



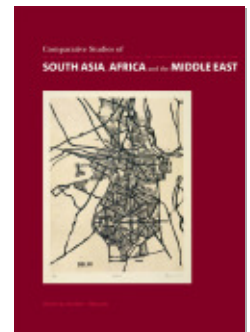
PROJECT MUSE®

Territorial Claims: Experts, Antelopes, and the Biology of Land Use in Uganda, 1955-75

Etienne Benson

Comparative Studies of South Asia, Africa and the Middle East, Volume 35, Number 1, May 2015, pp. 137-155 (Article)

Published by Duke University Press



➔ For additional information about this article

<http://muse.jhu.edu/journals/cst/summary/v035/35.1.benson.html>

Territorial Claims

Experts, Antelopes, and the Biology of Land Use in Uganda, 1955–75

Etienne Benson

In the twentieth century, the conservation of endangered species was commonly articulated in spatial terms: certain species were to be preserved by preserving the spaces or habitats in which they lived. Conservation thereby became part of a broader project of spatial biopolitics through which governments sought to regulate the human and nonhuman populations within their territories. This project was pursued with the aid of various kinds of experts, including development economists, scientific foresters, population biologists, anthropologists, ecologists, agricultural experts, and urban planners. These experts claimed to be able to determine the optimally productive use of each piece of land in light of particular social values, such as the accumulation of wealth, the preservation of social order, the security of the state, or the maintenance of the balance of nature. Although sometimes articulated in oppositional terms, endangered species protection was of a piece with this larger project. It was oppositional mainly in the sense that it sought to include the interests of certain nonhuman forms of life within an overwhelmingly anthropocentric framework of calculation.¹

Conservation biologists sought to assert the territorial claims of endangered species in a crowded field of competing forms of expertise, each offering an alternative set of criteria or guiding principles for the allocation of land and of rights to land use. Twentieth-century development economists and agricultural experts, for example, tended to argue for the allocation of the most fertile land to large-scale, capital-intensive farming practices that generated surpluses exchangeable for cash on global markets; less profitable practices such as pastoralism, they argued, could be restricted to “marginal” land. In contrast, conservation biologists offered a spatial-political vision ordered by the ecological integrity of the entire web of life or by the aesthetic or scientific value of particular forms of life. They argued that those pieces of the nation-state’s territory that were productive of particularly valued forms of nonhuman life, or of a particularly large number of valued forms (that is, “biodiversity hotspots”), should be protected as national parks or scientific preserves. These areas sometimes included precisely those marginal lands to which pastoralists had been restricted by agricultural development. Wherever these competing forms

This article could not have been written without the invaluable research assistance of Mala Shah or the support of Department II, directed by Lorraine Daston, of the Max Planck Institute for the History of Science in Berlin. I am also grateful to Kathleen Vongsathorn, who generously took time from her own research on the history of medicine and humanitarianism in Uganda to scan and share with me several hard-to-find reports from the Ugandan game and national parks departments.

1. On twentieth-century wildlife conservation as a spatial practice, see Wilson, *Seeking Refuge*; Alagona, *After the Grizzly*; Neumann, *Imposing Wilderness*; and Shetler, *Imagining Serengeti*. On colonial and postcolonial conservation in Africa as a productive (capitalist) practice, see Garland, “The Elephant in the Room.”

of expertise came into play, conflicts emerged; this remained the case despite late twentieth-century efforts to reconcile them under the rubric of sustainable development.²

One consequence of such conflicts was the elaboration, within each of these fields of spatial-biopolitical expertise, of increasingly sophisticated ways of justifying the allocation of land to particular purposes. A form of justification that became particularly important to conservation biologists in the mid-twentieth century was the concept of biological territoriality, which emerged as the subject of focused research in the interwar period and was put into use in the management of populations and territories after World War II. In mid-twentieth-century biology, territoriality was understood as a basic drive or instinct to claim exclusive rights to the use of a particular space, sometimes for the sake of control over material resources and sometimes as a token of social superiority over other members of the same species. Its discovery in a wide range of species suggested that the relationship between territory and population was socially mediated in animals as well as in humans, and that any effective population management regime would have to take social structures into account. In the words of the American wildlife biologist Helmut K. Buechner, an important contributor to this discovery, the discovery of territoriality made population management more than just a “numbers game.” It was also a game of managing the way in which animal individuals and populations laid claim to land.³

Though global in reach, the emergence of this social-spatial perspective on wildlife management is particularly visible in British East Africa in the postwar decades, where Buechner conducted the majority of his research. In the 1950s, Africa became the focus of internationally oriented European and North American conservationists, who saw it as the last chance to save a large, ecologically intact landscape with a full complement of large

herbivores and predators, albeit one threatened by pressures for development and lack of native support for conservation. The International Union for the Conservation of Nature and the World Wildlife Fund made African wildlife their first priority in the 1950s and 1960s, as did national organizations such as the New York Zoological Society and the Frankfurt Zoological Society. This interest had both political and scientific consequences. In British East Africa, as national independence for the territories of Uganda, Tanganyika, Zanzibar, and Kenya appeared increasingly likely over the course of the 1950s, American and colonial British biologists launched an intensive effort to study their resident wildlife. Among its other results, this research helped establish the phenomenon of territoriality as an important consideration in wildlife management.⁴

In addition to its significance for the history of wildlife conservation, the phenomenon of biological territoriality provides an opportunity to rethink the relationship between colonial structures of power and the development of natural knowledge. Territoriality was neither merely a naturalization of the idea of private property or state sovereignty nor simply a fact of nature discovered by disinterested observers. In the 1950s and 1960s, Buechner and other biologists conducted studies of African wildlife that generated clear evidence of territorial behavior. The Uganda kob, for example—a midsized species of antelope—displayed a rigid breeding system in which males competed to lay claim to small patches of grass; females then preferentially mated with those holding the high-status patches. Buechner and his peers had good reasons to see this behavior in territorial terms, and scientists today continue to do so. But these discoveries cannot be disentangled from the colonial situation in which they were made. Colonial land regimes made it possible for animal populations to manifest territorial behavior and for scientists to observe it; those scientists’ territorial

2. On agricultural experts and development economists, see Tilley, *Africa as a Living Laboratory*. On the emergence of the framework of sustainable development, see Borowy, *Defining Sustainable Development*, and World Commission on Environment and Development, *Our Common Future*.

3. This kind of management could be authoritarian, but it was not necessarily so; cf. Guha, “The Authoritarian Biologist,” and Agrawal, *Environmentalism*. On the “numbers game,” see Helmut K. Buechner (hereafter HKB) to John A. Bindernagel, September 19, 1967, in folder “Kob, general correspondence, 1965–1969,” box 6,

Record Unit 7279, Smithsonian Institution Archives, Washington, DC (hereafter Buechner Papers).

4. See Adams, *Against Extinction*; Wöbse, *Weltnaturschutz*; Lekan, “Serengeti Shall Not Die”; and Shetler, *Imagining Serengeti*.

theories, in turn, justified colonial and national reforms of those same land regimes. The human exercise of power over land thus influenced both the structure of animal societies and the form taken by knowledge about those societies.⁵

Such relationships between power and knowledge can be difficult to characterize in general terms, but they become clearly visible in the quotidian practices of science, where the importance of social relations, equipment, place, and the conditions of everyday life becomes difficult to ignore. In the remainder of this essay, I consider how the colonial situation in British East Africa in the 1950s and 1960s motivated, facilitated, and was—to a small but nontrivial extent—reshaped by the work of Buechner, who first arrived in Uganda as a Fulbright scholar in 1956. The quotidian conditions of Buechner's work, as well as the scientific theories and biases that he brought with him, were essential to his understanding of territorial behavior in the Uganda kob. This understanding, in turn, influenced his approach to East African wildlife conservation, which contributed to a broader biologization of the field. In the wake of Buechner's work and that of his colleagues, territoriality became one of the conservation biologists' tools for determining the optimal allocation of land in competition with other forms of spatial-biopolitical expertise. It was not the only such tool, and Buechner was not the only one who developed it, but his work from the mid-1950s until his untimely death in 1975 suggests how colonial power simultaneously reshaped animal and human societies and what could be known about them.⁶

The Colonial Conditions of Wildlife Research

The person responsible for bringing Buechner and a number of other American wildlife experts to Uganda from the mid-1950s to the early 1960s was Bruce G. Kinloch, one of the most influential figures in East African wildlife conservation during the decades after World War II. Kinloch had a background neither in science nor conservation but rather in the British colonial military. Born in

India and educated in England, Kinloch had led a battalion of the Gurkha Rifles during the Second World War before turning his skills to wildlife conservation in East Africa after India's independence. Following a brief stint as a game ranger in Kenya, he served as chief warden of Uganda from 1950 to 1960 and of the neighboring territory of Tanganyika from 1960 to 1964. Concerned about the difficulty of recruiting native Africans for work in wildlife management and the prospects for post-colonial conservation, Kinloch played a leading role in the establishment of the largely US-funded College of African Wildlife Management in the early 1960s. Although Tanganyika was his last post as chief game warden, he continued to consult on wildlife conservation in Botswana, Malawi, and the Cape Province into the 1970s. His memoirs of his time as game warden, including *The Shamba Raiders* (1972), influenced British and American understandings of the transition from colonial to post-colonial conservation in East Africa.⁷

The idea of inviting American biologists to study Uganda's wildlife and to advise on its management emerged in the mid-1950s from Kinloch's conversations with Lee Talbot, an ambitious young American biologist conducting a survey of East African wildlife conservation under the auspices of the International Union for the Conservation of Nature. Kinloch, like Talbot, was an enthusiastic advocate of science-based wildlife management. He believed that East African conservation in the postwar years had become mired in a dogmatism that made it nearly impossible to scientifically manage wildlife populations. Instead of allowing national parks to be managed, preservationists had attempted to prevent all human intervention, with the result that certain populations expanded out of control while others collapsed. Through discussions among Talbot, Kinloch, and the colonial administration in Entebbe early in 1956, it became clear that the recently established Fulbright program would make it possible to bring American biologists to Uganda for a year or two of intensive research and consultation. The arrival of Buechner

5. On the history of scientific research on animal societies, see Clutton-Brock et al., "Introduction: The Evolution of Society."

