Authorship

African students in Wildlife Management courses (2007-2017) and American students in Wofford College travel projects (2008-2017) have contributed generously to this book; their paragraphs and photographs are acknowledged in situ. The authors listed on the book’s cover are Ab Abercrombie and GR Davis. Ab wrote the introduction and the numbered chapters. GR motivated, selected, edited, and organized the Wofford students’ pictures and mini-essays. He is also responsible for some of the best (and some of the most challenging) photographs. Although we shall not name them, the primary creators of African Light are indigenous farmers, school kids, grandparents, professors, preachers, poachers, and poets. These people have told us the stories that would, if we could have listened more faithfully, whisper the song of the Gaboon Viper on every page of this book.
“My grandfather said that, under a full moon, the *bvumbi* [the Gaboon Viper, *Bitis gabonica*] would sing. I do not think that this can be possible, but my grandfather was born before the white people came, and he knew many true things. He said that the song of the *bvumbi* sounds like a rainbow.”

Older worker on Aberfoyle Tea Estates, Nyamkombe River, Eastern Zimbabwe, December, 1995

INTRODUCTION: RAINBOW

I. WAITING FOR SADZA

2015. *In line at the Dining Hall, Africa University, Old Mutare, Zimbabwe.* “Sir, what book should I read about America?” I do not recognize the student who is standing in front of me, also waiting for *sadza.* She must not be in Agriculture—maybe Humanities, maybe Management and Administration. I smile. I have never been asked that question before, but I am obviously American, so I am expected to have an answer, and I do. She continues. “My friend’s aunt is a surgeon in a place called Houston, and maybe….?” In other words, this student does not want to learn about America from books; she wants to go there. Of course she does, and rightly so! Everybody should visit America, even though there are more responsible ways to spend the $2k that airfare will cost. “One book about America,” I nod; “you should read *To Kill a Mockingbird.*” The student grins with delight: “I have already read it!”

So I had guessed correctly. I knew that my chances were better than 50/50: the student’s accent was Zimbabwean, and it suggested graduation from a good high school. And even if she’d been from backwoods Congo, she might have seen the film, in a run-down *sale de cinéma*, with Atticus Finch and daughter Scout talking like they lived in Paris, France.\(^1\) Furthermore, I truly am convinced that ...*Mockingbird* is the one right book. When a young African visits my country, I want her to see it with her heart.

Sometimes an American, back in the States, asks me to recommend one book about Africa. That is more of a challenge because Africa is so much larger, so much more diverse than North America. And I know so little about her. Naturally, after my few years in Africa I do have a list of favorites—seven of them—and I believe that any one of these books would be worth an American reader’s time. For the horrors of colonialism, there is *King Leopold’s Ghost.* For novels, Conrad’s enduring *Heart of Darkness* can be balanced by Achebe’s iconic *Things Fall Apart.* For animals, read Kingdon’s monumental *East African Mammals.* For a review of failed governments, consider *The Fate of Africa.* For the excitement of African innovation,

\(^1\) In French the film is called *Du silence et des ombres* (*Silence and Shadows*) while the book is called *Ne tirez pas sur l’oiseau moqueur* (*Don’t Shoot the Mockingbird*).
enjoy Olopade’s *The Bright Continent*. For autobiography, grab your hiking boots and follow Mandela’s *Long Walk to Freedom*.

Of course you might reasonably distrust the book-suggestions by a mere Ag School teacher, and if such be the case, most American universities could supply academically correct bibliographies from their African Studies courses. Meanwhile, GR Davis and I harbor no illusions that we might rise to citation on any such list. We don’t even lust after that particular honor, and if indeed you actually intend to learn the facts of Africa from one book, we insist that you not choose ours for that purpose! Nevertheless, we did create *African Light* for a good reason. We are delighted that it is in your hands. And here is our vision for how you might enjoy it. Obviously we can never approach the depth, insight, or elegance of *…Mockingbird*, but we hope our book can in a small way touch you—well, kind of like Harper Lee’s masterpiece has touched millions of young Africans. That is to say, we have struggled to compile a guidebook, about Africa, for the American heart.

Optimistically, GR and I would hope that anybody might appreciate our book. However, we have written it with six species of potential readers in mind. First, we have led several American college classes to Africa, and before each trip we’d always wanted a book that would suggest—but not prescribe—a generous, fun attitude to carry along on a first visit to the Continent. We could not find a book that suited our peculiar preferences, so we produced one.

Second, we have known dozens of people who have gone to Africa as short-term missionaries, serving between three weeks and three years. Mostly young and always idealistic (at least when we first encounter them), some have gone in groups, some as couples, some alone. Pre-departure, these good folks often ask GR or me for advice, and they typically give us about fifteen minutes to respond. That leaves us in something of a quandary because we feel obligated to emphasize the moral ambiguities inherent in their missions, and yet we really, really want them to go—and to have a good time. So we mumble professorially, saying things like, “Do you realize that your airfare is three years of Africa’s median income?” Or, “Christianity is growing explosively in Africa and shrinking right here in the USA.” Or, “Do you really think that Africans can’t paint that church and dig that school’s latrine?” Thankfully those missionaries still go a-missioning, but they leave our offices with less joy for the pilgrimage. And ununtarnished joy would be the greatest gift these Americans could offer to the Africans they will meet. Well, to borrow Darwin’s phrase, this book is, among other things, “one long argument” for why these short-timers should go to Africa, for why they should rejoice in Africa—and for why they should allow African landscapes and African songs and African people to minister to them, making them better Americans, better citizens of the world, and better human beings.

Third, this book often focuses on Africa University, a tertiary educational institution established by the United Methodist Church. Here in the USA, a few Methodists have supported AU sacrificially, and, because Methodist churches are obliged to pay “apportionments” that include AU, all members of the denomination have supported the school at least a little. These people deserve to know more about their University. They deserve to share some of the African tears, African laughter, African creativity, African silliness, and African heroism that GR and I have been privileged to witness. Furthermore, a substantial number of American United Methodists actually visit AU. After, or preferably before, they make the pilgrimage, we hope they might appreciate our “argument” about short-term missions. We also believe that this tour
guide for the heart will make an AU visit more meaningful—and, which is more important, more fun!

Fourth, we don’t claim that all Africa-bound tourists could profit from our book, but we would like to sermonize at every one of them anyhow: If you take kids to Africa, make sure that they see elephants. And no matter why you visit the Continent, learn at least one African name and make at least one African friend. These are important points that we repeatedly emphasize in our book.

Fifth, we particularly address this book to people who consider Africa to be “the Dark Continent,” a place of hopelessness, misery, bottomless tragedy, and broken humanity. Well, if you go to Africa, you can find plenty of those things, and if you study about Africa in American libraries, you will read about even more. Nevertheless, GR and I are convinced that the Darkness is not the real story, and that is why we call our book *African Light*.

Sixth, we hope that one or two Africans might read our book. This will prove to them that American white men are just as silly as they always thought. Also, because Africans tend to be both smart and empathetic, they will realize that *African Light* is a love-song for them and their Continent, perhaps with a few notes of insight.

Oh, *sadza* is maize porridge. If you like grits that are finely ground and have the backbone to stand tall on your plate, then you’ll like *sadza*. If you don’t like grits, well, thank you for buying this book, but you probably won’t like it either. And perhaps you should reconsider any plans to visit Zimbabwe. Also, I actually do have a one-book reading list for Africa-bound Americans. Or, come to think of it, I’d prefer that you see the movie. In *The African Queen*, Rose Sayer, my favorite cinematic Methodist missionary (who looks a whole lot like Katharine Hepburn), summarizes exactly the way I want you to feel about your trip to Africa: “I never dreamed that any mere physical experience could be so stimulating.”

II. DEFINING THE SPECTRUM OF AFRICAN LIGHT

2013-2015. *Epidemic. West Africa.* On 28 December, 2013, in the village of Meliandou, in the Guinean province of Gueckedou, a two-year old boy died. He was Emile Ouamouno, may grace and peace be with him, and I would not tell his name if it had not been widely published. At first nobody had thought Emile was particularly sick. His muscles hurt; his head ached a little; he was tired and had a touch of fever. It could have been malaria, or it could have been any of a dozen nothing-illnesses that plague active little boys in Guinea, in Sierra Leone, in Liberia, and in America. But it was not a nothing-illness. Something disrupted Emile’s immune system, both its ability to recognize invading pathogens and its ability to fight against them. Soon the little boy hurt like hell. His fever went through the roof. Then came the vomiting, the diarrhea, the dehydration. A rash erupted. Emile’s eyes and gums began to bleed. He died.

Western researchers would eventually designate Emile Ouamouno as the Index Case of the Ebola epidemic that devastated West Africa in 2014. Ebola is a river in the Democratic Republic of Congo. It is also a long, stringy virus that scientists place in the Family Filoviridae.
There are about five named species of the Ebola-organism (if you believe that viruses are organisms and that they are separable into species). In all forms the virus is zoonotic; that is to say, it is resident in non-human animals. Many epidemiologists believe that Ebola is typically transmitted to human beings from fruit bats, and around Christmastide of 2013 Emile had indeed been playing in a hollow tree that was home to a vast number of bats. These animals, however, were of the species *Mops condylurus*, which is not a fruit bat at all but is a member of the “freetail” Family Molossidae. Maybe these animals transmitted Ebola to Emile; maybe they did not. But Emile did die, and around the time of his death, he passed the virus onward.

Ebola Virus Disease, EVD, is a hemorrhagic fever, a hideous illness characterized by blood. A Google search will provide you with the gory details of Ebola’s clinical progression. You can also learn via Google how the virus spreads. Unlike HIV, Ebola is not contagious until its victims are obviously sick. Unlike influenza, Ebola is not transmitted aerially. Unlike measles, Ebola cannot survive for long outside of an animal host. To catch Ebola, you must come into direct contact with a body-fluid from an infected, symptomatic host. This mode of interpersonal transmission does not equip the Ebola virus for easy spread through rich, germ-averse Western societies. But things are different in West Africa, where folks believe that economics, duty and love require decent people to care with their own hands for the dying and for the corpses of deceased loved ones. Persons dying of EVD are dramatically symptomatic, and the virus is very, very good at smearing from the bodies of the dead into those of the living.

