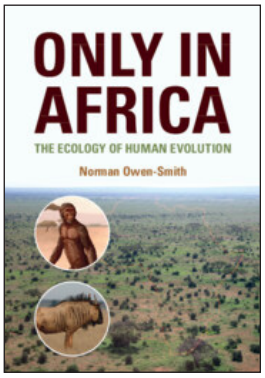
Ecology in the Cradle of Humanity

Only in Africa. Norman Owen-Smith. Cambridge University Press, 2021. 376 pp., illus., $44.99 (ISBN: 9781108961646, paper).

We all learned that the origin of *Homo sapiens* lies in Africa, but why there? Could humans have evolved in South America, Eurasia, or Australia? These continents also had savannas. Primates were present in South America and Eurasia, and Australia had tree-dwelling mammals not so different from primates. *Only in Africa* proposes that Africa has unique features that enabled the evolution of humans. Norman Owen-Smith has spent most of his life in the field, doing research in African savannas, and he is therefore an authority on the habitat where humans evolved. His extraordinary knowledge of Africa and his great capacity for synthesis makes this 350-page book an enjoyable read about the key ecological factors that made human evolution a success story. During the journey, we learn much about ecology in Africa.

The book first sets the scene for the cradle of humanity. In few pages, the author admirably describes the climate, geology, hydrology, and soil fertility of the whole continent. Here, Owen-Smith emphasizes the physical particularities that made Africa uniquely suited for human evolution, such as the volcanic intrusions that enriched soils for maintaining abundant large mammals and the rainfall that is not too low (as in Australia) nor high enough to leach the soil (as in South America). Another unique feature is the lack of migration barriers; for instance, most east–west African rivers can readily be crossed during the dry season (in contrast to the Amazon, for instance), there are not massive mountain barriers (as in Eurasia), and the Sahara was not a desert when our ancestors roamed the continent.



Owen-Smith then focuses on the savanna. A discussion about savannas is largely a discussion about grasses. For many researchers, savannas are a vegetation type with trees so widely spaced that the canopies do not close together. This definition is based on a lack of trees (for a closed canopy) and the forest-centered perspective likely stems from the majority of the relevant community being northern researchers (a cultural bias; Pausas and Bond 2019). For an African researcher such as Owen-Smith, savannas are defined by "the presence of a grass layer sufficiently dense to support recurrent fires over most of the landscape." This is a much more functional definition and makes it clear that trees do not make a savanna: "Most of the annual production of plant matter in savannas take place in the form of grass." Extensive African savannas accommodate large populations of mammals and allow migrations, facilitating the persistence of many mammals, even during the extreme droughts that Africa suffered during glaciations. Savanna plants with underground storage organs were a key food supply for hominids, and Owen-Smith argues that the abundance of grazers consuming grasses enabled early apes to walk more safely than in tall grasslands that are full of ticks and dangerous hidden animals. He also suggests that, because most savanna trees are drought deciduous (mainly, acacia trees that no longer belong to the *Acacia* genus), savanna apes (but not forest apes) were forced to search for alternative food sources when fruits and leaves were not available.

The third part of the book is a rich account of the ecology of large mammals—that is, herbivores (grazers, browsers, and mixed feeders) and carnivores; the author also mentions small but important bioengineers, such as termites, which are especially abundant in nutrient-poor savannas. Here, we learn how rainfall (dry versus wet years) and distance to water (rivers, lakes, temporal pools) control herbivore populations. They also condition savanna fires, which are more common in wet years (when more grass is left ungrazed) and far from water bodies (where the density of grazers is lower). Because some herbivores (e.g., elephants) can kill big trees, areas far from water pools also provide a refuge for vulnerable trees. Owen-Smith emphasizes the thin line between scavengers that seek dead animals and predators that kill, a line that was probably crossed during human evolution. A distinguishing feature of Africa's fauna is its diversity and abundance of medium to large grazing ruminants; it was richer during the Pleistocene—richer than on any other continent at that time (before the late Pleistocene extinctions). Owen-Smith suggests that the seasonal concentration of these animals near water bodies would make easy catches for a hungry hominid, especially during droughts, when herbivores starve.

The author devotes the last section of *Only in Africa* to the evolutionary

BioScience 72: 705–706.
https://doi.org/10.1093/biosci/biac018 Advance Access publication 22 March 2022

pressures that drove forest-dwelling, fruit-eating primates to become savanna-inhabiting bipedal hunters. Primates are forest animals that mostly eat fruit and leaves, while supplementing their diet with insects and eggs. The African droughts during the Pliocene glaciations opened the landscape and forced some apes to change their habitat and diet. Owen-Smith argues that, as aridity intensified, some apes started to combine open spaces (during the day) and forests (during the night to avoid carnivores). An increase in aridity meant that the distance between tree patches increased, and so moving between those patches would have stimulated bipedalism. Once in the savanna, these apes would benefit from tubers, rhizomes, and fires; fire foraging (Gowlett 2016) would provide occasional roasted animals. And during intense droughts, these apes would desperately eat dead (or starving) herbivores next to dry water pools. This would diversify their diet and then stimulate the development of hunting tools, hunting strategies, and social interactions. Owen-Smith suggests that a key innovation would have been the bow with poisoned arrows; only this would kill large animals. This technology would facilitate exploring new environments with hunting opportunities—and would also allow those humans to be competitively superior to their congeneric species (the Neanderthals) when they moved to Eurasia. Were these technologies responsible for the Pleistocene extinction of the largest African mammals, such as several rhino species or the Reck's elephant (a huge grass-eating elephant, the largest that ever lived)? Owen-Smith proposes that the main driver of extinction would have been the lack of grasses to maintain those big animals. This reduction in grass would have been mainly driven by aridity and perhaps by humans setting grassfires. Hunting would have also contributed to their extinction, suggests Owen-Smith, but humans would unlikely target the largest animals.

After this long history of interactions between humans and other animals, it is to be understood that African fauna were too scared of humans to be tamed, and no wild animals were domesticated in Africa. Domestication of herbivores and vegetables started in the Fertile Crescent and was then brought back to Africa. The book ends with a few words for the future: To preserve Africa's wildlife and our ancestral habitat, "the priority is for people living alongside wild animals to benefit economically, improve their livelihoods, educate their children, empower women with controls over their fertility and settle within cities."

Humans originated in Africa, but whether this was the only possibility is difficult to prove. But *Only in Africa* provides a convincing and scientifically sound argument and is an excellent book for understanding Africa's ecology. The book has many color pictures and is divided into 20 short and easily read chapters, each ending with a helpful synthesis section. *Only in Africa* may seems shallow in some of the many topics covered; however, each chapter is supported with a rich list of scientific papers that are an updated source of information for those who want to dig deeper into the details. *Only in Africa* is not another book on human evolution but a book focused on the ecological context and evolutionary pressures that drove the human evolution; through this, it outlines the unique significance of Africa for humanity. Owen-Smith has crafted a book for a broad audience interested in savanna ecology, Africa's nature, anthropology, and human evolution. *Only in Africa* is also a call for the appreciation and conservation of African biodiversity—the cradle of a series of unrepeatable events that shaped our ancestry.

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doi:10.1093/biosci/biac018