6. I start from the assumption that articulations and analogies between human and animal societies were, although often unjust, not inherently so; cf. Mavhunga, "Mobility and the Making of Animal Meaning."

7. The raiders in question were elephants. See Kinloch, *Shamba Raiders*, and Kinloch, *Tales from a Crowded Life*.

and other American biologists later that year, Kinloch later recalled, “had an effect like the slow but steady opening of the flood gates of a dam. One by one the scales fell from official eyes and slowly but surely effective opposition to a number of my ideas and plans faded and disappeared.” The apparently modest, hard-nosed, science-based advice of the Fulbright scholars was, Kinloch wrote, a “shot in the arm” not only for Uganda but for East Africa as a whole.⁸

Kinloch’s assessment of the significance of the American experts suffers from a certain amount of hyperbole and self-congratulation, but it nonetheless contains a grain of truth. Biological considerations had not been entirely absent from East African game conservation before the 1950s. The Americans singled out by Kinloch were joined, and in some cases preceded, by British, German, and South African scientists and conservationists advocating similar principles. As early as the 1940s, conservation in British East Africa (as in South Africa) had already begun to shift noticeably in the direction of more biologically informed management. Nonetheless, beginning in the 1950s, biological and ecological expertise played a markedly more important role than it had previously, and the Fulbright program that sent a series of American wildlife biologists to British African territories from the mid-1950s to the mid-1960s helped consolidate that new importance. This was particularly the case in Uganda, whose wildlife populations had been deemed less spectacular than those of Kenya and Tanganyika and had received less attention. If nothing else, the American experts gave colonial game wardens ammunition to fight their internecine battles in the form of scientific reports, personal testimony, and international networks of authority. It was a role that the Americans were eager to play, even if they did not always completely understand the local stakes.⁹

Kinloch was particularly interested in using the American experts to promote so-called positive wildlife management against what he saw as a well-

entrenched preference for “negative” measures. Whereas negative management focused on limiting the time, place, method, or target of hunting (especially native “poaching”), positive management focused on actively manipulating populations of animals inside as well as outside the borders of parks and reserves. In the United States, the shift from negative to positive wildlife management had been the main project of Aldo Leopold and other founders of a new field known as “game management” or “wildlife management” during the 1920s and 1930s. Leopold, who had been trained in scientific forestry before turning to wildlife conservation, advocated the manipulation of habitats and the “cropping” of wildlife populations—that is, the regular, planned killing of a certain percentage of the annual production of wild animals in order to extract value while maintaining the stability of the biotic community. Like Kinloch a few decades later, Leopold took this position in reaction to what he perceived as an ossified conservation establishment focused solely on restrictions on hunting. Scientific wildlife management, he argued, would render parts of the American landscape productive of aesthetic, scientific, and ecological values ignored by mainstream agricultural experts.¹⁰

Even before the arrival of the first American experts in 1956, Kinloch had taken steps to strengthen this approach in the Ugandan Game and Fisheries Department. Early in 1956, he appointed its first full-time biologist, A. C. Brooks, to survey the wildlife in the territory’s various game preserves and to identify problems deserving more intensive research. Nonetheless, the arrival of positive management in Uganda in the postwar period was closely tied to American scientific advisors. In the 1950s, reform-minded colonial administrators such as Kinloch, as well as international wildlife conservationists, had begun to consider the possibilities and perils of postcolonial conservation. Some continued to echo the paternalist-imperialist justifications for conservation exemplified by books such as Jim Corbett’s *Man-Eaters*

8. On the discussions with Talbot, see Uganda Game and Fisheries Department, *Annual Report, 1955–1956*, 16. For “opening of the flood gates,” see Kinloch, *Shamba Raiders*, 330–31. For “shot in the arm,” see *ibid.*, 326.

9. On the turn to science-based management of African wildlife and national parks from the late 1940s on, see Neumann, “Postwar Conservation Boom,” 31, and Carruthers, *Kruger National Park*.

10. On negative and positive management, see Kinloch, *Shamba Raiders*, 330. On game cropping, see Leopold, *Game Management*, and Newton, *Aldo Leopold’s Odyssey*.

of *Kumaon* (1944), which celebrated the glories of trophy hunting and the necessity of protecting “natives” from dangerous beasts, even while emphasizing the need for conservation. But others recognized that independent East African nations would find colonial nostalgia a weak justification for wildlife conservation. The American focus on using scientific research to guide the sustainable harvest of wildlife crops, whether in the form of sport-hunting trophies or locally consumed meat, provided an appealing alternative. Not insignificant at a time when colonial funds were scarce, the Americans also had money from both governmental and nongovernmental sources to pay for highly trained personnel and expensive equipment. The Fulbright fellowships represented only one component of a broader American effort to reform East African wildlife conservation along more scientific and managerial lines.¹¹

In part because of the positive impression made by the Fulbright scholars, there was widespread support for involving scientists in wildlife management in the colonial administration in Uganda in the late 1950s. In a 1958 report, R. L. E. Dreschfield, the chairman of the trustees of the Ugandan National Parks, praised the work of Buechner and another Fulbright scholar as “invaluable.” The following year, he again expressed his support for increasing scientific research in the parks, “as it is only by such study that proper programmes of development can be drawn up.”¹² Kinloch’s assessment was, perhaps not surprisingly, even more enthusiastic. “As a result of the investigations of the Department’s Biologist and visiting Fulbright scholars,” he reported in 1960, “Uganda has been given the lead in East and Central Africa, and probably the African Continent as a whole, in the introduction of varied schemes for wildlife management based on detailed scientific research.” Both the national parks and game

departments thus supported a turn toward the science-based management of pieces of land designated for the production of valued wildlife, which would be valuable both as a source of protein and as a tourist attraction. A major turning point came with the Game (Preservation and Control) Ordinance of 1959, which authorized controlled hunting and “cropping” in game preserves. Biological territoriality emerged in this context as an important concept for understanding and administering animal populations and territories.¹³

The American Wildlife Expert in Uganda

Helmut Buechner was one of three biologists who made up the first wave of American Fulbright wildlife scholars in Uganda. He and his wife, Jimmie Buechner, and their daughter arrived in western Uganda in October 1956 from Pullman, Washington, where Buechner had been teaching zoology at Washington State College for the previous eight years. To get to Buechner’s intended field site they traveled to Entebbe by air and thence by land to Masindi in western Uganda, just south of Murchison Falls National Park. The family’s first week in Masindi was taken up with recovering from the trip and hiring servants to manage the “mansion of a house” that Kinloch had arranged for them. Over the next two years, with Jimmie’s assistance, Buechner conducted research on elephants and antelope. Their joint discovery of the territorial behavior of the Uganda kob was particularly significant. While research on elephants and hippopotamuses attracted the most widespread attention both within and beyond Uganda, Buechner’s reports on kob territoriality showed that findings with broad implications for the biological evolution of social structures could emerge from wildlife research in Africa, even as they provided practical guidance for the management of territories and populations.¹⁴

American conservationists had been inter-

11. On the appointment of Brooks, see Uganda Game and Fisheries Department, *Annual Report, 1955–1956*, 9. On conservation in the British Empire, see Corbett, *Man-Eaters of Kumaon*, and MacKenzie, *Empire of Nature*. On scientific advisers, see Tilley, *Africa as a Living Laboratory*, and Mehos and Moon, “The Uses of Portability.”

12. For Dreschfield’s comments, see Trustees of the Uganda National Parks, *Report, 1958*, 3, and Trustees of the Uganda National Parks, *Report, 1959*, 1.

13. For Kinloch’s comments, see Uganda Game and Fisheries Department, *Annual Report, 1958–1960*, 17. On the 1959 law, see Uganda Game and Fisheries Department, *Annual Report, 1958–1960*, 14.