Few of us in America can imagine how Ebola rent the social fabric of West Africa in 2014. At least I know that I cannot wrap my own mind around the catastrophes associated with the disease. Even beyond the suffering and bereavement caused directly by EVD, the epidemic’s macro-level side effects have been horrific. Religious tenets were upended. Entrepreneurial activities slowed to a crawl. The public-education system collapsed. Families were split by travel restrictions and quarantines. Healthcare, in its pre-epidemic conformation, disintegrated. Citizens of three nations lost confidence in their governments. Crops went untended. Hunger stalked every village. Resurgent malaria attacked on the wings of daybreak and dusk. (Actually, I can definitely wrap my mind around this particular catastrophe; I’ve had my own personal encounter with *Plasmodium falciparum*.)

Of course America eventually learned about West Africa’s Ebola epidemic. Indeed, the dramatic news—the explosion of a virus that kills 30% to 75% of its victims—was a major feature of many newscasts, at least until the networks turned their attention to America’s bi-year elections of November. Characteristically, the media did not underplay the seriousness of the EVD Emergence Event. Fatality rates, it was said, would run as high as 90%. Trans-Atlantic spread of the disease was considered a very present danger. (Motivated by fear or politics, two Yankee governors actually believed this warning and tried to quarantine their states from Africa-travelers.) And at the height of the epidemic, the U.S. Centers for Disease Control and Prevention projected that EVD could infect 1.4 million West Africans by February, 2015.

Basically, this apocalyptic projection reflected the extrapolation of red lines on the case-total graphs of mid-November, 2014; that is, the CDC was telling us what could transpire if nothing happened to change the trajectory of the epidemic. But, thank God, something did happen. By 2015, the red lines were trending downward. Before the end of January emergency
treatment centers had a surplus of beds. Before the end of February village markets were re-opening; travel restrictions were being lifted. There was light at the end of the tunnel.

Worldwide, as of 29 March 2016, the epidemic’s total number of Ebola cases was reported as 28,646 (this total included all “confirmed” and “probable” cases; the number of cases actually diagnosed by laboratory procedures was 15,221). The number of deaths was reported as 11,323. These figures are horrifying. And even today, with WHO maintaining constant surveillance, EVD remains a threat in West Africa. But the feared Armageddon did not arrive; West Africa survives.

_Time_ magazine affirmed the turning of the epidemic-tide by naming The Ebola Fighters as the “Person of the Year.” The article (10 December 2014) explaining _Time_’s choice is simply wonderful, and I’ll never forget the phrase, “bleach and a prayer.” The author, Nancy Gibbs, was even-handed in her coverage, but of course she had to give prominent attention to stories about foreign fighters. And certainly their sacrifice, their importance, should not be underplayed. Samaritan’s Purse, resident in Liberia for over a decade, deployed its personnel into the farthest reaches of the country and mobilized an air force that delivered over 200 tons of medical supplies to the communities in most serious need. Doctors Without Borders (or MSF, _Médecins Sans Frontières_) also deserves special praise. Those courageous, arrogant physicians stood tall when it counted; they fought like rabid minks against Ebola and against the initial indifference of the so-called developed world. Also we should not forget deployments of the American and British Armies, of health-professionals from China, of doctors from Cuba, of workers from a dozen NGOs. Especially heroic were individual volunteers who emerged from hospitals, from churches, from mosques, from schools, from small towns, from big cities, from safe lives in safe places. Liberia, Guinea, and Sierra Leone owe the foreign Ebola fighters an enormous vote of thanks. And yet I want to offer a one-sentence synopsis of the victory over EVD—and I am certain that it is true. Ebola was defeated by Africans.

I do not know the details of how this essentially African victory was won. Heck, I wasn’t in the fight; I stayed in a very safe place, 5,000 kilometers from Ebola, protected by distance and by the vigilance of Zimbabwe’s Ministry of Health and Child Welfare. But I have read extensively about the epidemic, and I have thought for many hours about the Africans who fought against it. In particular, I remember six West African nurses, taught at Africa University by my coauthor, GR Davis—all smiles as they learned physiology during the Zimbabwean rains

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2 On that date the International Health Regulations Emergency Committee advised the Director-General of WHO to declare the end of the Ebola public health emergency; she did.
3 In Zimbabwe my wife and I followed the course of the epidemic on the BBC and Al Jazeera News. Back in South Carolina I have been overwhelmed by the massive amount of information (and some misinformation) available on the Internet. If you want a quick overview of West Africa’s struggle against EVD, then I recommend Gibbs’ _Time_ article plus “When the Fever Breaks: Battling Ebola in Liberia and Sierra Leone,” by Luke Mogelson, pp. 38-49 in the 19 January, 2015, issue of _The New Yorker_. Ebola is also the cover-story in _Nature_ for 6 August 2015, which contains editorials, articles, and letters about the epidemic—as well as recommendations on avoiding a recurrence. In my opinion the best full book, by far, is _Ebola_, by anthropologist Paul Richards.
of 2012. I wonder if any of those nurses might possibly be alive. May grace and peace be with them. Now, despite my meditations and my studies, I certainly cannot give you a proper history of the epidemic. However, I can tell you this. The Ebola-battle of 2014 was as nasty as trench warfare, a hecatomb of death, smeared with vomit, feces, blood, and fear, swirling with inefficiency, selfishness, ignorance, greed, and hate.

And there was love. In Africa’s response to the epidemic, contradictions abound. Medical officers deserted their posts or exacted bribes for doing their duties. Medical officers endured the battle beyond the reasonable capacity of any mortal flesh.

Bereaved families fought with fists and clubs about contagion and funerary obligations. Sisters and brothers joined hands, transcending the horror to care for the stricken, inventing safe rituals to bury the dead with dignity and grace.

Frightened villagers hurled rocks at Ebola workers and threatened them with machetes. Courageous villagers opened hearts and homes to foreigners dressed like spacemen and designed public-health strategies that awed the foreign experts with their University textbooks.

In other words, Africa’s Ebola-fighters, like great armies everywhere, included cowards, shirkers, profiteers, and heroes. But they won the war. And, despite my considerable ignorance, I shall presently meditate with you on how this victory was achieved. I owe that much to the Africa University graduates who fought the good fight.

2017. Our book. Academically, I was trained as a biostatistician. Specifically, I fit and evaluate mathematical models for biological/ecological data. If, for example, you show me a graph with weight on the Y-axis and height on the X-axis, I’m hot to specify a line or curve—i.e., I want to write a formula—that tells you how to estimate weight, given a value for height. Or if you provide quantitative data for biodiversity, altitude, rainfall, latitude, and longitude, I’ll joyfully squeeze out an equation that models the relationship among those variables. Of course ecological data are always messy, so biostatisticians’ lines, curves, etc., never fit exactly, and consequently our estimates for weight or biodiversity are sometimes pretty rough. But even when our errors are substantial, biostatisticians’ models reveal grains of truth. I can, for example, confirm the obvious: that tall people generally weigh more than short people. At another level I can probably demonstrate that altitude, rainfall, and latitude are to some degree predictive of biodiversity. Furthermore—and this kind of thing can be more important—I might discover that, in general, longitude has little explanatory power and can, at least for now, be left out of our biodiversity models. In other words, amid the wonderful, confusing complexity of ecological systems, I use numbers to search for patterns; I try to establish which data are important and which are not. Some physicists express this fundamental statistical task as the differentiation of Signal from Noise.

I would never claim to be a world-class biostatistician, but over the years my profession’s approach has become second nature to me. Therefore, compelled by memories of heroic students to address the complexity of Epidemic, 2014, I sort; I attempt to identify what things were important, versus what things were not, in Africa’s victory over Ebola. If I had a ton of numbers, I’d crunch ‘em hard, but I don’t, so I’ve read what I could, I’ve talked to people I respect, and I’ve sifted through my memories of Africa. In other words, with multivariate regression analysis precluded, I’ve listened for rainbows. And here is the spectrum of light that I
have discerned. Africa whipped Ebola by means of African endurance, African courage, African humor, African creativity, and African love. In my very tentative model, those factors are Signal; all else is set aside as Noise. Furthermore, endurance, courage, humor, creativity, and love are fundamental to my understanding of Africa in general, and although they are not equally emphasized in every chapter, they whisper like moonlight across the pages of this book.

My coauthor, GR Davis, is another scientist; therefore, like me, he is concerned with sorting Signal from Noise. To GR, this enterprise involves the discernment of Pattern. On a microscope slide where I see a chaos of membranes and nuclei, GR perceives cellular patterns that define specific tissues. Where I see sectioned tissues as discrete aggregations of cells, GR envisions structural patterns that comprise complete organs. Where I see the spiked lines of an electrocardiogram, GR discerns the patterned signal of electrical impulses that choreograph the beating of the heart—and he recognizes as noise the annoying squiggles that appear when the heart’s owner coughs or moves her hands.

For this book, GR has focused his skill at pattern-discrimination into teaching the science/art of photography to his Africa-bound students. As GR says, photography is, at multiple levels, an exercise of sorting Signal from Noise. Choice of subject, strategy of focus, angle of attack: all require decisions about what is beautiful, what is interesting, what is important, and what is neither. Then, in this digital age of cheap pictures, the photographer must sort through ten thousand images, deciding which to keep and which to format into oblivion.

Obviously, light is critical in the capture of meaningful photographic patterns. The camera is pointed towards a subject, whose significance is discerned because of the light that makes it visible to the photographer. Then the camera’s lens transmits light that excites electrons across a grid of miniscule metal-oxide light-catchers. From thence the pattern of excited electrons is transduced into a string of numbers. Finally, if you are GR or one of his students, you download the numbers into a computer, paint them as a pattern of colored light across a screen—and then manipulate the pattern by PhotoShop to get the light just right, thereby producing a meaningful image for human beings, the most visual of all mammalian species. GR Davis and I believe that the purpose of Essay is essentially the same: to see by the light, to ascertain significance, to transduce significance by a patterning of words, to offer the pattern to human beings as a witness to Signal, amid Noise. This book is our attempt to create a meaningful pattern of photographs and words, out of Africa, perceived within African Light.

