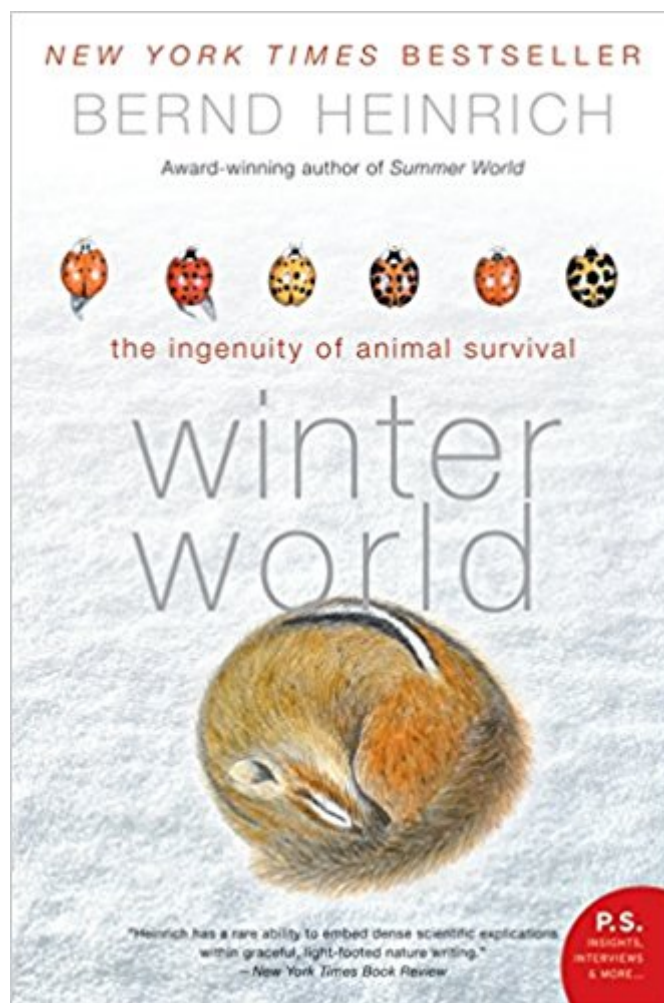


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Winter World: The Ingenuity Of Animal Survival



Synopsis

From flying squirrels to grizzly bears, and from torpid turtles to insects with antifreeze, the animal kingdom relies on some staggering evolutionary innovations to survive winter. Unlike their human counterparts, who must alter the environment to accommodate physical limitations, animals are adaptable to an amazing range of conditions. Examining everything from food sources in the extremely barren winter landscape to the chemical composition that allows certain creatures to survive, Heinrich's *Winter World* awakens the largely undiscovered mysteries by which nature sustains herself through winter's harsh, cruel exigencies.

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Customer Reviews

There cannot be many people who have gone into a beavers' lodge. Heinrich, professor of biology at the University of Vermont, did that in his quest to see how animals survive winter. It was a summer when the pond had dried up and the beavers were not in residence, but with a flashlight and room enough to turn around, Heinrich was able to conclude that the accommodation would be quite cozy for a beaver family in winter. Similarly trying to see for himself as much as possible, he describes the winter survival strategies of many animals. He marvels in particular at the success of the golden-crowned kinglet (*Regulus satrapa*), a bird "scarcely larger than a ruby-throated hummingbird" that remains active all through the winters of Maine and Alaska, its life "played out on the anvil of ice and under the hammer of deprivation." The kinglet, he says, symbolizes the "astounding and ingenious strategies that animals have evolved for coping in the winter world."

Editors of Scientific American --This text refers to an out of print or unavailable edition of this title.

The ways animals cope during cold winter months are highlighted in this new title from Bernd Heinrich, the award-winning author of *Mind of the Raven* (1999), physiological ecologist, and professor at the University of Vermont. Some animals, such as voles, stay awake all winter in tunnels and grassy nests built under the snow. Other small mammals, such as chipmunks and ground squirrels, spend winter hibernating. Some insects supercool through chemicals in their blood that inhibit freezing, while others do the opposite and survive by promoting self-freezing. Many other animals remain active all winter and retire to warm nests or dens when not seeking food. Heinrich is a graceful writer, taking the reader along as he uncovers aggregations of wintering bugs, follows a weasel's tracks in the snow, or watches the tiny kinglets fluff their feathers for insulation as they search for wintering caterpillars. Liberally illustrated with the author's pencil drawings, this title will be sought out by fans of good nature writing. Nancy Bent

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I will use this book as a reference again and again. Heinrich's writing is clear and his observations keen. He focuses on a few species but does not make the mistake of then drawing broad conclusions through induction. In the first dozen pages, for example, in clearing the air on hibernation and its various forms and nuances, he concludes "Different terms may apply in any one animal in varying degree, depending on circumstances, but ultimately the species, and often the individual, fashion their own solutions to fit the situation or occasion." A few degrees in temperature difference, for example, can greatly alter adaptive response, as his later examples document. His keen and unrelenting observation is insightful and inspiring; it inspired me to use a few of his examples in an interpretive poster I developed for a Master Naturalist class project I just completed (winter, 2014). What's great about the book in this respect is that it motivated me to learn more. What I discovered are the inconsistencies--updates, really--from source to source, particularly over time. As Heinrich mentions, today's "truths" are refuted by tomorrow's discoveries. That's what science is all about.