14. HKB to Ava [?], n.d. (October–November 1956?), folder “Buechner, Helmut K., correspondence filed at Washington State College during African stay, 1956–1958,” box 3, Buechner Papers. The other two Fulbright scholars who arrived in 1956 were George A. Petrides, a professor of zoology and wildlife management at Michigan State University, and Wendell G. Swank, the director of research for the Arizona Fish and Game Department; see “American Fulbright Scholars in Africa.”

ested in Africa since at least the time of Theodore Roosevelt's postpresidential safari, but it was only during the post-World War II period that they became important players in African wildlife conservation. After the war, members of the American Committee for International Wild Life Protection, founded in 1930, played leading roles in the establishment of the International Union for the Conservation of Nature and helped raise concern about the fate of Africa's wildlife. One of the influential Americans involved in both the American Committee and the postwar international organizations was the Harvard zoologist Harold Coolidge, who had visited Liberia on a specimen-collecting expedition in the late 1920s. In a letter sent to Buechner a month before his departure for Masindi, Coolidge described his Fulbright-funded project in Uganda as "a pioneer, pilot project which will have considerable importance to the future of wildlife conservation and game management in Uganda, the rest of East Africa, and potentially in other areas throughout the world, as well as on future American opportunities in this field." Unlike Coolidge, Buechner and the other Fulbright scholars had the opportunity to conduct extensive observation in situ. This opportunity for long-term research in close collaboration with local game management authorities encouraged a shift toward behavior and ecological research and away from the kind of natural-history collecting practiced by Coolidge's generation.¹⁵

Buechner's professional background was fairly typical for a wildlife biologist of his generation, if perhaps unusually well suited for addressing the conflicts between wildlife conservation and livestock raising common in East Africa. Born in 1918 in upstate New York, he studied forestry, zoology, and wildlife management before taking a position as a field biologist for the Texas Cooperative Wildlife Research Unit. After serving in World War II as a B-25 bomber pilot in the Mediterranean theater, he returned to Texas to continue

studying livestock-wildlife conflicts. This became the topic of his doctoral dissertation, which was completed at the Oklahoma Agricultural and Mechanical College in 1949. As returning soldiers flooded into universities and sought opportunities for recreational hunting in their leisure time, the field of wildlife management boomed, and Buechner quickly advanced in the profession. His dissertation on pronghorn antelope in Texas was published in the *American Midland Naturalist* in 1950 and received a prestigious award from the Ecological Society of America. In the eight years he spent teaching at Washington State before his first trip to Uganda, he helped expand the college's biology curriculum and launched studies of the region's deer, elk, and bighorn sheep.¹⁶

Like most of the American and British wildlife biologists working in East Africa in the late 1950s, Buechner saw wildlife preservation as a means of economic development, albeit one based on different assumptions than those governing the work of agricultural experts and development economists. Steeped in the American model of wildlife management developed by Leopold and others, with its roots in sustainable-yield forestry, he was convinced both that wildlife had values that went beyond the strictly monetary and that it would have to pay if it was to survive. Tourism was one obvious way of converting wildlife to hard cash, but it was clear to many in the late 1950s, as the possibility of independence grew more imminent, that a strategy that focused solely on marketing African wildlife to Europeans and Americans wealthy enough to pay for safaris would face serious political challenges. As a result, from the mid-1950s to the early 1960s, Buechner and his fellow Fulbright scholars focused on the possibility of harvesting wild game for meat, whose value they assumed would be self-evident to native Ugandans. From an ecological perspective, they also believed that establishing programs for "cropping" wildlife would provide a mechanism for reducing wildlife

15. Harold J. Coolidge to HKB, August 30, 1956, folder "Uganda Protectorate—General and unidentified correspondence, 1956–1958," box 3, Buechner Papers. On Roosevelt's safari, see Mitman, *Reel Nature*, 5–20; on the American Committee, see Barrow, *Nature's Ghosts*, 135–67.

16. On Buechner's career, see Buss and Eisenberg, "Helmut K. Buechner, 1918–1975," and Eisenberg and Kleiman, "Helmut K. Buechner, 1918–1975." Buechner's award-winning essay was "Life History, Ecology, and Range Use of the Pronghorn Antelope in Trans-Pecos Texas." On livestock-wildlife interactions, see Buech-

ner, "The Range Vegetation of Kerr County, Texas, in Relation to Livestock and White-Tailed Deer."

populations that might otherwise become so abundant that they damaged vegetation and harmed other species.¹⁷

Influenced by their experiences with conflicts among hunters, ranchers, and wildlife conservationists in the United States, Buechner and the other Fulbright scholars who worked in East Africa in the late 1950s initially approached the prospect of game cropping through the lenses of carrying capacity and maximum sustainable yield. One of their basic assumptions was that a given area of land was capable of supporting only a certain number of animals of a particular species, and that when those limits were transgressed, vegetation and other species would suffer long-term harm. Another was that the largest sustainable crop of meat could be obtained when the population was kept at some optimal number lower than the maximum, at which the rate of growth would be at its highest. Finally, they assumed that native species were more efficient at converting plants into protein than domesticated cattle, and that a diverse collection of wild species would be more efficient and productive than a single domesticated species. This last assumption was crucial for shaping their understanding of the impact of indigenous pastoralism on marginal lands. It suggested that the optimal use of such lands was for the production of wildlife, both as an aesthetic and scientific resource and as an ecologically resilient supply of protein.¹⁸

The focus on harvestable wild protein may explain Kinloch's decision to introduce the Nile perch to the Lake Victoria basin in the mid-1950s, which even at the time seems to have been in violation of regulations prohibiting the introduction of invasive species. In any case, it was consistent with an overarching concern with the practical value of Uganda's wildlife as a protein source during this period. With Kinloch's encouragement, Buechner and the other Fulbright wildlife scholars devoted much of their effort to determining where and

how East Africa's wild game could be sustainably harvested. Buechner's initial research focused on patterns of elephant movement across the landscape. This was a subject of equal interest to hunters who wanted to harvest elephant ivory and meat, farmers whose crops were at risk of depredation, and conservationists and animal welfare activists who wished to protect elephants from harm. The colonial parceling of the landscape into areas exclusively devoted to high-value cash crops, pastoralism, or wildlife preservation was relatively rigid in comparison to earlier land use regimes, and the elephants' movements across the borders between each of these areas in search of food and water increasingly led to clashes with human land use. Biological research promised to reveal how elephant land-use patterns had been influenced by, and could potentially be reconciled with, the colonial land regime.¹⁹

Discovering the Territoriality of the Uganda Kob

Despite the importance and attraction of elephants, it was another species that soon absorbed all of Buechner's attention. The Uganda kob is a medium-sized antelope that was then abundant in Uganda, gathering in herds of thousands on the Semliki Flats south of Lake Albert and in smaller numbers elsewhere in the western part of the country. Compared to the elephant, it was less charismatic in international conservation circles, less valuable financially, and less dangerous to rural Africans, but its size, abundance, and palatability made it, in Buechner's view, one of the most promising candidates for a sustainable wildlife crop for Uganda, particularly in regions where tsetse fly populations made raising livestock difficult. If a certain proportion of the kob population could be converted into meat and made available to rural Ugandans, he believed, biologists and conservationists would have a powerful argument for stemming the tide of pastoralism and agricultural development that seemed to threaten African wildlife's last refuges. This belief put Buechner

17. On game cropping, see Adams, *Against Extinction*, 217–20; Kinloch, *The Shamba Raiders*; and Carruthers, "Wilding the Farm or Farming the Wild."

18. See Petrides and Swank, "The Status of Wildlife and Wilderness Areas in East Africa," and Talbot, "A Survey of Past and Present Wildlife Research in East Africa." Some of this logic reflected the use of the logistic curve by fisheries and wildlife management experts in the

mid-twentieth century, despite lack of clear evidence that it obtained outside of very particular conditions in the laboratory. See Kingsland, *Modeling Nature*, 50–76.

19. On the Nile perch project, see Johnson, "Managerial Technologies," 256–57.

at loggerheads with native Ugandans trying to defend their rights to grazing and farmland, with international agricultural development experts, and with preservationist-minded conservationists. His research on kob populations was thus partly aimed at convincing authorities to allow wildlife cropping despite opposition, for different reasons, from each of these groups.

