

Evolutionary Psychology

www.epjournal.net – 2013. 11(4): 814-817

Book Review

The Shallow Grave

A review of Bernd Heinrich, *Life Everlasting: The Animal Way of Death*. Mariner Books, 2013, 256 pp., US\$13.05, ISBN #978-0544002265 (paperback).

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Bernd Heinrich is an emeritus professor of biology at the University of Vermont and a prolific author on topics in nature. He is best known for his research and writings on insect and bird behavior. His most recent book is advertised as a naturalistic perspective on animal death, and it delivers on this promise by surveying the many fascinating ways that living things have evolved to benefit from the death that surrounds them. *Life Everlasting: The Animal Way of Death* moves quickly through engaging anecdotes on scavenging, mating, burial, and conservation with an inquisitive, almost childlike joy. The book offers a collection of essays on animal behavior in the presence of death but does not represent a concerted effort to understand the role of death in an ecosystem, the evolution of death, or even a working definition of death. Heinrich does, however, provide firm foundations for discussion of these and other theoretical issues.

When most of us stumble upon a dead deer in the woods, our interest and disgust battle to determine the radius of our hike around the corpse. We give a wide berth. Heinrich never hesitates in his approach of the dead animal, and without caveat he absorbs the scene to report what you might have known but never stopped and stooped to consider. He demonstrates how to be boldly curious in the face of death. This is the gift of *Life Everlasting*, for once the emotional veil is lifted, the intellectual heavy lifting can begin. As an authority on evolution, ecology, and behavior, Heinrich writes with an informed and infectious passion on beetles, vultures, bears, tortoises, elephants, mammoths, flies, ravens, wolves, fish, whales, plankton, and humans, among other species. Many of the book's vignettes include drawings, providing visual cues to relevant anatomy. We learn about the co-evolutionary arms race between beetle and tree, salmon suicide, and the role of plankton in building the Roman Empire. The web of relationships is dense in the natural grave—canines open a hide, birds call out the dinner bell, bacteria putrefies while insects sanitize and bury. Falling to the ocean floor with a dead whale, we tour the strata of deep-sea life until resting on the perfectly dark floor where sharks, eels, crustaceans, and worms take

turns dissolving the disused energies in a spontaneous buffet. We're urged to consider the overwhelming power of human behavior on the environment, informed that the caterpillar dies to make the butterfly, invited to see culture as the same recycling process that matter undergoes in death, reminded that human flesh is a part of the grand animal feast, and asked to examine the universal concerns that motivate practices from modern casket burial to the pyramids of Giza.

Excitedly turning the page, anticipating a tractable and comparative evolutionary logic for the emotions surrounding death, the niche of ocean-floor carnivores, the delicate reciprocities between undertakers, and *just maybe* a naturalistic philosophy that extinguishes the fires of hell and thaws the frigid void, *Life Everlasting* repeatedly cuts itself short, instead summarizing in broad terms that life is impressive and death isn't the end. It's difficult to decide how to take this. It appears that in building the bridge to a clearer notion of death, Heinrich resigns himself to the role of bricklayer, letting others pave the road, wire the streetlamps, and sell the cars. He steadily builds a case, only to abstain from opening it up. Even the excuse of time management is spoiled by the amount of space dedicated to observations having little to do with the phenomena of death. Take *Nicrophorus tomentosus*, a beetle known to bury small dead animals with their larvae. We learn from Heinrich in much detail how these beetles have evolved a form of Batesian mimicry, as they resemble honeybees during flight. Heinrich proposes that this adaptation allows them to work during the day without interference from predators and without competition from nocturnal creatures. If this were the extent of the tangent, it would be an appreciated fun-fact, but there are several pages dedicated to how he managed to observe their yellow coloring, the mechanics of their wings, and the relevant behavior of bees. *Life Everlasting* is a shallow grave of similar captivating but otherwise dead-ending narratives, pieced together by virtue of being fresh in the author's mind and having some connection to something that died. Fortunately, in the fertile ground of dead facts, the seeds of theory can grow.