For GR and for me, African light illumines our memories of place and time. On a September night in the Chimanimani Mountains, African light reflects ten thousand stars from a moss-rimmed pool of dark water. Along the Nyanga Road, during a dry October, African light turns the sky the color of deoxygenated blood as the sun disappears behind Mount Chiremba. Southeast of Rusape-town; African light, shimmering through November heat, paints the farmworker as she coaxes her span of oxen to draw the plow once more across her thirsty field. In December, slanting rays of African light turn the falling hailstones into diamonds. Beneath the cliffs of Gonarezhou, at the beginning of winter, the visitor puts down his camera; he has a hundred elephant pictures, and no expenditure of megapixels can faithfully capture the play of African light through the dust that rises from the slow movement of the animals’ feet.
GR and I also recognize that Light has metaphorical significance in every living religion. Before Eden exists, Yahweh creates light (Genesis 1:3). As days shorten and Kartika’s moon grows dark (c. 23 October to 21 November), Hindus paint the sky with Diwali fireworks, celebrating the eventual victory of light over darkness. Halos of light are traditionally drawn above representations of the Buddha, who is the Enlightened. The Koran declares that Allah is “the Light of the heavens and of the earth” (verse 35 of the 24th sura), and Light becomes one of God’s 99 Beautiful Names. In the Gospel of John (8:12), Jesus offers himself as light of the world. And in Matthew (5:14), he instructs us that we ourselves are to be that light. GR and I affirm this symbolic importance of light because—with more hope than certainty—we confess ourselves to be members of the community of faith. As struggling scientists, we might define the spectrum of African light by the wavelengths of six representative colors: violet, blue, green, yellow, orange, and red. But as struggling pilgrims, in Africa, we define that spectrum by five representative words: endurance, courage, humor, creativity, and love.

Our plan. My wife (the ever-delightful Dr. Christine Hope, “Chrissy”) and I have spent ten semesters teaching in the ag school of Africa University, which, as we have explained, is a degree-granting institution established by the United Methodists in eastern Zimbabwe, which country is a landlocked, uneven, somewhat dry plateau, about the size of Montana, in southern Africa. We hope to go back again if we can wrangle the requisite invitations and permits from the Powers that Be. During 2012 GR Davis taught with us at Africa U, though he was affiliated with the Faculty of Health Sciences rather than the Faculty of Agriculture. GR has also led six classes of students from Wofford College to Africa.4 Our brief sojourns, plus a few journal articles, a handful of field guides, and the books I listed above, taught GR and me all we know about Africa. As my daddy would say, “Dat ain’ a whole lot.” But back in the USA, any visitor to “the Dark Continent” who has access to PowerPoint is automatically considered to be an Africa Expert. By that criterion GR and I certainly qualify, and by reading this, y’all are affirming our license to create an Africa-book.

So as not to abuse your confidence, I promise to keep my daddy’s words in mind—and to remember an incident from my first semester of Africa-teaching. Departing from the script of my biostatistics lecture, I confessed my failure to understand an important aspect of African politics. I concluded my detour from the syllabus by saying, “…of course I’m just an ignorant white man.” From the back of the classroom (a hastily converted farm building) a very tall, very black, student walked forward. He stood beside me, facing the class. He put one arm around me and hugged me close. Then, in a voice redolent of villages and a missionary education, the young man said, “You are correct about one thing sir. You are an ignorant white man.” The tall student grinned, hugged me again, and returned to his seat. If you are overly gullible and find yourself taking as gospel everything I have written, then please repeat these three words: Ignorant. White. Man. Heck, you might even whisper that mantra when you examine the book’s photographs: most were taken by white people, and many were taken by males.

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4 Wofford is a liberal arts college in South Carolina, which state, like Zimbabwe, is uneven in topography, though she is neither dry nor landlocked. GR’s American students studied history, culture, geology, and ecology in five African countries. I helped with two of these Wofford short-courses, and also, two decades ago, I led a Wofford short-course of my own in Zimbabwe.
We’re ignorant, white, and male, but you should still read this book. The cautionary tale of my embarrassment notwithstanding, GR and I do believe that for four reasons we can offer some insights into Africa. First, we shall claim the advantage of outsiders’ perspectives. Consider that tradition: Alexis de Tocqueville in America, Bernard Fall in Southeast Asia, Paul Gaugin in Tahiti, Margaret Meade on Samoa, Joseph Conrad on the River Congo. Yes, those white folks got a whole lot of things wrong, but they got some things right, and their insights have deepened our understanding of the wider world. Clearly GR and I can’t claim parity with Joe Conrad et al., but we are thankful to struggle down a path that they have lighted for us.

Second, we have African friends, people who, recognizing our ignorance, have shown the patience to chip away at it, making us somewhat less ignorant and perhaps a little less white.

Third, we just flat like Africa: we like the people, we like the animals, we like the food, we like the music. That is to say, we can authoritatively deny that Africa is the Dark Continent because we have seen the African light and by faith have discerned its spectrum.

Fourth, and most important, GR and I knew we needed help, so we got it! While in Africa, we listened more than we talked: although we were university lecturers, we knew we had more to learn than we had to teach. And, on two continents, we recruited student coauthors. Here, copied from Ab’s 2015 Africa syllabus, is the first assignment in Wildlife Management:

On Tuesday you will submit a short essay (2-5 typed pages) about your personal experiences/connections with wildlife, wild landscapes, etc. or about your cultural community’s attitudes towards wildlife (i.e., folktales might be acceptable).

Because I told students I would not put a formal grade on their papers, some failed to take the assignment as seriously as I would have preferred. (Some student traits are cross-cultural.) Others wrote about personal topics not suggested in my syllabus. Overall, because my Wildlife students have come from a dozen African nations, I’ve read quite a variety of essays. When content and quality were appropriate, and when students granted permission, I selected essays for inclusion in this book. With African views of Africa, they dilute a white man’s ignorance.

Back in the USA, my more rigorous coauthor did not promise a grade-free perusal of his students’ work. After each return from an Africa travel-project, GR required participants to submit photo-and-paragraph essays describing the sights, the sounds, the smells, indeed the intellectual and emotional impacts, of the Continent. Each year these submissions—I call them student reflections of African light—would be compiled as a book, perhaps a hundred pages per travel-class, published for distribution within the Wofford College community. For African Light, from this large body of student work, we have selected material that seemed creatively congruent or instructively incongruent with our visions of the Continent. As it turned out, the Wofford essayists were all American, but they were not all white, and a slight majority were female. Furthermore, their eyes and hearts were young, and their enthusiasm was boundless.

Our compilations of work by African and American students have been inserted between the longer, numbered chapters that I wrote. Please note that we interject student points of view

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5 As you shall see, this book contains more submissions by American students than by African students. One reason is that, alas, the power of the gradebook can influence quality.
in order to break the flow of my long Africa meditation: their purpose is to transcend the one-
white-man interpretation of a highly diverse continent.\textsuperscript{6} In other words, you should not expect
the students’ work to illustrate my chapters, and, conversely, you should not interpret my writing
as commentary on the student photo-and-paragraph essays.

Because both GR and I have been affiliated with Africa University, and because this is
the African place that we know best, the university naturally became the geographical center of
\textit{African Light}. This does not mean that we want to write a book about AU. In the first place,
we’ve been there, done that, and definitely earned the T-shirt—though AU’s Development
Office gave us ceremonial drums instead. Our 2009 book\textsuperscript{7} focused everything we knew about a
big continent to illuminate a small university. Now we are inverting the perspective, using the
small university as a window for apprehending the great continent. Furthermore, we intend to
transcend the AU campus with a wide-angle focus. Our tales and our photographs radiate
outward from AU, north to Sudan, east into Mozambique, west to the Skeleton Coast, south to
Robben Island and the Cape. Our subjects are as small as Ebola virus, as large as elephants and
the \textit{veldt} they traverse. We try to touch on the ridiculous (Ab is outsmarted by a snake with a
brain the size of a BB-shot) and the sublime (a Congolese preacher’s kid confronts a war and the
AIDS virus, single-handed). In our book a teenage white girl learns a lesson about sex from an
ageless \textit{n’anga}, a cleanliness-freak evanga-tourist meets a Real Missionary, a child soldier learns
to read, a Holocaust survivor plays Isaac Newton, and a Chicken Troll manifests his redemption.

\textit{… to listen for Africa...} So, now it’s time to sing for you our stories, my nine chapters
enlivened by nine kaleidoscope-bursts of student paragraphs and everybody’s photographs. I’m
still nervous about my worst faults as a singer of Africa: I include myself too much in what I
write. I detect sermons in stones, sometimes when the stones are just rocks. I see Africa through
the eyes of a South Carolina redneck. And I seize every opportunity to write about snakes.\textsuperscript{8} On
the other hand, as far as I can tell, the book’s student presentations are beyond criticism—though
of course I’m strongly prejudiced, and a few ungenerous readers might choose to disagree.
Anyhow, folks, whatever its faults and virtues, here is your song-line guide to Africa, for the
heart. I promise you that we have all tried very hard to tell the truth and to respect the Bright
Continent. And to the degree that we have done our jobs, you will hear in this volume a rainbow

\textsuperscript{6}For aesthetic reasons, and to increase the diversity of our book, we have included two or three
non-student photographs in every student-section. Most of these photographs were donated by
professional biologists who are also published photographers.

\textsuperscript{7}GR and I wrote our 2009 AU book, \textit{Thy Wonders Displayed}, with my wife Chris and our
colleague from Wofford Geology, Terry Ferguson. I think I’m supposed to say that copies may
still be purchased from the University Development Office in Nashville, Tennessee.

\textsuperscript{8}In this connection, you may recall my epigram for this Introduction. As a university-trained
herpetologist, I can assure you with absolute certainty that, like all other snakes, Gaboon Vipers
are incapable of singing. On the other hand, the epigram itself is a distillation of several very
real conversations, and I confess that if I were in the Aberfoyle forest under the full moon of
April, I would listen very hard. Oh, one more confession: some critics of my writing claim that I
use too many footnotes. Y’all don’t reckon they could be right, do you?
of African Light, of the five colors that we all discern in its spectrum: endurance, courage, humor, creativity, and love.
I. AFFIRMING THE NEW AFRICA

Nobody can see all of Africa, and I’ve never been tempted to try. On the other hand, I have looked pretty hard at the small piece of continent where I worked.