Driven by an interest in sustainable harvests of wildlife meat, Buechner's initial research was strictly demographic. He sought to determine the age structure of the kob population, the reproductive rate of females, and the key environmental factors that affected the growth or decline of populations. Because reproductive biology was essential for answering these questions, Buechner initially sought permission to "collect" several hundred kob from the herds in the Toro Game Reserve, which was located between the town of Fort Portal and the southern tip of Lake Albert. Neither the logistics nor the politics of such research were simple. Buechner's correspondence with local officials and colleagues in the United States during his first year in Uganda is full of complaints about the obstacles placed in his way. These included the otherwise supportive Kinloch, who warned Buechner that the large number of kob he planned to kill had "rather shaken people in 'official circles,' who consider that we must be careful about local repercussions." Allowing a foreign scientist to kill hundreds of animals in the midst of an ongoing campaign against illegal hunting by local hunters seemed likely to raise hackles. Only in the summer of 1957 did Buechner first receive permission to proceed, and then only after promising that he would carefully explain the objectives of his research to the provincial commissioner so that the latter could defend it to "leading Africans."²⁰

While Buechner busied himself with acquiring permits, arms and ammunition, and eventually the bodies of twelve to fifteen Uganda kob per month, his wife, Jimmie, was observing kob herds from observation platforms they had erected in the Toro Game Reserve, which they hoped would reveal details of kob mating behavior. This work, although initially seen as secondary in importance to Buechner's physiological and demographic research, eventually led to the most significant finding to come out of the Buechners' time in Uganda.²¹ Something like territorial behavior had been described in ungulates before, particularly during the breeding or rutting season, but the level of complexity and apparent rigidity of the territorial social system that Jimmie Buechner observed in the Uganda kob nonetheless struck both her and her husband as unprecedented. Male kob seemed to defend their territories not because they guaranteed access to scarce resources but because they represented high social status. As Helmut Buechner described it in a 1957 letter to a colleague at Pullman:

The males set up small territories adjacent to one another. The circles are only 20–30 feet across and there might as well be chalk lines around them. If a male crosses there is a good fight. The lines are really respected, but there is also the influence of peck order and a big male may take liberties others cannot. The little females come walking into the territories and stay if they like what they find—or move on if not satisfied.²²

Familiar to biologists from certain species of birds, such a breeding system, known as a lek, had never before been reported in a mammal. Its discovery in the kob suggested that territoriality might be far more widespread within the animal kingdom than previously suspected. By the 1950s, the term *territory* already had a rich history of cross-

20. On possible repercussions, see Bruce G. Kinloch to HKB, February 21, 1957, folder "Kinloch, Bruce G., 1956–1958," box 3, Buechner Papers. On "leading Africans," see HKB to Provincial Commissioner, Western Province, Fort Portal, June 2, 1957, folder "Uganda Protectorate—General and unidentified correspondence, 1956–1958," box 3, Buechner Papers. Early results of this research were reported in Buechner, "Unilateral Implantation in the Uganda Kob."

21. Buechner, "Territorial Behavior in Uganda Kob." Although Jimmie was never credited as a coauthor on this work, Helmut was consistent in acknowledging the importance of her "keen observation and unbiased interpretation" both for the initial observation and for later, more detailed investigations. Such husband-wife collaborations were not unusual for biologists working in the field at the time, but the extent to which Jimmie's discovery reoriented Helmut's entire research program until his death a decade and half later is distinctive. Earlier examples of husband-wife collabora-

tions in field biology can be found in Kohler, *All Creatures*, 215–19.

22. Helmut noted that Jimmie deserved "credit for noticing this clearly even before I had it completely sorted out!" The Pullman colleague was Irven O. Buss, who later followed Buechner to Uganda as a Fulbright fellow. HKB to Irv, September 14, 1957, folder "Buss, Irven O., 1956–1958," box 3, Buechner Papers. On theories of female choice and breeding systems during this period, see Milam, *Looking for a Few Good Males*.

ing and recrossing the human-animal border that stretched back to the beginning of the twentieth century. Reports of animals defending particular areas against other animals of their own species go back to antiquity, but it was only in the late nineteenth and early twentieth century, as the modern discipline of biology emerged, that territoriality was first situated within an evolutionary scheme and linked to the regulation of populations. The term *territory* itself was not used widely by biologists until the beginning of the twentieth century, when it was popularized by the British ornithologist Henry Eliot Howard. It was not until the late 1920s, moreover, that territory in Howard's sense became a major focus of interest among European and North American zoologists and naturalists, with ornithologists leading the way. Between the 1920s and the 1950s, territorial behavior was discovered in an increasing variety of species, and by the time of the Buechners' research in Uganda some biologists and popularizers of biological research were arguing that it was as fundamental a biological instinct as the drive to eat or to mate.²³

Recognizing that the discovery of territoriality in the kob potentially represented a breakthrough in evolutionary biology as well as in wildlife management, Buechner largely set aside his research on elephants and reframed his studies of demographics and the physiology of kob reproduction in terms of their relationship to the social-spatial structure of the population. To do so, he deployed many of the new tools of identification and observation that wildlife biologists had adopted in the previous decades, including tranquilizing darts and drugs, plastic collars and identifying tags, and motion films. In late 1957, around the same time he wrote the description of the kob's territorial system quoted above, Buechner contacted Kinloch about obtaining the necessary equipment to make a film of the kob. The finding was "one of the hottest results" of his research in Uganda,

he explained, and a film "would be dramatic and attract much human interest," potentially leaving "lasting impressions . . . with a vast audience."²⁴ This was neither the first nor the last time that a research tool would be chosen with an eye toward public audiences. More than just self-promotion on Buechner's part, the film was also an attempt to capture a complex phenomenon visually and to heighten the value of the otherwise comparatively unspectacular kob as an object of tourism.²⁵

Buechner was convinced not only that the kob's territorial behavior was worthy of interest beyond the scientific community, but also that it was essential to understanding the species' population dynamics. In particular, he suspected that territoriality helped the population maintain its balance in relation to the available resources—for instance, in the case of kob, grass and water. As Buechner explained to Kinloch after a summer of filming in 1959, his main hypothesis was "that territoriality functions in the natural regulation of numbers." The male kob's competition over high-value territories, he thought, might limit the growth of the population and prevent it from expanding beyond its resource base. Territoriality, in other words, could be a form of Malthusian "negative check" that operated throughout the animal kingdom. Perfectionist as a writer and exceedingly cautious in his interpretation of evidence, Buechner made no mention of these larger stakes in a report on kob territoriality published in the journal *Science* in 1961. In the following decade, he remained reticent even as others made bold claims for or against such population regulation mechanisms in both animals and humans. As other scientists followed his lead in investigating territoriality in the kob and other African antelope species, however, it became undeniable that, whatever their ultimate cause or significance might be, powerful social mechanisms were at work shaping how animal populations distributed themselves across the landscape.²⁶

23. Howard, *Territory in Bird Life*. On the history of territoriality in ethology, see Burkhardt, *Patterns of Behavior*, 96–97. On the history of ideas of balance and equilibrium in ecology, see Worster, *Nature's Economy*.

24. HKB to Bruce G. Kinloch, September 22, 1957, folder "Kinloch, Bruce G., 1956–1958," box 3, Buechner Papers. On the use of tranquilizing drugs, see Buechner et al., "Control of African Wild Animals."

25. On the central role played by film both in the development of ethology as a discipline and in the growth of interest in African wildlife in the postwar period, see Mitman, *Reel Nature*, 59–84; Mitman, "Pachyderm Personalities"; and Beinart and McKeown, "Wildlife Media and Representations of Africa."

26. For the quote on the regulation of numbers, see HKB to Bruce G. Kinloch, November 25, 1959, folder "Kinloch, Bruce G., 1958–1962," box

4, Buechner Papers. Further details on research on kob by Buechner and his collaborators can be found in Buechner, "Territorial Behavior in Uganda Kob"; Leuthold, "Variations in Territorial Behavior"; and Buechner and Roth, "The Lek System in Uganda Kob Antelope." On understandings of population regulation mechanisms among biologists and wildlife managers in the mid-twentieth century, see Borello, *Evolutionary Restraints*, and Young, "Defining the Range."

This discovery was enabled in crucial ways by the late colonial spatial-biopolitical context in which Buechner and the other Fulbright scholars conducted their research. Their very presence in Uganda was, of course, the result of Kinloch's desire to generate scientific evidence supporting the "positive" management of wildlife populations in Uganda's various parks and preserves. Without this local (colonial) motivation and the kinds of everyday material and social support it provided, the American biologists' long-term research projects would have been extraordinarily difficult, if not impossible, to carry out. Moreover, the existence of national parks and game preserves provided spaces within which scientific research could be carried out with less disruption from hunting, farming, or other kinds of disturbance than in nonprotected spaces. The parts of the landscape set aside by colonial regimes for the preservation of wildlife were thus repurposed as territories for science. Places like the Toro Game Reserve afforded the construction of the Buechners' observation towers, for example, from which the kob's territoriality became visible. Moreover, that territoriality was itself, in a very concrete sense, a product of the colonial regime. In areas forcibly cleared of human residents and their livestock earlier in the twentieth century in the course of campaigns against the tsetse fly, populations of kob and other wildlife boomed. As research by Buechner and his collaborators later revealed, Uganda kob only manifested their territorial breeding system in its most complex form when populations reached and maintained high densities. The designation of certain parts of the colonial landscape as optimally suited to the production of wildlife thus provided scientists opportunities to observe the kob's territoriality, on the one hand, and provided kob opportunities to behave territorially, on the other.²⁷

Territorializing Colonial and Postcolonial Conservation

Like many other biologists of his generation, Buechner was strongly influenced by neo-

Malthusian thinking and was convinced that one of the greatest threats to the survival of African wildlife was the growth of the human population. Inasmuch as biological territoriality was an evolved social mechanism that regulated population in relation to resources—a hypothesis that he found highly plausible, even if strong evidence was lacking—it was therefore potentially relevant for managing both wildlife and human populations. In one respect, it might offer suggestions for how to control human population growth in the face of limited resources, a problem that the kob appeared to have solved, albeit at the cost of a rigid and hierarchical social system. At the same time, perhaps more feasibly, information about animals' use of space would be useful for wildlife conservation as humans exploited more and more of the landscape. The kob's territoriality therefore served simultaneously as an analogy between human and animal societies and as a means of articulating them. If humans wanted to divide the landscape into areas optimally appropriate for the production of different values, the line of reasoning suggested, they would have to take the territorial claims of antelope and other nonhumans into account.

