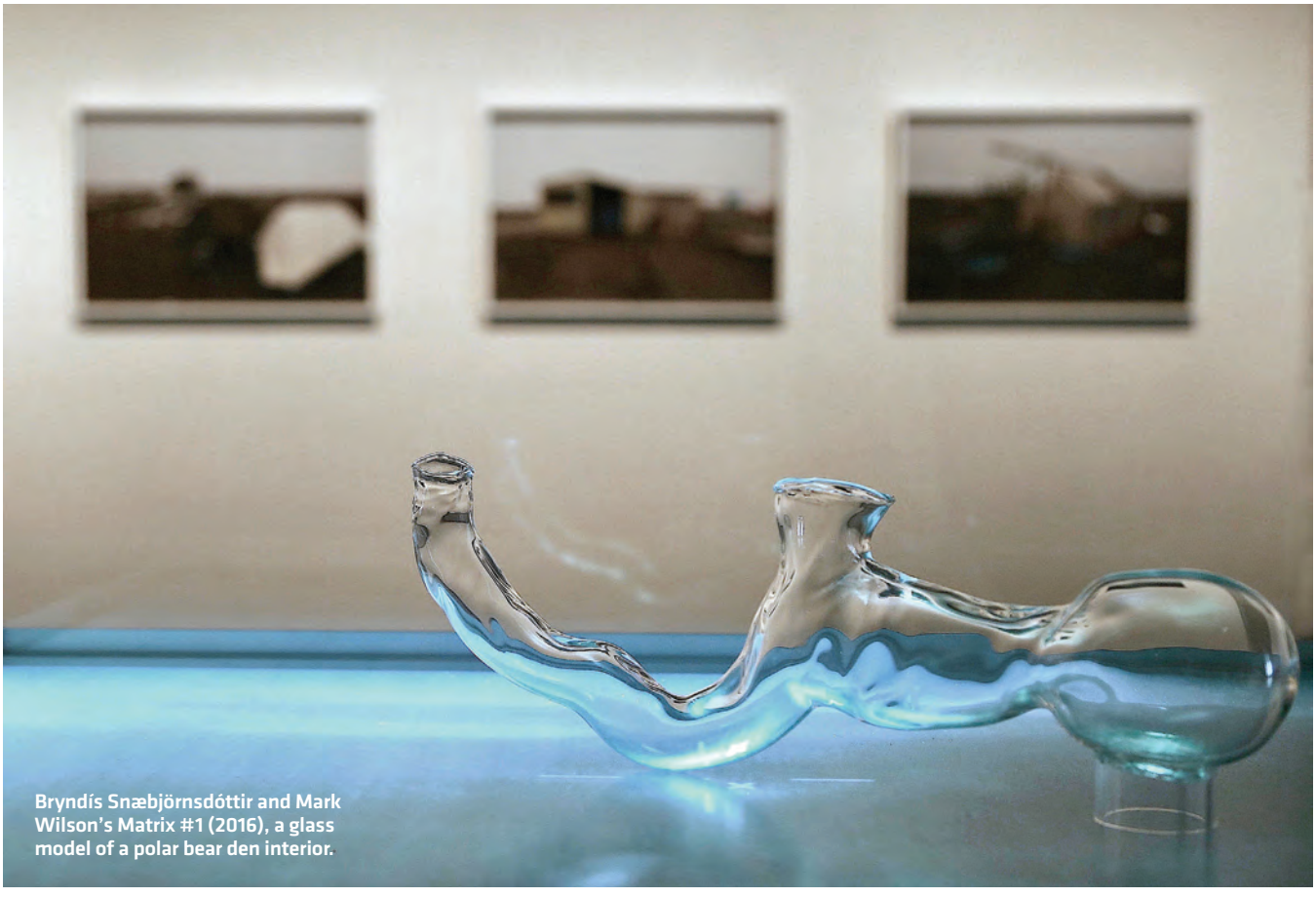

Bryndís Snæbjörnsdóttir and Mark Wilson's Matrix #1 (2016), a glass model of a polar bear den interior.

flattened arc. Her tunnel typically ends in an elevated chamber and acts as a cold sink. In snow-filled depressions, she digs a vertical shaft that does not lead straight to the natal nook but instead to a bend off to its side. Cub-holes also are scooped from cut banks or ridges before the first snow falls, a scenario likely to become more common with delayed onset of winters; earlier emergence from the den where food is still scarce risks the cubs' health and survival. The female fashions the nest cavity only a little larger than her bulk. Due to her fasting, it remains very clean. Normally single-chambered, multiple-cell structures have been documented; scientists think these are spring add-ons to accommodate fast-growing, squirrely cubs. Claw marks on a den's ceiling show where mom thinned it to allow air to percolate. As in igloos, inside temperatures rarely dip below the freezing point and often hover above: This reflector oven traps body heat, and the difference between a mammalian domicile and its environment allows detection with infrared cameras.

The subsurface havens refined throughout the season become unsafe as spring approaches or as human activity increases. Rain might collapse dens, evicting the denizens. Oilfield activity—road-building or seismic testing—can do the same. Disturbed bear families have fled winter homes, seeking quieter ones elsewhere. Legally bound to assist with thermal imaging, the industry is supposed to avoid building ice roads near known polar bear birthplaces.

For almost 10 years, the variability and ergonomics of these maternal retreats have intrigued the Icelandic artist Bryndís Snæbjörnsdóttir ("Snow-Bear's Daughter") and Mark Wilson in England. The pair marvels at such "places of beginning and of continuity" because they "embody both a biological specificity of purpose and a cultural and environmental register of touching significance." Researching dens on Svalbard and in Greenland and speaking with North Slope biologists determined to curb the oil industry's impact on hibernation sites, they've put their art where their mouths are. For their latest project, partly showcased at the Anchorage Museum's Polar Lab, they commissioned scientifically accurate, hand-blown miniature glass models of polar bear dens. Snæbjörnsdóttir and Wilson consider these to be more powerful artistic statements than the flood of glossy bear images in contemporary media. Video of whalebones, photos of hunting camps, and computer diagrams based on infrared camera data round out the Anchorage installation. However, it's those sculptural artifacts, the fragile, ephemeral nature of womblike bear habitats—curved cogs in a larger whole—that best capture the Arctic's Fabergé preciousness.

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