My wife Chrissy and I had real jobs in Africa, so we could stay there for months at a time. During our several visits we ate real food, suffered real frustrations, made real friends, and lived a more or less normal life. Of course we sometimes did “Africa things.” And when we did, I immediately emailed friends back in the States, telling each Africa-story as dramatically as possible. But actually Chrissy and I spent most of our Africa-days doing what we’ve done throughout our adult lives in South Carolina. That is to say, we taught classes, prepped labs, graded papers, shopped for groceries, prepared meals, hung out laundry, visited doctors and dentists. And, as in South Carolina, we walked around out-of-doors looking for amphibians and reptiles. Over time these everyday activities have become more significant to me than the exotic stuff because nowadays, when anybody mentions the small community where we lived, I don’t think “Africa”; rather, I think “Home.” And when you call a place home, you have license to sing praises and to speak criticism. You can also tell the sundry virtues of a community’s residents and attempt to describe the more general surroundings.

As you have read, the nation where we’ve spent ten semesters is Zimbabwe, a medium-sized country that would be a big US state. As her national anthem proclaims, Zimbabwe extends from the Zambezi River in the north to the Limpopo River in the south. The country has a growing population of around 12 million. Agriculture is the primary economic activity. GDP/capita/day is variously estimated at $1.50-$3.00. This is supplemented to some degree by subsistence farming plus herding of scraggly cows and goats.

Zimbabwe is mostly high country, drier in the west but marginally capable of supporting rainfall agriculture in the east. The region developed as the epicenter of Shona civilization around the 10th Century. The Shona smelted iron, cultivated sorghum and millet (after 1890, more maize), herded cattle, and built the magnificent stone edifice known as Great Zimbabwe, which I shall describe in a later chapter. In 1888 King Lobengula, who claimed much of the land between the Limpopo and Zambezi, granted Cecil Rhodes imperfectly delimited mining rights within his realm. Rhodes somehow parleyed this questionable concession into a Royal Charter from the United Kingdom, and in 1890 his British South Africa Company deployed “the Pioneer Column” north into Lobengula’s territory, establishing de facto white rule by means of fast talk,

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9 Zimbabwe’s total area is about 390,000km². Ranked by size, that’s 25th out of 53 African countries. (That list includes a few independent offshore islands that are quite small.) Zimbabwe would be the fourth-largest US state.
10 That places the country between about 15° South Latitude (the Zambia border) and 23° South Latitude (the South African border).
trade-goods, and Maxim machineguns. In 1923 the UK government formally accepted the region as a British colony, granting broad powers of self-government to the ruling white minority. The colony would be called Southern Rhodesia.

As independence came to Europe’s African colonies during the 1950s and ‘60s, white Rhodesians (roughly 15% of the population) began to get antsy. In 1965, suspicious of anti-imperialist sentiments maturing in London, these whitefolks proclaimed their own independence from the UK, declaring that majority rule would never be accepted in Rhodesia, “not in a thousand years.” England grudgingly tolerated this unilateral secession from her decaying Empire, but for black-nationalist leaders and their increasing number of followers, the move was entirely unacceptable. Simmering political protest developed into guerrilla warfare.

The horrors of this war have been graphically described by historians, poets, and novelists, so I see no purpose in reiterating them here. The Rhodesian government was officially under embargo by the Western powers but received substantial military aid from the apartheid regime in neighboring South Africa. The rebels accepted arms (and a few advisors) from China, North Korea, and Eastern Bloc nations, who perceived the fight as one more proxy-battle in the Cold War. Of course the Zimbabweans (and Rhodesians) paid the war’s real costs—which were the lives of their sons and daughters. The struggle continued for fourteen years, sometimes smoldering to low embers, sometimes erupting into open flames. In 1979 a truce established the transition-nation of Rhodesia-Zimbabwe. In 1980 the name was shortened to Zimbabwe, and the victorious guerrilla leaders assumed the reins of government.

The voyages of independent Zimbabwe have been conducted upon stormy seas. I cannot speak authoritatively about socio-political currents that underlie the nation’s ongoing troubles, and I’d be incensed if some African visitor to the USA condemned our government without substantial evidence. So I’ll mostly withhold judgement. Nevertheless, because Americans often ask me about him, I feel compelled to write a few words about Zimbabwe’s president.

Robert Gabriel Mugabe was born on 21 February 1924 at a Catholic mission-station in Katuma, which is about 100km west of Harare. His father was a carpenter (any other similarities to Jesus are not salient), and his mother claimed a distinguished Shona lineage. Young Robert was an excellent student at the local Catholic high school, where he developed a love for education that has never wavered. He was a public school teacher for fifteen years, and when he was jailed for pro-independence activities in 1964, he taught English to his fellow prisoners until he was released ten years later. Extremely intelligent, Robert Mugabe would become one of the most highly educated political leaders the world has ever known. He earned seven college degrees. He was awarded fourteen honorary doctorates. And he would eventually boast that he had also earned “a degree in violence.” Three of the honorary degrees have been revoked; the degree in violence has not.

Robert Mugabe’s commitment to black-majority power in “Rhodesia” was absolute. Leading mostly from exile, he assumed military/political command of the Zimbabwe African National Union (ZANU), the main resistance effort, in 1977. Mugabe won the post-independence election of 4 March, 1980, and he immediately initiated a campaign to convince Zimbabwe’s white residents that they should remain in the country. His approach to black rivals was less conciliatory. In 1982 he deployed the army’s elite Fifth Brigade west into provinces largely controlled by the Zimbabwe African People’s Union (ZAPU), a rival independence-party
widely supported by the non-Shona, Ndebele ethnic group. Political opposition to the Mugabe regime was defined as treasonous, and for five years the Fifth Brigade conducted a brutal suppression campaign that resulted in hundreds of deaths.\footnote{Some estimates place the death toll as high as 20,000.} After the local leadership had been neutralized, President Mugabe invited ZAPU’s residual adherents to join his government of national unity. From this union ZANU-PF, the party controlling Zimbabwe today, was formed.\footnote{Despite considerable disillusionment, many Zimbabweans continue to support ZANU-PF. The reasons for this include pride, gratitude, inertia, hope, greed, and fear. Some Party officials are honest public servants. Some are corrupt. Some are outright thugs. Many are just trying to get by and to support their families in a difficult world. Western analysts often blame ZANU-PF policies for the disruption of Zimbabwe’s once-vibrant economy, and, for sure, Party policy has adversely affected Zimbabwean agricultural productivity. On the other hand, Mugabe and ZANU-PF deserve substantial credit for universalizing public education during the 1980s. Indeed, Zimbabwe is often listed as having the highest literacy rate in Africa.}

Meanwhile, despite Mugabe’s post-independence reassurances, many of the old Rhodesian whites continued to fear a racial bloodbath. This never occurred, and indeed the white minority continued to dominate Zimbabwe’s economy into the 1990s. Eventually, however, many Zimbabweans who had supported the struggle for black-majority rule demanded some tangible fruits of victory; in particular, subsistence farmers and unemployed veterans wanted radical land reform. Over time the ZANU-PF government would seize more and more commercial farms without compensation. Most white farmers—who had once employed about 30% of Zimbabwe’s paid labor and produced almost 40% of her agricultural exports—would eventually lose their land after the passage of the Land Acquisition Act of 1992.\footnote{The Lancaster House Agreement (ending the guerrilla war and establishing Zimbabwe; signed in December, 1979) specified that for ten years land reform could occur only on a “willing seller, willing buyer” basis. The Mugabe government scrupulously followed this policy for thirteen years, until 1992, when the Land Acquisition Act was passed. The pace of confiscation accelerated in 2000 with the institution of the Fast-Track Land Reform Program.}

It was at about this time that Chrissy Hope and I first came to Zimbabwe—to visit briefly in ’92 and then to teach in 1993, 1995, 2000, 2007, 2010, 2012, 2013, 2014, 2015, and 2017. During all our semesters in the country, we experienced only one instance of racial hostility. In 2012 an elderly woman riding with us in the back of a Toyota pickup ranted for 23 kilometers about how all whites were devils incarnate. Other black riders tried to hush her up, but she would not be silent, and her English was more articulate than I might have wished. On the other hand, we have met a number of white people who were more than willing to trash black Zimbabweans. Mostly these folks have been bitter about the loss of farmland owned by their families for maybe a century—and originally acquired from locals by stratagems familiar to many Native Americans.

So anyhow, as I began to explain several pages ago, Chrissy Hope and I have experienced our clearest views of Africa while we were teaching in the Ag Faculty\footnote{In Anglophone Africa’s higher education, a Faculty is like a college or a school within a large American University. I think that’s the way higher education is structured in the UK as well.} of a school
called Africa University, or AU. I don’t want to detail all the facts and figures of the institution; for such information you can consult the University’s website, support-africauniversity.org. However, AU will be a major focus throughout several of this book’s chapters, so I reckon I should define the place right now. Africa University is a liberal arts institution affiliated with the United Methodist Church. It is located in eastern Zimbabwe, near the Mozambican border, at Old Mutare, a community about 17km north from the city of Mutare.15 Academically AU is divided into six Faculties plus the Institute for Peace, Leadership, and Governance. Pan-African by design, the University enrolls about 1500 students from almost two dozen nations.

The campus spans roughly 600 hectares (c. 1500 acres), of which academic buildings and student residences occupy about 10%. AU also has a farm—about 20% of campus—that produces food, earns badly needed revenue, and serves as a laboratory for most courses in our Ag Faculty. The remaining 70% of campus is largely undeveloped. It is under varying intensities of ecological assault by gold miners as well as poachers of bush-meat and firewood. This undeveloped portion of campus becomes my local laboratory when I teach Wildlife Management.

Of all our times teaching at AU, the most challenging was August-December, 2007. This was a fantastically wonderful semester in many ways. The Botswana Boys were in both of my classes. (You’ll meet these gentlemen in “Students,” the next section of this chapter.) I had a real Wildlifer-colleague, a Kenyan biologist who had completed a Master’s Degree on rhinoceroses. Chrissy and I went with a class to Mana Pools National Park, where we and our students survived the incursion of elephants and Cape buffalo into our campsite. We caught two pythons on campus, and an elegant cobra graced us with her presence in our kitchen. And best of all, our closest AU friend, fellow Ag-teacher Fanuel Tagwira, became Vice Chancellor of the University!16 But wonderful 2007 was also a very difficult time; that was the year Zimbabwe’s economy imploded. Effects of the economic crisis were highly visible on the AU campus. Gaunt villagers scratched through our dining hall’s garbage cans. Our forests were ransacked for firewood. Domestic cats mysteriously disappeared. Hunters with scraggly dogs combed our woodlands for any animal big enough to eat.

