of methylation from critical genes impairs learning and memory function as studied at the cellular level. Several chapters reflect on the possibilities of finding pharmaceuticals that target epigenetic processes and which may be useful for delaying ageing or fighting cancer and other chronic conditions. However, that subject is in its infancy.

Surprisingly, the book ignores the vast body of work indicating that prenatal nutrition and other factors affect the prospects of the mammalian fetus through epigenetic mechanisms. A discussion of the consequences of the Dutch famine of 1944–45 would have been apposite: researchers have shown that, six decades on, children who were conceived during the Nazi-enforced famine suffered more cardiovascular disease and type 2 diabetes than a control group. This was linked to an undermethylated version of the gene for insulin-like growth factor 2. Another curious omission is any discussion of methylation and longevity in honeybees: the queen develops with an unmethylated genome and lives 20 times longer than a worker, whose genome is selectively silenced by methylation. There is more to the biochemistry of epigenetics than is recorded in this volume, including the role of poly(ADP-ribose) and chaperone proteins that help newly formed proteins fold into the correct shape and prevent the formation of toxic aggregates in cells.

Epigenetics of Aging reminds us that mysterious and fascinating processes govern the last phase of life in all organisms. ■

Michael Sargent is a developmental biologist at the National Institute for Medical Research, Mill Hill, London and the author of *Biomedicine and the Human Condition*.
e-mail: msargen@nimr.mrc.ac.uk

Where the wilderness line blurs

Living Through the End of Nature: The Future of American Environmentalism
by Paul Wapner
MIT Press: 2010. 252 pp. $21.95

Seen from a distance, some of the wild lynx of Colorado seem to have three ears. As the book *Living Through the End of Nature* explains, behind their trademark pointed ears, the lynx sport an antenna wire that is connected to a radio collar. All of the lynx in that state have been reintroduced. In the late 1990s, their ancestors were trapped in Canada, sedated, given a health check-up, collared and transported by truck, plane and snowmobile to Colorado.

Paul Wapner, director of the Global Environmental Politics Program at the American University in Washington DC, is discomforted by such interventions: "The silver metal wire would in some undefinable way remove a bit of the untamed character of the lynx." Yet he argues that environmentalists must put such fastidiousness about nature aside in a world where a lynx with an antenna is the only alternative to no lynx at all.

Lynx reintroductions in Colorado: back to the wild?

A. TOENSING/EDIT/GETTY

It has been more than 20 years since environmentalist Bill McKibben's book announced *The End of Nature*, a state he diagnosed after observing that humans have now affected every square centimetre of Earth by clearing, burning, logging, fishing, moving species around, introducing pollutants and — most pervasively — changing the climate. At the same time, a group of scholars called ecocritics have been pointing out that the concept of nature as a wilderness untouched by humanity does not exist as a concrete entity, but is an abstract concept shared by some peoples in some eras.

Although Wapner does not mention it, this concept of nature is getting a second look among scientists too. It may be that treating humans as something outside nature, rather than as an influential species of animal, has subtly coloured the field of ecology. For example, there is a move among some ecologists to fold the study of invasive species — those species that have been shifted from one place to another by humans — into subdisciplines such as community ecology and biogeography that study species movement more generally.

What does the 'end of nature' — both the destruction of wild places and the unravelling of a certain Western idea of nature — mean for environmentalism? Wapner imagines a movement that does not worship pristine wilderness, paint humanity as a cancer or alienate those who trust human ingenuity to solve problems. As he points out, "misanthropy is a difficult politics to advertise and sustain". Today's environmentalists, he contends, must stop seeing humanity as the enemy and work for a sustainable future in which people and all the other species on the planet coexist happily.

What would such an ideology look like on the ground? Wapner suggests that we take our cue from the increasingly blurred dividing line between humans and nature, and create soft boundaries between wilderness and developed areas. Instead of a park fence meeting a concrete car park or a clear-cut forest plantation, he sees zones of selective logging shading into wildlife-friendly suburbs. These would be landscaped in a natural style and criss-crossed by wildlife corridors, with pavements and driveways surfaced with "materials that retain rainwater and approximate soil to encourage the encroachment of wildlife into our lives". Inside the wilderness area, we should act as stewards or shepherds, gently working to help other species flourish. As inspiration, he cites natives of the Pacific Northwest, who tidied up streams so that salmon could come home to spawn.

Some wilderness fans will cringe at the prospect of nature management, but Wapner is not advocating aggressive intervention — he is too much in love with the old idea of the untamed wild. For example, he finds the idea of geoengineering our way out of climate change "distasteful" and arrogant. Instead, he recommends focusing on the inexhaustibility of renewable-energy sources rather than stressing the cataclysms that await if we continue to burn fossil fuels, and proposes public meetings to discuss "shared ways of working with pain as a strategy for assisting in our collective ability to live through the greenhouse age in a humane manner". These ideas are representative of the few concrete suggestions he provides: neither particularly daring nor new.

Wapner is right: environmentalists have to adjust to a world without pristine nature. And once they do, they are bound to invent environmental techniques that go beyond creating protected areas. In future, the wilderness may be less wild, but our cities, suburbs, farms and industrial sites will be wilder. ■

Emma Marris writes for *Nature* from Columbia, Missouri. Her forthcoming book on the future of conservation will be published in early 2011.