An emerging awareness of the complexity of the kob's social system was closely tied to belief in the practicability of cropping the population for meat, but it also complicated plans for cropping in at least two ways. Buechner believed that the kob's territorial breeding system was worth preserving as an object of scientific inquiry and as a spectacle for tourists. Any harvesting program that disrupted the kob's territorial behavior, he thought, would threaten these scientific and aesthetic values. It also appeared that the survival of the Uganda kob population might in fact depend on the continuation of its territorial "traditions," which helped maintain both social stability and genetic diversity. Once those traditions were disrupted, Buechner thought, there was no telling whether the kob population would continue to thrive, even if all of its material needs were satisfied. The discovery of the

27. On the role of researchers' expectations and experimental designs in the elicitation of animal behavior, see Despret, "Sheep Do Have Opinions," and Haraway, *Companion Species Manifesto*.

social structure of the kob population therefore made it impossible for biologists to keep thinking of wildlife management solely as a “numbers game”—a question merely of carrying capacity and maximum sustainable yield. It was now also about managing animal societies whose survival depended on their own territorial claims on the landscape.²⁸

Buechner was not alone among wildlife biologists in realizing the importance of social structure to population dynamics during this period, but he was one of the earliest and had one of the best-documented empirical examples to offer. His work was popularized by the science writer Robert Ardrey, who saw it as striking proof of the power of the “territorial imperative.”²⁹ Among his fellow biologists, as two of his colleagues at the Smithsonian recalled after his death in 1975, the “discovery of territorial behavior in the male of this species [that is, the Uganda kob] by Helmut and his wife, Jimmie, opened a new research dimension in game biology since it focused attention on behavior as a vital component for game management.”³⁰ Another commenter on Buechner’s work writing in the same year suggested that it “shows how comprehension of social systems can lead to enlightened management.”³¹ Perhaps the best-known work to emerge from an increased interest in the social structure of animal populations at this time was E. O. Wilson’s *Sociobiology*, also published in 1975. While Wilson’s sources were numerous, Buechner’s work played a crucial role in his chapter on territoriality by demonstrating that complex, rigid social patterns could be found among mammals. It thus helped Wilson build a bridge between conclusions drawn from his own specialty, the social insects, and the speculations in his controversial chapter on human behavior.³²

The “socialization” of wildlife biology and

population ecology also had had practical consequences for conservation, and specifically for conservation plans based around cropping. As Buechner explained at a conference on ungulate management in 1971, “To preserve genetic viability and the social organization of the population requires a pattern of harvest that protects territorial males, concentrates on young males in bachelor herds, and distributes the offtake [that is, harvesting] among the separate sub-units of the population.” It was particularly important, in Buechner’s view, to focus on killing young males in the bachelor herds, since the older males had already been naturally selected for genetic fitness. Cropping young males at random, in other words, was least likely to eliminate those high-quality males who would have survived natural selection pressures to eventually take possession of the best territorial grounds and have the opportunity to pass their genes on to the next generation. At the same time, by not killing males while they were in possession of territories, regardless of their age, managers could avoid causing social disorder that might threaten the orderly reproduction of the herd.³³

Discovering the way the kob and other wildlife partitioned the landscape in response to both ecological and social factors was one thing; convincing those who actually had the power to manage those animal societies to take these territorial claims into account was another. After his initial two-year stint in Uganda in 1956–58 and a short return visit in the summer of 1959, Buechner was able to spend another full year in Uganda in 1962–63 on a grant from the US National Science Foundation. Thereafter, he continued his studies of the kob mainly via the help of a younger Swiss biologist, Walter Leuthold. However, institutional shifts following Uganda’s independence in 1962, as

28. On the “numbers game,” see HKB to John A. Bindernagel, September 19, 1967, in folder “Kob, general correspondence, 1965–1969,” box 6, Buechner Papers.

29. Ardrey’s discussion of Buechner’s work can be found in Ardrey, *The Territorial Imperative*, 48. Buechner recognized that Ardrey played an important role in disseminating his work; Buechner, “Lek Behavior in the Uganda Kob,” 11. On Ardrey’s role as a science popularizer, see

Weidman, “Popularizing the Ancestry of Man.” Ardrey and Buechner maintained a correspondence for several years; see, for example, Robert Ardrey to HKB, January 8, 1964, and HKB to Ardrey, January 17, 1964, folder “A,” box 5, Buechner Papers.

30. Eisenberg and Kleiman, “Helmut K. Buechner (1918–1975),” 417. Eisenberg and Kleiman were, incidentally, another husband-and-wife biological team.

31. Barash, “Behavioral Ecology of Ungulates,” 758.

32. Wilson, *Sociobiology*, 332. Unlike Buechner, who emphasized the importance of female choice and the rarity of male coercion, Wilson suggested that dominant male kob controlled the females that entered their territories.

33. Buechner, “Implications of Social Behavior in the Management of Uganda Kob,” 853; see also *ibid.*, 866.

well as Buechner's obligations in the United States, made it increasingly difficult for him to establish the kind of lasting relationships that would have given him influence over Ugandan conservation policy. After Kinloch was lured away from Uganda in 1960 to become the chief game warden of Tanganyika, his post was taken by another non-native African game warden, Lawrence Tennant, who served through the transition to independence. Like Kinloch, Tennant was a believer in game cropping as a solution to human-wildlife conflicts and as a counterbalance to the threat of poaching.³⁴ In 1966, Tennant was succeeded by Sylvester Ruhweza, Uganda's first native chief game warden, with whom Buechner never seems to have established a significant relationship.³⁵

Despite continued statements of support, particularly under Tennant, the Ugandan game department after Kinloch's departure seemed less interested in the advice of American biologists than it had been before. The establishment of the British-led Nuffield research station in 1961 probably contributed to the decreasing importance of American advisers, who had helped fill a gap in interest among British wildlife biologists in the preceding years. There were nonetheless some promising developments. In 1964, Leuthold reported to Buechner that Tennant had agreed to create a kob sanctuary covering most of the main territorial breeding grounds in the Toro Game Reserve, where Jimmie Buechner had first observed the kob's territoriality in the late 1950s. Illegal hunting continued, however, as did the spread of cattle ranching onto marginal lands—often areas forcibly evacuated early in the twentieth century in response to epidemics of sleeping sickness spread by the tsetse fly, where wildlife populations had since flourished in the absence of competition from cattle. By 1965, after Ruhweza had replaced Ten-

nant as chief game warden, Buechner had begun to lose hope for Ugandan wildlife. In a letter to the Kenyan biologist Aloys P. Achieng, he wrote that he believed he was "witnessing the destruction of one of the finest ecosystems in the world where the opportunity to contribute to basic knowledge has not been fully appreciated."³⁶

By the mid-1960s, even though it still had its advocates, wildlife cropping had also begun to lose its appeal. One factor was the growth of the safari industry in Uganda, which had previously had a negligible industry in comparison to Kenya's. In the early 1960s, after the liberalization of sport hunting under the Game Act of 1959 opened up new possibilities, Ugandan safari operators began to undercut Kenya's industry by offering cheap tours that appealed mainly to middle-class Americans. Between 1963 and 1964, according to one report, the number of tourists in Uganda rose by 20 percent to nearly 11,400, while revenues doubled. A few years later, the number of tourists visiting the national parks of Murchison Falls and Queen Elizabeth alone surpassed 43,000. Tourism was not necessarily incompatible with game cropping, but it did lessen the apparent necessity to justify wildlife preservation by harvesting meat for local consumption. As the safari industry grew, parts of the Ugandan landscape that the American wildlife biologists had thought could best be used to produce protein had now become more valuable as sources of foreign currency.³⁷

A second factor reducing the appeal of game cropping in Uganda was that the experiments carried out between the late 1950s and early 1960s had not been outstanding successes from a commercial perspective, even if they had achieved some of their ecological goals. In 1964, reflecting on an influential IUCN-organized meeting on African conservation held several years earlier, Buechner

34. Tennant was quoted in one newspaper article as saying, "If we are to keep the game thriving and the public behind the conservation program, the game will have to be utilized." Don Shannon, "U.S. Breathing Life into African Big Game Hunting," *Los Angeles Times*, August 6, 1965.

35. In 1965, Tennant left Uganda to become chief game warden in Botswana; Child, "Growth of Park Conservation in Botswana," 52.

Ruhweza is briefly discussed in Robins, *Ebony Ark*, 144.

36. See Beadle, "Nuffield Unit of Tropical Animal Ecology." Walter Leuthold to HKB, February 3, 1964, folder "Leuthold, Walter, 1962–1965," box 5, Buechner Papers; HKB to Aloys P. Achieng, May 6, 1965, folder "A–C, 1962–1965," box 4, Buechner Papers. On the tsetse fly clearances, see Cioc, *Game of Conservation*, 14–57.

