The Fly Who Came In From the Cold
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The Fly Who Came In From the Cold

How do creatures survive, and sometimes even thrive, in brutal winter weather?

WINTER WORLD
The Ingenuity of Animal Survival.
By Bernd Heinrich.
Illustrated. 347 pp. New York: Ecco/HarperCollins Publishers. $24.95.

By Marcia Bartusiak

IT is snowing here in New England as I write this — a perfect time to slip under a comforter and enter Bernd Heinrich's "Winter World." "It is getting light now," he writes. "The snowflakes continue their soothing rustle on my jacket. . . . I look down and see a blade of sedge wiggle. A tiny load of snow slides off. A flash of movement. A moving black dot. It's the eye of an immaculately white weasel. . . . The weasel stands up, extending its slender six-inch body toward a tiny rustle, looks in that direction, then dashes off. In seconds it is back, standing tall and looking at me. Fearless, focused, improbably alert and powered with unbounded restless energy, it soon again disappears from sight." A biologist at the University of Vermont and the author of such notable books as "Bumblebee Economics" and "Mind of the Raven," Heinrich enthralls us now with this new, captivating and at times surprising examination of animal survival in the coldest of seasons, when woodland creatures face "the anvil of ice" and "the hammer of deprivation."

We look out of our frost-covered windows and often perceive only a sun-deprived and barren landscape. Heinrich, who combines his keen scientific eye with the soul of a poet, glimpses an entirely different realm, one filled with wondrous activities both above and below the seemingly lifeless countryside. There are squirrels flying, white-furred hares scampering, snow fleas huddling, wood frogs enduring icy suspended animation, disoriented honeybees divebombing into the snow and a variety of birds constantly foraging for seeds and insects. Heinrich teaches backyard naturalists how to observe.

Take the case of the vole, a type of short-tailed mouse. In the winter, voles inhabit the "subnivian zone," the network of caverns that is generated within a snowpack. There temperatures remain within a degree or two of the freezing point, warm enough for the voles to wander through the latticework and gnaw at the bark of young trees right up to the snow line. Cozily ensconced, their tummies full, they become reproduction superstars. A well-fed vole can bear 17 litters (up to 85 babies) over a year's time. "The young females . . . can produce their own litters in one month. At such reproductive potential, it would not take long for them to carpet the earth," the author notes. "Instead, the voles' role in the economy of nature is . . . to convert vegetation into the protein-rich dietary staple of many predators that rely on them in winter, principally fox, weasels, fisher, coyote and bobcat."

FROM WINTER WORLD

Crossbills dine by extracting seeds from pine cones all winter long.

Heinrich's descriptions of his travels in the forest are intoxicating, but he's a realist about the web of life. Nature has a strategy, and it's not necessarily a benign plan. Life is a battle: for food, for warmth, for shelter, for the time to reproduce and continue the gene line.

These struggles can be traced back billions of years to earth's first "winter," when our planet was cooling down from its tumultuous birth. Bacteria, initially accustomed to boiling temperatures, gradually had to adapt to more chilly surroundings. Some took symbiotic refuge in other cells, turning themselves into the mitochondria that now serve as a cell's power source within the animal kingdom. Over the succeeding eons, animals evolved a variety of techniques to deal with the cold, from flocking and hibernation to hoarding and fattening up. Each chapter in the book is a gemlike essay (beautifully illustrated with the author's own line drawings) that deftly discusses one of these tactics. The accounts are based on animals observed near Heinrich's home in Vermont or around his rustic cabin in western Maine. From these distinct settings he sheds valuable light on the more general principles of ecology and animal physiology.

A theme that runs throughout the book is the evolutionary heritage of humankind. Our domestic concern for the perfect color and thickness of carpet in a living room is simply the continuation of behavior that insects, birds and mammals have been performing for millions of years. An insulated home is not much different from the nest of a gray squirrel. Inside the nest's globe of twigs, which looks deceptively makeshift from the outside, are layers of dried oak leaves "as watertight" as "interlocking shingles." Finely shredded bark serves as soft upholstery.

As he goes along, Heinrich continually poses questions. A contemplation of the insulating properties of feathers has him wonder about their evolutionary development. He hypothesizes that flat feathers first emerged as protection from rain, a size and shape that naturally led to flight. And curious about the winter survival of flies that gather inside his cabin windows, he simply dabs red paint on their backs and releases them outside to see if they return.

The ways in which animals can hibernate provide the most amazing stories. What is death to a snapping turtle when it can bury itself in the mud below an ice-covered lake, taking no breath of air for months at a time? Certain caterpillars in the high Arctic stay frozen throughout the winter; after some 14 years of freezing and thawing, they turn into adult moths, mate and lay eggs, only to die a few days later. Bears are a medical miracle. They can forgo drinking water and urinating for up to five months, suffering neither bone loss during the torpor nor hardening of the arteries from their high-fat diet. They are nature's champion couch potatoes.

The cold, in fact, can prolong life in the wild. Bats need to be chilled in the winter to conserve their energy until spring. "The main danger" to some temperate zone bats waiting out the winter in their traditional caves, Heinrich says, "is not quick freezing, but slowly starving to death in temperatures above 10°C when their elevated resting metabolism eventually exhausts their fat reserves by the end of the winter."

Heinrich is at his most lyrical when writing on the kinglet, a tiny olive-colored bird with a brilliant-colored crown that has captured his fancy since childhood. Only the size of walnuts, kinglets are the ultimate winter survivors. They must eat three times their body weight each day to build up the reserves that allow them to keep warm by shivering through the frigid night. (This fact alone now spurs me to keep my bird feeder full when temperatures drop.) Their fortitude is so endearing that I can easily accept Heinrich's one slide into anthropomorphism, at the close of his book: "Whenever I've watched kinglets in their nonstop hopping, hovering and searching, seen their intimate expressions and heard their constant chatter . . . I've felt an infectious hyperenthusiasm flow from them, and sensed a grand, boundless zest for life. . . . Like us, they are programmed for optimism. . . . When I'm in the warmth of my cabin and hear gusts of wind outside that moan through the woods and shake the cabin on wintry nights, I will continue to marvel at and wonder how the little featherpuffs are faring. They defy the odds and the laws of physics, and prove that the fabulous is possible." □

Marcia Bartusiak's most recent book is "Einstein's Unfinished Symphony: Listening to the Sounds of Space-Time."