In fact, there is a forest of competing evolutionary theories on ageing and death, each of which depends upon a high resolution picture of the kinds of creatures that Heinrich studies. Disposable Soma Theory, for example, makes the intuitive prediction that as an organism allocates more of its finite energy to growth, reproduction, and movement and has less energy for maintenance, ageing accelerates (Kirkwood and Holliday, 1979). Yet, experiments on mice show that restricting energy intake *improves* lifespan (Masoro, 2005). Or, consider Mutation Accumulation, the proposition that past the age of reproductive viability, the pressure of natural selection diminishes and the effects of deleterious genes flood the organism, leading to senescence and death (Medawar, 1952). But, modern genetic assays on roundworms and flies suggest cellular mechanisms whose express *function* is to self-destruct (apoptosis and telomere attrition) and that these controlled deaths occur more frequently in advanced age (Bernardes de Jesus et al., 2012; Zhang and Herman, 2002). Meanwhile, the fascinating notion of "evolvability" provides the argument that a higher frequency of death in a species provides more rapid opportunities for natural selection to work on a population. Although, as with group selection, it's difficult to know how the meta-benefit of accelerated evolution could evolve given the individual fitness benefits of cheating. Finally, "antagonistic pleiotropy" suggests

that the same genes active in youth that function to secure reproduction carry heavy costs in their effects on the adult, analogous to the short-term necessity and long-term toxicity of stress response hormones (Williams, 1957). Nevertheless, fruit flies bred for longevity achieved improved fecundity across a longer lifespan in laboratory experiments (Leroi, Chippindale and Rose, 1994). It's hard to fault Heinrich for merely paying lip-service to the tapestry of theoretical considerations—death is a hairy and unresolved arena. But there is a higher canopy overhead, where the flowers of personal philosophy bear fruit.

When he's not dismantling the position of faith in books and debate, Sam Harris lectures on topics ranging from neuroscience, happiness, philosophy of mind, morality and, at a recent convention, death (Harris, 2012). In his hour-long encapsulation of a secular position on death, Harris plants a flag in the high-ground, marking a personal philosophy, informed by science. We're asked to reflect on the constancy of death, the immediacy of conscious experience, and how it's ultimately the pain of loss that inspires the religious rejection of our physical origins and destinies. Indeed, research indicates that merely reminding people of their mortality makes their perspective on human origins more likely to align with intelligent design and less likely to include principles of evolutionary theory. Perspective is warped in the presence of death, in that attention to personal mortality may motivate supernatural belief (Tracy, Hart, and Martens, 2011). Yet, pay attention to what Harris's lecture lacks. He never addresses comparative examples of death, explores what happens to the body after death, or recounts first-hand interactions with the dead. Nonetheless, these hard facts nourish Harris's secular perspective from below while the daylight of logic animates it from above. Heinrich tacitly inhabits each of these tropic layers of thought and reveals at the end of the book that he views "the whole world as an organism with no truly separate parts" (p. 197). This is a refreshing admittance that builds naturally out of his work, but comes too little too late. By placing *Life Everlasting* in its context as a characterization of facts—the first essential step in science, we can see how Heinrich is himself an undertaker of the essential nutrients in the cultural cycle of knowledge.

Even if *Life Everlasting* fails to reach the intellectual depth that readers might desire or expect, it succeeds in reaching educated conclusions. By exploring diverse factual and logical discoveries, Heinrich aids in the effort to trivialize perspectives on death that rely on fear and mystery. He represents the kind of thinker who has unloaded the emotional baggage of death, and equipped a vibrant curiosity in its place—a key feature of scientific practice. If you're looking for rich discussions of evolutionary theory, you'll find little satisfaction here, but if you're up to travel the world and dig up the dead, *Life Everlasting* won't disappoint.

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