37. On the liberalization of hunting regulations, see Uganda Game and Fisheries Department, *Annual Report, 1958–1960*, 35. On the rise of the Ugandan tourism, see "Uganda Competes for Safari Clients," *New York Times*, November 25, 1962; "Cut-Rate Safaris Attract Tourists," *New York Times*, January 25, 1965; and "In Uganda, the Perch Weigh 200 Pounds," *New York Times*, February 5, 1968.

admitted that the “need for promoting the marketing of wild animals for meat to interest African people in the preservation of wildlife is perhaps being overemphasized.” Game cropping might still play a useful role in discouraging poaching, he thought, but over the long term it faced significant practical challenges and would, in any case, never be able to keep up with human population growth. It was therefore at best a temporary solution; as African populations grew, only intensified agriculture would be able to satisfy their protein needs. Under such circumstances, the optimal use of wildlife populations that were themselves limited by resources and, perhaps, by social structures—in the case of the kob, a rigid system of territoriality—was as a source of foreign currency through tourism.³⁸

Neither Buechner nor those concerned with overpopulation of elephants and hippopotamuses in East Africa’s national parks gave up on the idea of cropping completely, however. In 1971, looking back at the cropping of Uganda kob since 1963, Buechner noted that the program had managed to produce meat without notably disrupting the kob herds. During this period, approximately 1,000 animals had been harvested each year out of a population of around 18,000 in the Toro Game Reserve. Most of those harvested had been males in bachelor herds, who might someday acquire territories but were yet to do so; a smaller proportion, about 10 to 20 percent, were females. This cropping pattern closely followed Buechner’s recommendation to maintain the kob’s social structure and thereby preserve both a spectacular natural phenomenon and the balance of the kob population with its habitat. Between 1965 and 1968, many of Buechner’s ideas about kob sociality were also put to work in an experimental program of cropping under the administration of the Canadian biologist John Bindernagel in the Acholi region north of Murchison Falls National Park, where poaching had long been seen as a major problem.³⁹

If from a biological perspective the cropping program was satisfactory—that is, it seemed

to produce meat without disrupting the ecological balance or territorial traditions of the kob populations—its success as a commercial endeavor that would convince native Africans of the material value of their wildlife resources was modest at best. Cultural, economic, and logistical challenges kept people living near the parks and reserves from eagerly consuming the meat of antelopes, hippopotamuses, or other animals harvested within them. In Bindernagel’s Acholi experiment, for example, the absence of a dedicated slaughterhouse, reliable transport, or refrigerated storage made it virtually impossible to establish a regular harvesting schedule; instead, kob were killed only after a local middleman had received an order for meat. For this and other reasons, including a local preference for domesticated over wild meat, wildlife cropping never satisfied the high ambitions that Buechner, Kinloch, and others had for it in the late 1950s. Instead, pastoralism and agriculture continued to make inroads into the lands around protected areas, while tourism became the dominant revenue-generating activity with the parks. Nonetheless, the intense interest in cropping during this period suggests that the eventual dominance of tourism was not an inevitable consequence of foreign (and especially American) involvement in African wildlife conservation.

One result of the triumph of wildlife tourism (and, outside of the parks and reserves, of intensive agriculture) over cropping was that the kob’s territoriality took on a different significance than it had originally held. Rather than something to be taken into account within a well-regulated system of wildlife cropping that directly linked animal reproduction to human well-being, territoriality became a justification for defending and expanding protected areas devoted to tourism. Intensifying a process begun during the colonial era, the postcolonial landscape was divided into heavily exploited and populated agricultural or pastoral areas, on the one hand, and protected areas devoted solely to tourism and wildlife preservation, on the other. In this context, scientific knowledge

38. Buechner, “Conservation of African Wildlife,” 421. This neo-Malthusian argument resonated with two influential proto-environmentalist tracts published in the late 1940s: Osborn, *Our Plundered Planet*, and Vogt, *Road to Survival*.

39. See Buechner, “Implications of Social Behaviour in the Management of Uganda Kob,” and Bindernagel, *Game Cropping in Uganda*.

about the territorial behavior of particular species became a justification for establishing or expanding the borders of exclusive protected areas. This was not a phenomenon confined to Uganda. On the contrary, biologists working in many regions of the world began arguing on the basis of their studies of the territorial claims of various species of wild animals for the expansion of protected areas. In many cases, they claimed that the social organization and ecological needs of such species demanded the establishment of large reserves from which most or all human economic activities would be excluded; within these reserves, they argued, territory and other social mechanisms would allow animal populations to regulate themselves.⁴⁰

On a global scale, through an increasingly biologically based international wildlife conservation movement, the human allocation and distribution of land thereby became partially biologized in a way that took into account the social-spatial systems of certain forms of nonhuman life. The rapid global spread of this new, biologically based conservation does not mean that it was an unqualified success. In many places, conservation biologists' attempts to reform land use in light of the territorial claims and social structures of nonhuman populations were ignored in favor of the claims put forth by other kinds of experts. Moreover, the many deleterious effects of twentieth-century wildlife conservation on people whose own territorial claims were often ignored have by now been well documented. It is possible that things might have been even worse without conservation, which was hardly the only force that did not take the needs of the poor and powerless into account, but it is clear that actions were taken in the name of protecting endangered species and ecosystems that exacerbated the hardship and suffering of many people living within or adjacent to protected areas. In many cases, these actions also failed to lead to a secure future for the

animals in question, either because the ecological dynamics were improperly understood, because the alienation of local people failed to build or maintain support for conservation measures, or because political developments overwhelmed any efforts to achieve sustainable solutions.⁴¹

Some biologists recognized that their focus on the animals' territorial claims left them inadequately prepared to deal with the humans whose own claims were just as essential to the success of conservation. Buechner was hardly a visionary in this regard, but some of his published writings and private correspondence suggest that he was well aware of the limits of a strictly biological approach. Nonetheless, he never took concrete steps to move beyond the role of expert adviser to state authorities; there is no evidence, for example, that he ever thought of engaging directly with local people to develop conservation policies. In the last years of his life, seemingly frustrated by the increasing political instability and intractability of conservation problems in East Africa, he devoted most of his effort to captive breeding of species held at the National Zoo in Washington, DC. These efforts were successful on their own terms, but for someone who had dedicated his career to in situ conservation in human-inhabited landscapes, they seem like an admission of failure. An understanding of a species' social behavior was important to maintaining healthy zoo populations, but captivity detached the phenomenon of territoriality from the questions of sustainable balance between population and resources that had initially motivated Buechner's research. His untimely death in 1975 at the age of fifty-seven of a malignant brain tumor cut short his plans to return to East Africa. In any case, the violence and corruption of Idi Amin's regime had, for the foreseeable future, undermined any hope of putting a science-based wildlife management regime into practice in Uganda.⁴²

40. On the relationship between territoriality, new research techniques, and arguments for expanded parks, see Lewis, *Inventing Global Ecology*, 146–54.

41. See Adams and McShane, *Myth of Wild Africa*; Adams and Mulligan, *Decolonizing Nature*; Walley, *Rough Waters*; Beinart, *Rise of Conservation in South Africa*; West, *Conservation Is Our Government Now*; Lowe, *Wild Profusion*; Jacoby, *Crimes against Nature*; Spence, *Dispos-*

sessing the Wilderness; and Rangarajan et al., "Nature, Culture, and Empires."

42. For Buechner's ideas on moving beyond strictly biological approaches, see Ripley and Buechner, "Ecosystem Science as a Point of Synthesis," 1193–94, and Buechner, "Some Ethical Implications." The text of the sermon can be found at the Andover-Harvard Theological Library, in Cambridge, MA (microfilm unit 701, reel 3, no. 31). The captive-breeding work

is described in Buechner et al., "Birth of an Indian Rhinoceros." For a prematurely hopeful assessment of the impact of Amin's regime on wildlife management in Uganda by a leading British conservation biologist, see Myers, "Wildlife and Development in Uganda," 1075. Under Amin's regime, "enforcement of national legislation which aided environmental protection collapsed ... or was ignored or dramatically altered to serve short-term political gains." Fusch, "Human Settlement," 335.