In Mutare-city the situation was just as bad. Grocery-shopping was a nightmare: the shelves were 99% empty, and you bought absolutely any food that happened to appear. On days when Chrissy had no classes, she’d go into town and haunt the bakeries, hoping to acquire a loaf

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15 When you walk the sidewalks of downtown Mutare, the place feels like a small town. But actually, when you include Mutare’s the high-density suburbs and immediate rural surroundings, the city is more than twice the size of Charleston, South Carolina. When Chrissy and I go to town, we spend most of our brief visits in TM Grocery or in the Mutare Farm Supply hardware store. “Old Mutare,” which is much smaller, consists mostly of an extensive mission-station across the paved Nyanga Road from Africa University.

16 A Vice Chancellor is the on-campus chief executive officer of many African universities; he or she is like an American university president. The Chancellor is largely a figurehead—as famous as possible—who may live at a considerable distance from the university and is seldom seen on campus. I have been told that this practice is British, and I do not know whether it is common in Francophone or Lusophone African countries.
Two thousand seven was the year when, nation-wide, Zimbabwe’s unemployment topped 75%. The banking sector collapsed. Inflation was explosive: UN economists quit trying to estimate the rate when it exceeded 100% per day. At the worst, people substituted billion-dollar bills for toilet paper. Without loans for seed or fertilizer, agricultural production plummeted; food-production capacity declined by 45%. In the international news, commentators began to use the term “failed state.” But you know what? Zimbabwe survived! Somehow, most of the time, most people found some little something to eat—and, often, some little something to laugh about. And to this day Chrissy and I remain thankful for that bag of rocky rice!

When we got back to the States in December, Chrissy and I felt guilty for every big meal we ate, for every pound we re-gained, for Novocain, for a Christmas far too rich in Things that we could not share across the Atlantic. And, of course, we followed the news from Zimbabwe. We learned that although 2007 had been bad, 2008 became worse. Reuters, the international news agency, estimated the maximum annual inflation rate at five hundred billion percent. Food remained acutely scarce. Unemployment edged towards 95%. And in a country that values education over almost all other things, the government closed its primary schools. Still, Zimbabwe survived, and over time the situation began to improve. Chrissy and I returned to AU in 2010. By then the service stations had fuel. There were no subsistence-hunters on the university campus, and almost nobody tried to snare our small birds. Mutare’s grocery stores were reasonably well stocked, and once a week Chrissy and I splurged on fifty-cent ice cream cones at the Creamy Inn.

When we had been at AU for a few weeks, our old friend, Vice Chancellor Tagwira, invited us to supper at his home, which is near the Odzi River, about twenty km west of campus. The dinner was so amazingly bountiful (even in 2010, Chrissy and I weren’t exactly getting fat in Zimbabwe) that, at my first opportunity, I wrote down the sumptuous menu: butternut squash, rice with amaranth, beans and peas with carrots, and, unbelievably, three kinds of meat. (Chrissy, who seldom eats beef, tore into a steak with the gusto of an Orangeburg County

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17 At inflation’s height, the government issued a hundred-trillion-dollar bill, which was almost instantly worthless, except, of course, as a curiosity on eBay.
18 The taming of runaway inflation played a substantial part in the economic turn-around, and this was effected by a currency-decision. During 2009 the desperate government had ditched the Zimbabwean Dollar to rely on international hard currencies. These included the Pound (UK), the Pula (Botswana), the Rand (South Africa), and, above all, the American dollar. Readers should note that the enormous improvements associated with “dollarization” rebounded largely to those who had dollars! The situation for Zimbabwe’s poor remains at the edge of desperation.
dumpster dog.) For dessert we enjoyed ice cream and fresh fruit. Then, of course, we had tea and biscuits and extended conversation.

After supper, as we relaxed over steaming cups of Earl Grey (with milk, of course), Chrissy and I asked, somewhat reluctantly, how the University had fared during the worst of the Dark Times. The Vice Chancellor spoke slowly. “Africa University was in many ways a microcosm of Zimbabwe as a whole. Sometimes I could think ahead to the next tomorrow,” he said, “but mostly I was able to plan only for each today. Before the end of 2008, when our currency was worthless, AU could collect tuition only by barter.” I accepted maize, lightbulbs, pumpkins, and even toilet paper in exchange for student enrollment. But what I really wanted was cattle. When a student’s parent said, ‘I have a beast…’ I knew that Mai Kagurabadza could feed the student body for another day.” Prof Tagwira went on to explain how on some evenings the dining hall would serve up its last morsel of food. “But something would always appear by the next morning. And for several weeks a cabal of Mozambican students ran a food-import scheme that involved unofficial border-crossings. I did not inquire into questions of legality.” Teaching salaries went to zero, of course, and faculty were sometimes paid in eggs from the farm’s Layer House, sometimes in a few liters of bootleg Mozambican diesel fuel.

In other words, during 2008, by most American standards, Africa University as an institution just flat-out collapsed. But the deep Africa-truth of this matter is very different. Throughout 2007, 2008, and all the recovery-years, AU students never quit learning—Sociology of Education and Biblical Greek and Irrigation Systems Design and Computer and Society and History of Europe from 1789 to 1919… As surely as the bright sun rose over the border-ridges to the east, the University opened her classroom doors. Every other tertiary institution in Zimbabwe shut down, but AU never closed.

You readers will have noted that Chrissy and I relish AU’s triumphs and mourn her tragedies. And we return there to teach whenever we can muster the time, lab-equipment, determination, and airfare. As soon as we set foot on campus, we look to the fields and forests, to the surrounding mountains, to the African faces—and we know that we have come home. Also, since 2007, we immediately begin to think about food, and we seek transportation for a grocery-run. In 2014, even before we unpacked, we crowded onto the four o’clock student bus to Mutare, where we’d shop for our first week on campus. Filled to capacity, the bus crossed AU’s Bridge of Dreams, cleared the University gate, and turned south. The weather was warm

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19 I made notes as soon as Chrissy and I got back to the farmhouse where we were living. But some of the Tagwira-quotes are inexact.

20 During 2007 and particularly during 2008, hard-currency contributions to AU by American Methodists (and others) were particularly important. I think that in “normal times” these donors pay about 20% of the school’s expenses. During the Dark Times, the same dollar-amount of funding comprised a much larger proportion of the operating budget. Of course Professor Tagwira knew that Chrissy and I were aware of this fact.

21 I unsure of the spelling, but Mai (+/-) is a local Shona honorific term that, I think, means Mrs or mother. Anyhow, Mrs. Kagurabadza has been the absolute ruler of the AU dining hall since the university was established.
for August, and the Nyanga Road appeared deserted except for a young man, walking north, carrying two tools. One tool was a traditional spike-mounted hoe. For this hoe-design, the wooden handle is cut to the length desired by the user. The proximal end of the handle is whittled to a diameter ergonomically congruent with the user’s grip. The distal end is rounded to about the size of a fist. A hole is drilled straight through the rounded end, and the spiked heel of an iron hoe-blade is pounded through the hole, with its pointed tip protruding out the far side.  

Thus, when the blade wears out, the spike can be hammered free and the useless blade replaced. If the handle breaks first, a new handle, carefully smoothed, can be fit to the old blade. This type of hoe can be a multipurpose instrument: if the user desires to chop wood rather than weeds, an axe-head can easily be substituted for the hoe-blade. Even better, if some tourist sees the hoe and becomes enamored of its craftsmanship, the hoe will be sold—and a season’s worth of Round-Up (®; 1% glyphosate, 2% pelargonic acid, 0.17% imazapic) will be purchased at Mutare Farm Supply to zap the weeds in Twenty-First Century style without Eleventh Century toil.

The basic design of the hoe is ancient. Somewhere north of the Zambezi River, the earliest blades emerged millennia ago from iron-smelters shaped to represent the posture of women giving birth. Handles have always been fashioned from local wood, but blades must have moved freely in African trade, because the iron tool spread rapidly beyond regions with workable ore deposits. Today the traditional hoe is most definitely not Africa’s most favored tool for agricultural work! But it remains ubiquitous in Zimbabwe, and it does the same essential job it has done for two thousand years. It makes family life possible for village farmers.

In Sub-Saharan Africa there are more than 650 million cell-phone users—who frugally conduct relatively few cell-phone conversations. Voice commo is too expensive, so Africans usually text. Many of their texts address the individual challenges of daily life. With his cell phone, our farmer can be sure that his brother is caring for their aged mother in the next district.

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22 In my observation, traditional Zimbabwean hoes conform to either of two designs. One is described above. The other consists in an iron blade with a “collar” that surrounds the reverse-tapered distal end of the handle. This second variety is more widely available for purchase.
23 I’d guess that Africa’s technology for producing iron hoe-blades dates from about the time of Christ. Some experts say it was invented in West Africa around 1200BC, and there is some evidence that Tanzanians actually worked carbon-steel by 0BC/AD. Those claims, however, are contested, and indeed archaeologists apparently enjoy arguing about the dating of iron-smelting in southern Africa. Perhaps most authorities would agree that the technology existed in Zambia (just north of Zimbabwe) by the First Century BC and had reached the Cape of Good Hope before 400AD. Anyhow, feel free to question my dates for Africa’s iron technology. On the other hand, if you see the excavated smelters, you’ll have no doubts about their shape.
24 At least in the wildest dreams, that most-favored tool would probably be a John Deere 8310R.
With his cell phone, our farmer can check on his daughter’s progress at her missionary boarding school. With his cell phone, our farmer can determine whether the district clinic has the Anti-Retrovirals for his sister’s HIV—and he can save himself a 20-km walk if the drugs have not yet come in. For twenty-five cents, our farmer can contact his cousin in the States, and if she recalls Zimbabwean norms of family-obligation, she’ll send money for his kids’ school-fees. And if the farmer’s land is plumb wore out, he can text a friend in Mutare and have him load a 50kg sack of fertilizer onto a north-bound Combie van.  