My house burned, all of it, everything. This is one of the first book that I picked to start my library over again. It will take a long time. My focus is on our diverse earth and our fellow animals and the environment. Science. This book is one of the bibles *Arctic Dreams* (Barry Lopez) is another one.

I am a wildlife biologist working in the deep south. I have long been interested in adaptation strategies of various species, but winter is not really a topic that comes up when learning about southern ecosystems. This book was suggested to me by a fellow biologist, and I was looking for something to read on an upcoming flight, so I took the advice and ordered this book. I only give four stars because I was hoping for something a little more science-heavy. The author's anecdotal style was not terrible, but it reminded me of a memoir, or a set of articles reminiscing about his youth in the northern U.S. while I would have enjoyed more technical discussions of physiology. Overall, a good set of short stories about winter and the animals that endure it,

Reads like a long novel with all the author's personal experiences in the wild. Often comic, like shaking trees to survey small insects, along with touching descriptions of how plants and animals survive the winter.

After Heinrich's "A Winter in the Maine Woods", this is my favorite book. He explores the mysteries of how creatures survive during what we would consider a pretty harsh winter. Particularly remarkable is his description and study of the tiny Golden-crowned Kinglet, a truly amazing bird.

Heinrich is one of America's national treasures. This book, one of his many, are some of the reasons why.

Heinrich has a real love of the natural world that shines through in his writing. Though 'Winter World' is ostensibly about various interesting physiological mechanisms that allow the creatures - particularly the ones outside of Heinrich's Western Maine cabin or on his Burlington office at UVM - to survive winter, it seemed to be just as much about the process of scientific discovery in its rawest form: 1) author wonders about something he notices, 2) author thinks about how he could find an answer, 3) author's method comes up short, 4) author repeats steps 2 and 4 until he succeeds. In the text, Heinrich has not reached the 'succeeds' step in all of his endeavors, and so the reader is invited to think along with him on how the next experiment might be devised to give more insight. The result is a text that serves as much to make the process of discovery fascinating and accessible as it is about the discoveries themselves. As Heinrich notes in his acknowledgments, "Nature exists. But the wonders of nature dwell in the minds of sentient beings who are receptive to them." The stories of animal winter survival are fascinating. Honey bees survive through huddling, winter food storage, and a uniform genome that drives a high degree of cooperation despite the fact that they're

so small that they die within seconds of leaving the hive on cold days (Heinrich can tell you exactly how many seconds for a given temperature based on his "prod stick with hive" experimentation). Some amphibians produce proteins that allow them to survive body temperatures below freezing. Black bears simultaneously appear to select certain tissues for down-regulation (typical of hibernation) while up-regulating mammary gland function so that the nursing young can survive the winter; this is made all the more impressive by the fact that the nursing mother drinks and urinates minimally all winter. Woven throughout the rest of his tales, Heinrich reports of his ongoing fascination with the Golden-crowned kinglet. The kinglet weighs little more than two pennies and its metabolic demands are particularly high in the winter because of its small mass (in proportion to its surface area, through which body heat is lost to the environment). Yet the kinglet can be observed feeding and surviving all winter long. So through careful observation, Heinrich identifies the larva that make up the kinglet's winter diet; he collects samples at daybreak and dusk to find out how much energy the kinglet must burn each night. One simple discovery at a time, he shows the reader how he goes about answering the questions of a fascinating creature's ability to 'make it' to the next day and the next generation. I read *Winter World* as an extra credit assignment for a comparative physiology course. It was an excellent introduction to how physiologists approach their work and how animals use different mechanisms to achieve similar goals. The writing is engaging and reminiscent of other recent, excellent non-fiction narratives (i.e. 'Secret Life of Lobsters,' or 'Cod'). For those interested in physiology, naturalists, outdoors-people (particularly New Englanders), or budding scientists, the tales are fascinating and educational and the text is highly recommended.

I really liked this book very much. You have to read it in small sections to digest all the information but Heinrich is an excellent writer and thoroughly knows his subject. You feel you are right at his elbow as he heads out and about in the snow and cold of winter trying to discover something about the wildlife trying to survive the harsh elements. I learned a lot reading this book and will constantly be referring to it as questions come up in my mind.

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