



Birds such as golden eagles eat carrion, recycling the nutrients captured during an animal's lifetime.

## ANIMAL BEHAVIOUR

## Dissecting decay

Clive D. L. Wynne celebrates a lively exploration of the life-and-death cycle in the wild.

Despite focusing on death and decay, *Life Everlasting* is far from morbid; instead, it is life-affirming. Bernd Heinrich, emeritus professor of biology at the University of Vermont in Burlington, does a tremendous job of convincing the reader that physical demise is not an end to life, but an opportunity for renewal.

He was prompted to ponder mortality by an odd request from a friend, who asked if, when he dies, his corpse might be left out for the ravens on Heinrich's land in Maine. That set Heinrich off on a quest to understand the role of death in life. His journey in this book starts and ends in, and often returns to, his beautiful Maine woodland, where nature can be observed at close range, and occasionally friends show up with elderberry wine and guitars.

Heinrich opens with a succession of animal corpses that he watches being buried by beetles, colonized by maggots, hauled off by ravens and vultures, and putrefied by bacteria. He starts small, with a deceased mouse, and proceeds through ever larger bodies: a freshly killed squirrel, a rooster, deer and pig, and finally a massive bull moose. Most of these he places so that he can watch their decay comfortably from a chair in his cabin. Each corpse provides opportunities to describe, in loving detail, the life that death provides.

Beetles with beautiful wings use the dead mouse as a romantic meeting place. Having

found each other, they carry the carcass to a safe place for burial. The female lays her eggs in soil close by. When the larvae hatch, the parents feed them regurgitated food from the corpse, staving off decay with antibiotic anal secretions.

Maggots prefer the deer carcass. Being larger, it stays warm for longer and encourages bacteria, whose "soupy by-products" provide sustenance for maggots. The maggots quickly colonize the corpse, and, because of their high metabolic rates, actually raise the temperature inside it and accelerate their own growth rate, creating a frenzied positive-feedback loop.

Looking at marine life, Heinrich contemplates the death of salmon and the dismantling of whales. When a whale carcass comes to rest on the ocean floor, it may be kilometres deep, in total darkness and at temperatures very close to freezing. Nonetheless, there is no shortage of specialist scavengers even in these extreme conditions, including sleeper sharks, hagfish and a wealth of tiny crustaceans.

Heinrich also reminisces about his time in Africa during the 1970s. In these time travels



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he considers the biggest of land beasts — the elephant. This animal's death brings humans into the picture: Heinrich argues that our ancestors were to elephants "what the sleeper sharks and hagfish are to the whales of the ocean depths: the ultimate recyclers".

Discussion of starving people in Zimbabwe today hacking at an elephant carcass segues into consideration of how early humans would have had to learn to cooperate to bring down mammoths, armed only with sharpened sticks and stones. Heinrich suggests that learning to process elephant meat taught us so much that tackling any other animal left us unfazed. He even details the decomposition of elephant dung, recounting with relish the time he watched half a litre of it be colonized by some 3,800 beetles in just 15 minutes.

Heinrich also considers the death of plants. When a tree falls in the forest and no one is around to take the wood away, what becomes of all that timber? In a gripping section on "plant undertakers", he considers how dead plants are broken down and the nutrients captured during their lives recycled. This process is led by sawyer beetles, jewel beetles and bark beetles, followed by horntail wasps, countless other beetles, fungi, birds such as woodpeckers, centipedes, millipedes and, if the tree falls into water, fish. Even other trees may use a rotting log as a base from which to grow.

Heinrich argues passionately that we cannot and should not fight the return of life to life through death. Death is the ultimate recycler. In the United States, most people choose to have their corpse either pumped with toxic formaldehyde and sealed in a steel box, or incinerated. The incineration of bodies in the United States burns enough fuel each year to power 80 trips to the Moon. In this way, we perpetuate in death the exclusion of ourselves from the natural world that many of us also proclaim in life.

Extinction, not death, is the real problem. Heinrich notes that unloved "undertaker" species such as ravens, vultures and condors are especially vulnerable to humans' effects on ecosystems. The largest cause of loss for such species is the complete replacement of large wild animals with farming activities that displace habitat and take away carcasses that nature would have left to return to the earth.

Ultimately, Heinrich is unable to indulge his friend's desire for a "green burial". In the United States, the movement and disposal of dead bodies is tightly bound by legal restrictions. He succeeds, however, in a larger aim. He replaces the inanimate biblical bookends to our lives, 'dust to dust', with what we really are at death: conduits for life. If nature has its way, the real progression is 'life to life'. ■

Clive Wynne is a professor of psychology at the University of Florida, Gainesville, Florida 32611, USA.  
e-mail: [wynne@ufl.edu](mailto:wynne@ufl.edu)