Africa’s cell phones are also employed in more sophisticated tasks. Personally, I’m not much of a cell-phone user, and I have not stayed abreast of the latest developments in communications-technology. However I do know that in rural Zimbabwe cell phones play increasingly important roles in education and in the delivery of health care. Furthermore, cell phones are helping increase agricultural productivity. 

It is my job to believe that agriculture is the foundation upon which Africa’s development must be based, and I do. Theoretical models and empirical observation solidly demonstrate that growth in agriculture is more effective in reducing general poverty than equivalent growth in any other economic sector. Real per capita growth, of course, will be difficult to achieve. Merely to keep pace with Africa’s population, food-production must increase by about 70% over the next thirty-five years, and to fuel Africa’s development, ag must do even better than that. This is not an impossible dream. According to most of the development-experts I know, Africa’s farmers can achieve this miracle if they have sufficient information, investment capital, crop insurance, and market access. According to most of the African farmers I know, you can’t have any of those things without a cellular telephone. 

Back in the USA, agricultural information is widely disseminated by journals, newspapers, the Internet, the Weather Channel, and agricultural extension agents from our A&M universities. At least for now, similar sources are less available and more expensive in Africa. Cell phones, however, are taking up some of the slack. You can call for a weather report. You can compare prices charged by regional providers for seeds or chemical inputs. You can coordinate with local farmers about hiring a tractor or a combine. You can learn whether a new maize cultivar has worked out well for other farmers across your province. You can text our Faculty at AU and find out the cheapest way to get a reliable soil-test. Furthermore, if you have a smart phone—and smart phone usage is exploding in Africa—you can install apps like M-Farm and i-Cow. Then, for about a penny a call, you can send pictures of pests and get pesticide recommendations. You can consult veterinarians about your chickens or your goats. You can receive real-time severe-weather warnings. You can review updates on scientific advances, 

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25 For American visitors, Combies are lots of fun. I’ll write more about Combies presently. 
26 I should also mention three other, more fundamental building blocks upon which African food security must be constructed. Global temperature increases must be held within the 2°C limit specified in the Paris Agreement (December, 2015). (For sub-Saharan Africa, variations in the spatiotemporal distribution of rainfall will be more important than temperature changes. But the 2°C temp-limit is easier to list.) Arable land must be more equitably distributed, and tenure to it must be more secure. And, above all, peace must be secured and maintained. Each of these three prerequisites of Africa’s agricultural success merits a whole shelf of books—which I am not qualified to write.
rainfall projections, agricultural epidemiology, university training-seminars, and impending ag legislation. And with any cell phone, however antique, you can participate in the regional network of serious farmers, learning and teaching how to do modern agriculture in modern Africa.

I don’t know beans about economics or finance, so I cannot confirm reports that African banking systems are “broken.” But I have stood in a bank line for six hours to get a stamp that allowed me to stand in another bank line until closing time, and I have never personally known a black African farmer who managed to borrow money directly from a bank. On the other hand, several charitable NGOs offer microloans to support African agriculture, and cell phones are becoming the ubiquitous medium through which such loans are discovered, provided, monitored, and repaid. Of course the technology of mobile-phone finance is still developing, but in provincial Mutare you can already use a cell phone to pay many seed, feed, and fertilizer bills. And maintaining a savings account in your phone is trivially easy: just buy an Air Time card from any street kid in a bright red vest; scratch off the coating and type in the code-number.

Given the mobility of African pests and the vagaries of African weather, small-farm agriculture is always a gamble in Africa. Therefore potential loan-providers are reluctant to grant unsecured loans, and farmers are equally reluctant to put up their lands (typically their only substantial assets) as security. Similarly, few farmers can afford to risk a growing-season on the hope that a new cultivar or technique might provide an extra handful of dollars at harvest time. But crop-insurance can provide a mechanism to spread the risk across a larger population—and can thereby facilitate loan security, practical experimentation, and agricultural development. With a cell phone you can purchase crop-insurance—maybe not much, maybe just enough to help you survive a worst-case catastrophe—for pennies a day. The insurance providers can review your before-and-after pictures of your busted crop; then, using an algorithm that involves soil-type and regional rainfall, they can issue a payoff directly to your cell phone.

Markets are complex, and their operations vastly transcend the world of individual farmers and their tiny mobile phones. Nevertheless, cellular telephones enable farmers to monitor and compare commodity prices, to coordinate with other farmers in their region, to plan affordable transport of produce, and to negotiate collectively, at near-parity with potential buyers.

As a phone-naïve South Carolina redneck, I have tried to explain some specific, creative ways in which Africans use cell phones. And I hope y’all more sophisticated readers will understand my general point: Africans have responded to institutional failures and arising challenges by adopting, modifying, and inventing a mega-swarm of applications that make modern phones as important as ancient hoes for preserving family life in rural Zimbabwe. And, if all this fails absolutely…, well, on our grocery-run into Mutare, Chrissy and I read about another cell-phone use: “Buy funeral insurance on your phone! Select Lite, Basic, Regular, or Premium.”

The advertisement for the burial-insurance app was printed in big red letters on the side of a white Toyota Combie. A Combie is a van, often white or blue in color, usually with an

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27 I must admit that in 2015 the ATMs in Mutare worked extremely well, at least if you had enough savings to cover the fifty- and hundred-dollar bills they dispensed.
official passenger-capacity of 10-12 people. On the roads of modern Zimbabwe, Combies are almost as common as hoes and cell phones. Also, they are almost as important, for they are the mode of mass transit that glues the countryside together. Chrissy and I ride Combies often. When we get into a Combie, something magical happens: we cease to be white people. So, we are not ushered to the best seats or shunted to the worst. We just get the next seats. If we have an excess of grocery bags, somebody may hold one for us. And if we are less encumbered than our fellow passengers, we may hold a bag or two for somebody else. Heck, I’ve even held a baby, who cried at first and then fell asleep on my shoulder.

Of course a Combie driver will never depart with even one empty seat. He and his assistant will advertise for more riders, shouting the name of the vehicle’s most distant destination: Nyanga! Nyanga! Nyanga! By the time it is fully loaded, our Combie will contain about twice its advertised passenger-capacity. My hips or knees or shoulders will always be jammed uncomfortably against a window or a broken seat or a school-child’s bony elbow. Often I actually hurt, sometimes appreciably…

...but now we’re almost underway. The last passenger is shoehorned aboard; our Combie starts, and the driver puts on a CD. Combie music can be either traditional or contemporary; today it is a blend of both. As we clear the suburbs of Mutare, I hear a rap song interpreting the 43rd chapter of the Book of Ezekiel. On the open highway now, I listen as I marvel at the red foliage of late winter’s miombo woodlands: from the Combie’s speakers I hear something vaguely familiar; maybe it’s Thomas Mapfumo. But now there is a marimba, and now an m’bira. The scenery flashes by—Christmas Pass Hotel, a broken car, a truck from Mozambique, a troop of baboons in the flatlands. An instrumental piece unfolds its evolution: eight syllables, change, repeat; eight syllables, change, repeat. I try to think about my problems with an upcoming biostats class, but I’m in a Combie, and the worries bounce away. My back hurts only a little; I smile; I am home....

Few Zimbabweans want to ride in a Combie all their days. They dream of having their own car, preferably a Mercedes C-Class or a Lexus, like high Government officials and some white people drive. But Combie-rides are cheap—a dollar or two will take you a long way—and Combies depart from their street corners several times an hour, as soon as their seats are double-filled. They provide free music, the driver will take care of any police-bribes, and they will get you where you need to go.

Transport-Combies, cellular telephones, and traditional hoes are, literally, icons of modern Zimbabwe. That is to say, if you look at them with the vision given by grace, you will see a Rainbow that transcends the mundane world of an African nation with more problems than any number of outsiders could ever address. You will see an Africa that flat gets things done! Need to chop weeds? Use a tool from the dawn of civilization, input a surge of your own ATP, and chop the damn weeds. Desperate for your children’s school fees? Beat an SOS upon a long-range signal-drum constructed around a tantalum capacitor from the nastiest mines in Congo. (I.e., cell-phone your cousin in Atlanta for the damn money to keep your kids in school.) Need
fertilizer from Mutare Farm Supply? Text your neighbor to tote you a 50kg bag on that wonderful damn Combie.

This invincible spirit of innovation—cows for tuition, eggs for Hebrew lessons, cell phones as banks, Iron-Age hoes augmenting Monsanto’s herbicides, electronic music about dry bones, mass transit by Toyota, and maybe let a white man hold your baby—those are all bright blazes of what GR and I call African Light. They are what you will love if you visit the “dark continent” with your eyes and your heart wide open. Look, and then you will see an Africa that is running—under her own power, a hundred clicks an hour—to embrace the Twenty-First Century. Our first job, when we try to be of service, is to keep out of her way, and if I hadn’t learned that on my own, I would have learned it from my Wildlife and Biostats students at AU.

II. STUDENTS

Nowadays, students in Africa University’s Faculty of Agriculture are very much like students in other modern universities. Many are intelligent, well-educated, and eager to learn. A few go zero-for-three by those criteria, and a goodly number are just about average. Good, bad, or in between, almost all of our Third Millennium ag students are thoroughly up to date: that is, they dress fashionably, they are knowledgeable about modern film or music, and they are polite enough to turn off their cell-phones during academic classes. However, the first time I taught at AU, things were different. In 1993 my students comprised what is now known as “the Alpha Class,” the first group to enroll in the brand-new Africa University. These students were few in number, but they had been selected from a vast pool of applicants. They all had full scholarships, and they were, in general, academic super-stars. Most of my Alpha-Class students were from poor families in Zimbabwe. They owned few material possessions, and they had been forced to study thousands of hard hours in order to compete for university scholarships. Overall, these students had the appearance you’d expect of people who had done little in their lives but agricultural labor and schoolwork. Many, quite frankly, were study-nerds, and they looked it. Then one day an International Student (whose name was not Tania, though that is what I shall call her) arrived on campus, her tuition paid by an affluent congregation of the United Methodist Church. Because she was from Angola, Tania’s high school studies had been less rigorous than those of my Zimbabweans. Also because she was from Angola, she spoke English with a Portuguese lilt, and she walked with an almost Brazilian flounce. And there were her clothes—oh my—her cosmopolitan, new-purchased clothes that included skirts so scandalously short that they almost showed her knees. When Tania walked across campus, every male eye turned in her direction, and she rewarded every glance with a smile as warm as African sunshine. I mean, this woman would have been considered a beauty on any university campus where people had decent eyesight! In 1993 most of my students talked to one another in Shona, and although I did not understand that language, I would occasionally hear Tania’s name, and because I liked her, I wondered what the students were saying. Then one morning I was able to eavesdrop. Two young men—both tall, both handsome—were conversing in English. One sighed wistfully, “Ah the lovely Tania—do you think you will ask her out?” The other Zimbabwean shook his head;
“No, my brother,” he replied, “I would never wish to be seen with a woman who was not proficient in calculus.”