Conclusion:**Biological Knowledge under Colonial Conditions**

Only a few species manifest the kinds of complex territorial systems that Jimmie and Helmut Buechner discovered in the Uganda kob. In fact, it was precisely the rarity of the phenomenon that initially made it so noteworthy. Other species of antelope are sometimes territorial, but most do not gather to compete in a central arena the way kob and a few other species of lekking antelopes do. Nonetheless the discovery of territoriality in the kob played an important role in changing the way wildlife biologists and conservationists in East Africa thought about relationships between territories and animal populations. Previously, they had tended to start from the Malthusian assumption that animal populations were regulated primarily by positive checks—that is, by disease, starvation, predation, and other factors that increased mortality. Buechner's work seemed to show, if controversially, that animal populations were also regulated by negative checks—that is, by the social exclusion of certain animals from breeding. In the case of the Uganda kob, this apparent mechanism of population regulation depended on well-established traditions, such as the use of a particular part of the landscape as an arena for competition. Managing such populations was, to use Buechner's phrase again, clearly more than a "numbers game"; it required detailed knowledge of the traditions and relative social status of the animals being protected or harvested. Even as new ways of interpreting territorial behavior emerged that rejected some of Buechner's basic assumptions, this basic insight remained.⁴³

In the twentieth century, the elaboration of this kind of biological knowledge was intimately entangled with the development of land-use regimes and of competing forms of expertise that emerged to offer reasoned justifications for the allocation of particular pieces of land to various uses. The story of land reform and attempts to formalize property rights in British East Africa is a familiar one; it represented an attempt to maintain

certain political and economic inequalities while also enhancing the productivity of the landscape and the people living in it. To support and direct this effort, legal and economic experts offered social theories that explained how the formalization of land tenure would enhance efficiency, productivity, and justice. In a parallel fashion, biologists offered theories of animal territoriality and other ways of articulating nonhuman claims to land. On the basis of their understandings of the structure of animal societies, they suggested ways of rendering the land occupied by those animals as productive as possible. Such theories were the counterpart in the realm of natural knowledge to what historical geographer Roderick Neumann has described as "a fundamental and geographically extensive spatial reorganisation of wildlife populations, land uses, and African settlements" in colonial conservation. Biological territoriality was in this sense both very real and very constructed. Neither an anthropomorphic projection nor a transhistorical fact, it became immanently manifest and observable as a result of colonial patterns of land use that were as material as they were ideological.⁴⁴

Histories of the colonial administration of territories and populations have only recently begun to take into account the fact that some of the populations in question were nonhuman. When they do consider the management of wildlife populations, they tend to see it as a domain quite separate from that of the management of human populations. Indeed, it was quite separate in one sense—probably too separate. Buechner, Kinloch, and others concerned with wildlife conservation in Uganda in the 1950s and 1960s were not interested enough in how people were being managed as populations by the colonial state or its postcolonial successor. If they had spent more time investigating human land tenure and land use, they might have developed more nuanced and effective conservation policies. In another sense, however, the management of human populations was always intimately connected to the management of nonhuman populations. Arguments about

43. Buechner's hypothesis that territorial behavior helped keep the population on balance with resources was dismissed, for example, in Spinage, *A Territorial Antelope*, 284. More re-

cent works have tended to view territoriality as a strategy for maximizing individual fitness under particular conditions, rather than as a drive that regulates populations. Buechner's

late work was already moving in this direction; see, for example, Buechner and Roth, "The Lek System in Uganda Kob Antelope."

44. Neumann, "Africa's 'Last Wilderness,'" 641.

the territorial claims of kob and other nonhuman species were implicitly arguments about the (de)allocation of land to humans. The growth of conservation regimes, with their biologists and conservationists, paralleled the growth of land management regimes of other kinds, with their agricultural experts and development economists. Together they constituted a single, if internally differentiated and often competing, set of methods for managing territories and populations. Despite some important recent contributions, the historiography of this system remains highly imbalanced. In places like rural Uganda, however—and in many places unlike it, from the Himalayas to the American West—power over people and animals operated simultaneously and in close connection. The animals that biologists studied could not be disembedded from that context any more than could the biologists themselves.⁴⁵ ■■■■

References

- Adams, Jonathan S., and Thomas O. McShane. *The Myth of Wild Africa: Conservation without Illusion*. New York: W.W. Norton, 1992.
- Adams, William M. *Against Extinction: The Story of Conservation*. London: Earthscan, 2004.
- Adams, William M., and Martin Mulligan, eds. *Decolonizing Nature: Strategies for Conservation in a Post-colonial Era*. London: Earthscan, 2003.
- Agrawal, Arun. *Environmentality: Technologies of Government and the Making of Subjects*. Durham, NC: Duke University Press, 2005.
- Alagona, Peter S. *After the Grizzly: Endangered Species and the Politics of Place in California*. Berkeley: University of California Press, 2013.
- “American Fulbright Scholars in Africa—1949/50 to 1957/58.” *African Studies Bulletin* 1, no. 1 (1958): 30–32.
- Ardrey, Robert. *The Territorial Imperative: A Personal Inquiry into the Animal Origins of Property and Nations*. New York: Atheneum, 1966.
- Barash, David P. “The Behavioral Ecology of Ungulates.” *Ecology* 46, no. 38 (1975): 757–58.
- Barrow, Mark V., Jr. *Nature’s Ghosts: Confronting Extinction from the Age of Jefferson to the Age of Ecology*. Chicago: University of Chicago Press, 2009.
- Beadle, L. C. “The Nuffield Unit of Tropical Animal Ecology (1961–1971).” *Journal of Zoology, London* 173 (1974): 539–48.
- Beinart, William. *The Rise of Conservation in South Africa: Settlers, Livestock, and the Environment, 1770–1950*. Oxford: Oxford University Press, 2003.
- Beinart, William, and Katie McKeown. “Wildlife Media and Representations of Africa, 1950s to the 1970s.” *Environmental History* 14, no. 3 (2009): 429–52.
- Bindernagel, John A. *Game Cropping in Uganda: A Report on an Experimental Project to Utilize Populations of Wild Animals for Meat Production in Uganda, East Africa*. [Kampala?]: Uganda Game Department, 1968.
- Borello, Mark. *Evolutionary Restraints: The Contentious History of Group Selection*. Chicago: University of Chicago Press, 2010.
- Borowy, Iris. *Defining Sustainable Development for Our Common Future: A History of the World Commission on Environment and Development (Brundtland Commission)*. New York: Routledge, 2014.
- Buechner, Helmut K. “Conservation of African Wildlife.” *Ecology* 45, no. 2 (1964): 420–21.
- . “Implications of Social Behaviour in the Management of Uganda Kob.” In *The Behaviour of Ungulates and Its Relation to Management*, vol. 2, edited by V. Geist and F. Walther, 853–70. Morges, Switzerland: International Union for the Conservation of Nature, 1974.
- . “Lek Behavior in the Uganda Kob.” *Zoonoos* 45, no. 2 (1972): 10–14.
- . “Life History, Ecology, and Range Use of the Pronghorn Antelope in Trans-Pecos Texas.” *American Midland Naturalist* 43, no. 2 (1959): 257–354.
- . “The Range Vegetation of Kerr County, Texas, in Relation to Livestock and White-Tailed Deer.” *American Midland Naturalist* 31, no. 3 (1944): 697–743.
- . “Some Ethical Implications of Conservation Needs: A Sermon Delivered by Dr. Helmut K. Buechner at the Unitarian Church of Arlington, Virginia, June 15, 1969.” Arlington, VA: Unitarian Church of Arlington, 1969.
- . “Territorial Behavior in Uganda Kob.” *Science* 133 (1961): 698–99.
- . “Unilateral Implantation in the Uganda Kob.” *Nature* 190, no. 4777 (1961): 738–39.