That snippet of conversation still colored my view of AU students when I returned to teach in 1995. Therefore, in my Biostatistics class I did not hesitate to assign a homework problem that required a whiff of first-semester calculus: “Prove that the average of a set of numbers is the measure that minimizes the sum of squared deviations around itself.” My Zimbabwean students—almost the entire class—rolled their eyes with the expression that asks, “How dumb does the whiteman think we are?” At the next class meeting they all turned in half-page proofs, all correct, some with the Latin “Quod erat demonstratum” written at the bottom of the page.

But I had one non-Zimbabwean, a man I’ll call Isaac. And he asked for more time to complete his homework assignment. Back in the USA I routinely dealt with requests for deadline-extensions. However, I was still relatively new to the ways of Africa University; I understood that the Faculty had strict policies about academic requirements, and I did not want to commit a mortal violation of any formal rule. Therefore I asked my friend (and eventual boss) Dr. Fanuel Tagwira for advice. “Generally,” he said, “we do not like to offer such extensions. But Isaac is special, and you should give him all the time he wants.” So I told Isaac the news, and he grinned. A week later he asked for more time; I granted it, and he grinned again. Two weeks later, he turned in the completed assignment.

Now there are some things y’all should know about Isaac. He was a tall man, and he had only one eye. He had lost the other to a burst from an AK47, which had left him unconscious and apparently dead. Sadly, the eye was not the only thing that Isaac had lost. He was a Rwandan Tutsi, and as you must remember, 1994 was a time of incomparable horror for Isaac’s people. Approximately 800,000 were killed in about one hundred days. Seven of these victims were Isaac’s siblings; two were his parents. As he would later tell me, they were hacked into pieces that could fit into such containers as white people might use for the storage of bread. Obviously, Isaac did not die. Struggling toward recovery he left Rwanda on foot, headed south. With one eye and almost no resources, he trekked over 2500 kilometers. Across Tanzania and then across Zambia, he relied on African hospitality, on the proverbial kindness of strangers. Muslims, he said, were particularly generous, never failing to shelter a Christian boy in flight from the cataclysm that consumed a small, mountainous country to the north. Somehow—by luck, endurance, indomitable courage, African Light, and the Grace of Allah—Isaac made it to Africa University, where the Methodists, for their part, said hell yes, we’ll admit him!

But I digress. When Isaac finally submitted his much-delayed homework assignment, it was not a half-page calculus proof. Instead, it was about twenty pages, with tables, graphs, and line after line of algebra. I stared at the pages for a while, and then, dazzled by African Light, I grasped what Isaac had done. Having never heard of calculus, this Holocaust-survivor had just flat-out f-ing INVENTED it.

For contrast with Isaac, I shall now introduce the Botswana Boys. In 2007 I had my usual, enormous Biostatistics class, but only five students were enrolled in Wildlife Management. One was a Zimbabwean. He plays no important role in this essay, so I can tell his real name, which was Elvis. The four Botswana Boys, however, might choose to be designated
by aliases. I like Biblical names, so two will be Matthew and Mark. One was a—uh, here the requirements of correctness are unclear. There is no polite, general term for the indigenous hunter-gatherer people of Botswana. Some anthropologists prefer San, but that was originally a derogatory term coined by sympatric herding peoples. !Kung isn’t bad, but it is not sufficiently inclusive. In Botswana, most locals say Basarwa (singular is Mosarwa), but the etymology of the term is unpleasant. Nowadays almost everybody considers “Bushman” to be derogatory, but that’s how this student defined himself, at least around me. I’ll call him !Koga; that’s the only gender-appropriate, culturally correct alias I could find on the Internet. The fourth of the Boys insisted that everybody, including me, call him “the Godfather of Francistown”28; he asked for the name in my class, and so he gets it in my essay. So, here was my class roll: Elvis, the Godfather, !Koga, Mark, and Matt.

The entire teaching staff in our Ag Faculty called these International Students “the Botswana Boys.” Usually the term was preceded by a long, resigned sigh because the Boys were not God’s gift to academia. Under normal conditions they might not have been accepted into Africa University, but as I explained in the first section of this chapter, 2007 was not a normal year. Africa University, like the rest of Zimbabwe, was flat broke.

Meanwhile Botswana, Zimbabwe’s western neighbor, was profiting from its natural resources, from several wise political/economic decisions, and from proverbial Botswanan luck. When the education ministry in Gaborone learned that a government forestry college29 near Mutare could not fill its classes with broke Zimbabweans, the Botswana Boys were given tuition-money and shipped across the border. When the Boys finished their forestry-tech classes, Gaborone contacted Africa University. Would we accept four young men whose fees would be paid in full by means of hard currency? Well, what do you think!

As our difficult semester matured, the Boys limped along in my Wildlife class, sometimes attending and sometimes not. Their English was bad; their math was non-existent. But they were having a great time—nothing but smiles—and Zimbabwean Elvis was actually learning something, so I had no legitimate complaint. At least that was true until the day before the Field Trip.

A Kenyan colleague of mine, Daniel N’zanya, shared “academic” custody of the Boys, and against all odds he was determined for us to take a field trip. The objective was Mana Pools National Park, which is 600 kilometers away, up north on the Zambian border. Through fair means and foul, we started accumulating hard currency and stockpiling fuel in army Jerry-cans. We bought cornmeal and rice when we could. We borrowed tents from missionaries. And some powerful AU administrator convinced the government that Daniel, Chrissy, the Boys, and I were loyal Zimbabweans who could visit the Park at the citizens’ rate. The success of these

28 Francistown is the second-largest city in Botswana with a population of maybe 150,000. An ancient resting site for travelers, it has been continuously occupied since Gold Rush times in the 1890s. Francistown was named for an English prospector, Daniel Francis. It is only about 90km (a very short distance by Botswana standards) from the Zimbabwe border.

29 That sort of college would be a tech school for some high-school aged students and some high-school graduates. The Mutare forestry college is about a dozen clicks from AU.
preparations was a minor miracle;30 we were actually going to Mana Pools! Then, on the pre-departure day, plans fell apart.

I was sitting in my office, preparing a Biostats lecture, when the Godfather burst in.

“Bad news, Prof,” he said, “the Boys are in jail, and you’ve got to help me spring ‘em.” I stared at the Godfather. His Lazy Eye had its usual, glazed look, but his good eye was shining, as was the enormous diamond in his left earlobe. “Come on, Prof,” he continued, “now! Meet me at my car, and let’s GO!” And the Godfather was out the office door.

“Do you want me to go with you?” Chrissy asked.

“No,” I answered, “one of us should stay out of jail.”

“Better take your passport.” Chrissy reached into her daypack. She is the curator of passports. She also withdrew a couple of US hundred-dollar bills from our emergency stash. I stuffed one into each sock.

Jogging down the ag-building stairs, I ran into a Biostats student. She was of the Type that Knows Everything, so I asked her, “Do you know the Godfather’s car?”

“Sure,” she nodded. “He is the only student who has a car.” [This was not quite true, but it was close.]

“How will I recognize it?” I asked.

“It is a Botswanan car.” The student turned up her Zimbabwean nose. “It is worth about two hundred US dollars, but the sound system is worth about two thousand.”

I found the car—by ear. The motor was running, barely. The sound system (perhaps a bargain for only $2k) was playing an American rap number; the volume was adjusted to entertain people in Mozambique and perhaps even Zambia. I remember the exact lyrics because the rapper repeated the same sentence over and over. He was “gonna kill that…,” well, kill somebody who was designated by his commission of Oedipal acts. I begged for silence, and the Godfather turned off the performance so that he could explain the nature of the crisis.

“You know your assignment, that we take pictures of wildlife?” the Godfather asked. I nodded. “The Boys were in town. They saw a bright-colored lizard running up the side of the police station. They took pictures. The police told them to stop. They didn’t.”

“How did you escape?” I asked. I glanced over my shoulder into the back seat; I was relieved that no AKs or RPGs were in evidence; perhaps the jail break would be peaceful.

The Godfather looked at me as if I had asked the dumbest question in the world. “The Boys work for me,” he said, “and I have enough sense not to take pictures of a Zimbabwean police station.”

I never learned the Godfather’s break-‘em-out plan because on the way to Mutare, we were flagged down by three jubilant Botswanans in the back of a Zimbabwean pickup truck.

“What happened?” I asked, silently praying that no fatalities had attended the great escape.

“After a time they turned us loose.” Matt and Mark were grinning.

“We convinced the police that we might corrupt the morals of their decent Zimbabwean prisoners,” !Koga added. “We were having a very, very good time in jail.”

30 I never learned—and don’t want to know—how it all got done. I would credit success largely to the drive, the determination, and the baffle-‘em-with-BS Kenyan attitude of Daniel N’zanya.
We made the field trip. Mana Pools National Park is fantastic. It lies along the Zambezi River, downstream from Lake Kariba. You can camp in the shade and look across a kilometer of flat water into Zambia. Crocodiles and hippos abound, and elephants regularly cross the International Border, their trunks raised as snorkels. Regulation-wise, Mana Pools is unlike Zimbabwe’s other big-game national parks. In Hwange or Victoria Falls or Gonarezhou, you stay on the roads, you remain in your vehicle, you camp in protected campgrounds or you book lodging in secure cottages. If you break the rules, you are likely to be caught, and you are likely to be evicted, with a serious lecture and no refund of entry fees. But Mana Pools, as I have told you, is different. As far as I know, there are no rules. To an American wildlife, the park seems designed to facilitate suicide-by-large-mammal—and each year several visitors succeed (perhaps unintentionally) in that self-destructive enterprise.