45. For a similar statement, see Gißibl, “Das kolonisierte Tier.”

- Buechner, Helmut K., and H. Daniel Roth. "The Lek System in Uganda Kob Antelope." *American Zoologist* 14, no. 1 (1974): 145–62.
- Buechner, Helmut K., A. M. Harthoorn, and J. A. Lock. "Control of African Wild Animals." *Nature* 185, no. 4705 (1960): 47–48.
- Buechner, Helmut K., Sally F. Mackler, Herbert R. Stroman, and William A. Xanten. "Birth of an Indian Rhinoceros at the National Zoological Park, Washington." *International Zoo Yearbook* 15, no. 1 (1975): 160–65.
- Burkhardt, Richard W., Jr. *Patterns of Behavior: Konrad Lorenz, Niko Tinbergen, and the Founding of Ethology*. Chicago: University of Chicago Press, 2005.
- Buss, Irven O., and John F. Eisenberg. "Helmut K. Buechner, 1918–1975." *Wildlife Society Bulletin* 3, no. 1 (1976): 40–41.
- Carruthers, Jane. *The Kruger National Park: A Social and Political History*. Pietermaritzburg: University of Natal Press, 1995.
- . "'Wilding the Farm or Farming the Wild': The Evolution of Scientific Game Ranching in South Africa from the 1960s to the Present." *Transactions of the Royal Society of South Africa* 63, no. 2 (2008): 160–81.
- Child, Graham. "The Growth of Park Conservation in Botswana." In *Wildlife Conservation: Parks and Game Ranches to Transfrontier Conservation Areas*, edited by Helen Suich and Brian Child with Anna Spenceley, 52–66. London: Earthscan, 2009.
- Cioc, Mark. *The Game of Conservation: International Treaties to Protect the World's Migratory Animals*. Athens: Ohio University Press, 2009.
- Clutton-Brock, T., S. West, F. Ratnieks, and R. Foley. "Introduction: The Evolution of Society." *Philosophical Transactions: Biological Sciences* 364, no. 1533 (2009): 3127–33.
- Corbett, James Edward. *Man-eaters of Kumaon*. New York: Oxford University Press, 1946.
- Despret, Vinciane. "Sheep Do Have Opinions." In *Making Things Public: Atmospheres of Democracy*, edited by Bruno Latour and P. Weibel, 360–70. Cambridge, MA: MIT Press, 2006.
- Eisenberg, John F., and Devra G. Kleiman. "Helmut K. Buechner, 1918–1975." *Bulletin of the Ecological Society of America* 57, no. 1 (1976): 66.
- . "Helmut K. Buechner (1918–1975)." *Journal of Mammalogy* 57, no. 2 (1976): 417–18.
- Fusch, Richard. "Human Settlement, Political Instability, and Environmental Deterioration in Uganda, 1972–1989." *Centennial Review* 35, no. 2 (1991): 335–68.
- Garland, Elizabeth. "The Elephant in the Room: Confronting the Colonial Character of Wildlife Conservation in Africa." *African Studies Review* 51, no. 3 (2008): 51–74.
- Gißibl, Bernhard. "Das kolonisierte Tier. Zur Ökologie der Kontaktzonen des deutschen Kolonialismus" ("The Colonized Animal: On the Ecology of the Contact Zone of German Colonialism"). *Werkstatt Geschichte* 56 (2011): 7–28.
- Guha, Ramachandra. "The Authoritarian Biologist and the Arrogance of Anti-Humanism: Wildlife Conservation in the Third World." *Ecologist* 28 (1997): 14–20.
- Haraway, Donna Jeanne. *The Companion Species Manifesto: Dogs, People, and Significant Otherness*. Chicago: Prickly Paradigm, 2003.
- Howard, H. Eliot. *Territory in Bird Life*. London: J. Murray, 1920.
- Jacoby, Karl. *Crimes against Nature: Squatters, Poachers, Thieves, and the Hidden History of American Conservation*. Berkeley: University of California Press, 2003.
- Johnson, Jennifer Lee. "Managerial Technologies, [II] legal Livelihoods, and the Forgotten Consumers of Africa's Largest Freshwater Fishery." In *Landscape, Environment and Technology in Colonial and Postcolonial Africa*, edited by Toyin Falola and Emily Brownell, 248–71. New York: Routledge, 2011.
- Kingsland, Sharon E. *Modeling Nature: Episodes in the History of Population Ecology*. 2nd ed. Chicago: University of Chicago Press, 1995.
- Kinloch, Bruce. *The Shamba Raiders: Memories of a Game Warden*. London: Collins, 1972.
- . *Tales from a Crowded Life*. Kinloss, Moray, Scotland: Librario, 2008.
- Kohler, Robert E. *All Creatures: Naturalists, Collectors, and Biodiversity, 1850–1950*. Princeton, NJ: Princeton University Press, 2006.
- Lekan, Thomas. "Serengeti Shall Not Die: Bernhard Grzimek, Wildlife Film, and the Making of a Tourist Landscape in East Africa." *German History* 29, no. 2 (2011): 224–64.
- Leopold, Aldo. *Game Management*. New York: C. Scribner's Sons, 1933.
- Leuthold, Walter. "Variations in Territorial Behavior of Uganda Kob *Adenota kob thomasi* (Neumann 1896)." *Behaviour* 27, nos. 3–4 (1966): 215–58.
- Lewis, Michael L. *Inventing Global Ecology: Tracking the Biodiversity Ideal in India, 1947–1997*. Athens: Ohio University Press, 2004.
- Lowe, Celia. *Wild Profusion: Biodiversity Conservation in an Indonesian Archipelago*. Princeton, NJ: Princeton University Press, 2006.

- MacKenzie, John M. *The Empire of Nature: Hunting, Conservation, and British Imperialism*. Manchester, UK: Manchester University Press, 1988.
- Mavhunga, Clapperton. "Mobility and the Making of Animal Meaning: The Kinetics of 'Vermin' and 'Wildlife' in Southern Africa." In *Making Animal Meaning*, edited by Linda Kalof and Georgina Montgomery, 17–44. East Lansing: Michigan State University Press, 2011.
- Mehos, Donna C., and Suzanne M. Moon. "The Uses of Portability: Circulating Experts in the Technopolitics of Cold War and Decolonization." In *Entangled Geographies: Empire and Technopolitics in the Global Cold War*, edited by Gabrielle Hecht, 43–74. Cambridge, MA: MIT Press, 2011.
- Milam, Erika L. *Looking for a Few Good Males: Female Choice in Evolutionary Biology*. Baltimore, MD: Johns Hopkins University Press, 2010.
- Mitman, Gregg. "Pachyderm Personalities: The Media of Science, Politics, and Conservation." In *Thinking with Animals: New Perspectives on Anthropomorphism*, edited by Lorraine Daston and Gregg Mitman, 173–95. New York: Columbia University Press, 2005.
- . *Reel Nature: America's Romance with Wildlife on Film*. Cambridge, MA: Harvard University Press, 1999.
- Myers, Norman. "Wildlife and Development in Uganda." *Bioscience* 21, no. 21 (1971): 1071–75.
- Neumann, Roderick P. "Africa's 'Last Wilderness': Reordering Space for Political and Economic Control in Colonial Tanzania." *Africa: Journal of the International African Institute* 71, no. 4 (2001): 641–65.
- . *Imposing Wilderness: Struggles over Livelihood and Nature Preservation in Africa*. Berkeley: University of California Press, 1998.
- . "The Postwar Conservation Boom in British Colonial Africa." *Environmental History* 7, no. 1 (2002): 22–47.
- Newton, Julianne Lutz. *Aldo Leopold's Odyssey*. Washington, DC: Island Press/Shearwater Books, 2006.
- Osborn, Fairfield. *Our Plundered Planet*. Boston: Little, Brown, 1948.
- Petrides, George A., and Wendall G. Swank. "The Status of Wildlife and Wilderness Areas in East Africa." *Oryx* 5, no. 4 (1960): 295–306.
- Rangarajan, Mahesh, Vasant Saberwal, and Ashish Kothari. "Nature, Culture, and Empires." In *People, Parks and Wildlife: Towards Coexistence*, edited by Mahesh Rangarajan, Vasant Saberwal, and Ashish Kothari, 11–23. Hyderabad: Orient Longman, 2001.
- Ripley, S. Dillon, and Helmut K. Buechner. "Ecosystem Science as a Point of Synthesis." *Daedalus* 96, no. 4 (1967): 1192–99.
- Robins, Eric. *The Ebony Ark: Black Africa's Battle to Save Its Wild Life*. London: Barrie and Jenkins, 1970.
- Shetler, Jan Bender. *Imagining Serengeti: A History of Landscape Memory in Tanzania from Earliest Times to the Present*. Athens: Ohio University Press, 2007.
- Spence, Mark D. *Dispossessing the Wilderness: Indian Removal and the Making of National Parks*. Oxford: Oxford University Press, 1999.
- Spinage, C. A. *A Territorial Antelope: The Uganda Waterbuck*. New York: Academic Press, 1982.
- Talbot, Lee M. "A Survey of Past and Present Wildlife Research in East Africa." *East African Wildlife Journal* 3 (1965): 61–85.
- Tilley, Helen. *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870–1950*. Chicago: University of Chicago Press, 2011.
- Trustees of the Uganda National Parks. *Report and Accounts of the Trustees of Uganda National Parks, For the Year Ended 30th June, 1958*. n.p.: Uganda National Parks, 1958.
- . *Report and Accounts of the Trustees of Uganda National Parks, For the Year Ended 30th June, 1959*. n.p.: Uganda National Parks, 1959.
- Uganda Game and Fisheries Department. *Annual Report of the Game and Fisheries Department, For the Period 1st January, 1955, to 30th June, 1956*. n.p.: Uganda Game and Fisheries Department, 1956.
- . *Annual Report of the Game and Fisheries Department (Game Section), For the Period 1st July, 1958, to 30th June, 1960*. n.p.: Uganda Game and Fisheries Department, 1960.
- Vogt, William. *Road to Survival*. New York: W. Sloan Associates, 1948.
- Walley, Christine J. *Rough Waters: Nature and Development in an East African Marine Park*. Princeton, NJ: Princeton University Press, 2004.
- Weidman, Nadine. "Popularizing the Ancestry of Man: Robert Ardrey and the Killer Instinct." *Isis* 102, no. 2 (2011): 269–99.
- West, Paige. *Conservation Is Our Government Now: The Politics of Ecology in Papua New Guinea*. Durham, NC: Duke University Press, 2006.
- Wilson, Edward O. *Sociobiology: The New Synthesis*. Cambridge, MA: Belknap Press of Harvard University Press, 1975.

- Wilson, Robert M. *Seeking Refuge: Birds and Landscapes of the Pacific Flyway*. Seattle: University of Washington Press, 2010.
- Wöbse, Anna-Katharina. *Weltnaturschutz: Umweltdiplomatie in Völkerbund und Vereinten Nationen, 1920–1950 (World Nature Protection: Environmental Diplomacy in the League of Nations and United Nations, 1920–1950)*. Frankfurt am Main: Campus-Verlag, 2012.
- World Commission on Environment and Development. *Our Common Future*. New York: Oxford University Press, 1987.
- Worster, Donald. *Nature's Economy: A History of Ecological Ideas*. 2nd ed. New York: Cambridge University Press, 1994.
- Young, Christian C. "Defining the Range: The Development of Carrying Capacity in Management Practice." *Journal of the History of Biology* 31, no. 1 (1998): 61–83.