And Mana Pools was habitat for the Botswana Boys! Inept at academics, they were great at building fires. Challenged by English grammar, they were superb cooks. Defeated by mathematics, they could see every mammal before their highly educated Wildlife teacher could, and !Koga could keep exact counts of a dozen different species without a scrap of writing-paper to his name. In the morning the Boys showed me how to find birds. In the evening they showed me how to attract hyenas into range of my remote cameras. In between they showed me how to enjoy a fine nap in the African Light of midday.

Two field-trip events stand out particularly in my memory. During the first full day, at about noon, two Cape buffalo wandered into our camp. Cape buffalo kill more people at Mana Pools than any other mammal, and these two animals were old bulls, real “dagga boys” that looked murderously irritated with the whole world. A family of white folks, camped next to us, piled into their 4X4, but our AU van was parked at some distance. The white people motioned that we should all join them, but their vehicle was much too small for that, so the Godfather smiled and shook his head. The buffalo moved between us and our water source; they were maybe eight meters away, watching us intently. Zimbabwean Elvis was very quiet, perhaps as scared as I was. But Matt and Mark spoke calmly, instructing us to be absolutely still; then they took turns whispering tales about their previous encounters with Cape buffalo, back closer to home. Periodically !Koga would interrupt them and say, “I wish I had a rifle; we would feast like bushmen tonight.” The buffalo remained in our camp for over an hour. Then, as silently as they had come, they walked away. The white couple, hot and sweaty, poured out of their 4X4. Their small children were immediately all over !Koga, whose shoulder-length curls were something seldom seen in Shona people. The Godfather invited the family to share our supper, a meal in whose preparation he played only a supervisory role.

Chrissy and I learned details about the other major field-trip event only second-hand. For several years Mana Pools had hosted a lion-telemetry project. Unfortunately, financial support for the project was running low, and the enterprise supported itself in part by allowing visitors—for a fee—to accompany lion-trackers afield. Our class had studied radio telemetry at AU, so of course the students wanted to participate. I checked out the operation. The tracking biologist seemed reasonably competent, and a fierce-looking guard carried an AK with a topped-off 30-round magazine. Predictably, Chrissy and I had the only disposable funds in our happy group; fortunately, we had enough to pay for all the students plus Daniel. That left us broke, so we sat out the exercise.
After about three hours Daniel, Elvis, and the Boys returned. The two non-Botswanans looked strangely subdued, but the Boys were laughing and whooping and generally cavorting with even more energy than usual. “Tell us what happened,” I demanded.

The tale was related mostly by Matt and Mark, choreographed by nods from the Godfather. They had hunted for a long time, with no radiotelemetric beeps audible. Then, for altitude, they climbed a termite mound, “…just like you taught us at AU.” They heard a beep. “It is the lioness,” the telemetry-biologist said. They followed the signal; I knew that the Boys were proficient at radio-tracking, so I was not surprised that they could close in rapidly. “The sound came from the short grass,” one of the Boys explained; “we checked the area from all sides. We could see nothing. The biologist said the lioness had thrown her collar, so we went forward to retrieve it.”

Finally, at a distance of a couple of meters, the lioness, impossibly invisible in the short grass, stood up and roared. Everything froze, perhaps for a long second, perhaps for two. Then the lioness exploded into warp-speed, away from the telemetry party.

“And the guard,” I asked, “the one with the AK?”

“Oh,” !Koga laughed, “he throw down the damn gun and run like hell.”

In the end I gave every Botswana Boy a B in Wildlife Management. Academically, they did not deserve Bs (or Cs for that matter). But what the heck, I was supposed to teach them, and I had failed. On the other hand, they had generously elected to teach me, and they had succeeded. The Dean of Agriculture called me into his office and spoke of the matter. “Thank God you have elected to mark so charitably. Perhaps we shall be able to graduate them and send them home. This will improve the quality of our program—though to tell the truth, I shall miss them.”

There is a moral to these stories. Over the years Chrissy and I have learned that African Light, when it shines its brightest, can be emitted by unexpected sources. Also, it can present itself at wavelengths virtually undetectable by the visual centers of our America-trained brains. I introduced Isaac to you as the smartest man who ever sat in my classroom. Who can say, however, that his intellect is superior to that of the Botswana Boys, who had learned to revel so joyously in the fields of the Lord—and who had the brains and blarney to talk their way out of a Zimbabwean jail? I was privileged to teach all these kids, and I was fortunate to understand how special they were. Furthermore, by luck or grace I’ve been able to recognize many other extraordinary students at Africa University:

… a man from the Alpha-Class who earned his PhD at Clemson University—and has become a world-class entomologist, teaching today at AU…

… a woman from the mountainous fringe of eastern Zimbabwe, who could whip through statistics proofs, sweet-talk flies off a honey-comb, and detect a hidden python at the length of a soccer field—and who has presented a formal paper to the National Council for Black Studies in Los Angeles…

… a Zambian Fisheries biologist who quit a dream job and left his home to pursue a more theoretical understanding of freshwater ecology….
I could expand this honor roll for pages, and I might feel better if I did. But I realize that I’ve been an AU teacher with made-in-America academic prejudices, and for every wonderful student I’ve ever recognized, I wonder if there was another whom I missed. You know, some average-looking kid who sat in the back of my Biostats class, mentally wrestling with problems more important than Analysis of Variance—some student whose name I never learned and whose Light I never perceived…. 

So, heck yes I feel guilty, and there is no way I can atone right now for years and years of teacher-sins. However, as you know, GR Davis and I created this book in large part so that a few of our students, African and American, can tell tales and introduce themselves to you in their own words. Please read these words. Please listen. Please hear the whisper of a rainbow.
As I write this in October of 2016, GR and I have not selected any essays or photographs by American students, and I have made final decisions about only two essays by African students. I include them in this FIRST STUDENT INTERLUDE as a sample of the eight INTERLUDES that should enliven our final book. As our work progresses, GR and I reserve the right to annotate student submissions and to introject occasional “boxed” comments like this one.

The following two autobiographical essays were written for my Wildlife Management class. The first essay is by Evans, a Rwandan. He is small, somewhat light in complexion, and quiet. The second is Simon, a South Sudanese. He is tall, very dark in complexion, and not at all quiet. Both students asked me to use their real names, and therefore I have done so. They also insisted on appending their AU student numbers; I have left those numbers in place. I worked with Evans and Simon to “improve” their essays, and the two men incorporated a few of my suggestions. Nevertheless, the words are essentially the students’ own—uh, except that neither student routinely thinks in English, which is the fourth language for Evans and the third language for Simon.
When I was eight years old, I was in a car accident. I spent four months in the hospital, under “threatened” conditions, cared for by various doctors and nurses. Although I was quite young, the hospital’s procedures fascinated me, and when I was released, I was very interested in medicine. A few years later, after completing my primary school, I focused my high school studies on biology and chemistry; my objective at that time was to become a doctor.

Unfortunately, however, after I had completed my high school professional certificate in biology and chemistry, I had to leave my country, Rwanda, because my security there was no longer safe. Without any certain destination, I came to Zimbabwe, and I spent years in that country without studying at all. Then, by grace, I met with another Rwandan refugee, who had been in Zimbabwe for quite some time. This new friend advised me to apply for admission to Africa University. At first I hoped to study in AU’s Faculty of Health Sciences, but I had no money for tuition, and scholarship aid was unavailable. Eventually, however, I enrolled in Agriculture and Natural Resources because that Faculty was able to offer me financial aid. After my admission to FANR, my vocational destination became environmental management.

And perhaps this change of focus had deep roots. When I was eight years old—again, an important year in my life—I was given a very nice book, in French, about how species interact ecologically. I remember particularly one page that showed images of butterflies, various species living in various ways, sharing the environment. This made me happy. I really liked that book, and even now I cannot erase it from my mind. I am saying this because the book I liked so much was stolen; someone who knew its value took it from my hospital room while I was almost sleeping. Half awake, I saw him leaving with my book, but I could do nothing because my pelvis had been broken, and I had burns on both sides. But although the thief took my book, I held onto the memory of those butterfly species interacting in their natural habitat.

When I think back upon my hospital stay, and upon my book, I believe that my most important lesson was that I should love nature and that I should speak for the creatures that cannot speak for themselves. This is, in short, the path by which I found my way into FANR’s Natural Resources curriculum at Africa University.

The second student who will speak is Simon, the tall, skinny South Sudanese. When he first came to AU, he was as quiet as Evans. But one day Simon decided to wave his arms and make sure that everybody learned his name. This was not the beginning of an academic rags-to-riches success story; Simon’s grade-point average has remained marginal, at best. But he really wants people to know who he is, and reading his essay will give you another chance to develop your proficiency at appreciating the varieties of African Light. As you will see, in his much longer essay, Simon writes a lot about his homeland, South Sudan, and about that country’s liberation struggle. To make these complex subjects more American-comprehensible, I have annotated Simon’s essay heavily. I realize that the organization of Simon’s autobiography is challenging to follow, even without interruption by my footnotes. I’m just hoping that you’ll wade through the story one good time, with or without notes, whichever is more fun for you. For his part, Simon would grin and insist that you should read his precious words at least twice.
I was born on 12/1/1976 in a small village called Paduai in Uror County in Jonglei State of what is now South Sudan. My father came from the Jaak Dak, a subgroup within the Goon Section of the Lou Nuer, a large clan of the Nuer Tribe. My mother was born in a village called Weikol. She is the daughter of Yuol Thijok, who was a paramount chief of the Chiejak Section of the Lou Nuer. I spent my early childhood in a village called Pieri in northern Uror County, where farmers reared goats, sheep, and cattle. From 1983 to 1990, my parents and I survived several aerial bombardments and ground attacks from the Arabs who were hunting for Anyanya One and for rebel forces of the Sudan People’s Liberation Army (SPLA). During those days I came to live with my grandmother and grandfather in a place called Makong, which was a five-hour walk from my parents’ home. I was then in great love with my grandparents. My favorite foods included pumpkin, milk, and beans. During harvest I would also enjoy chewing canes from sorghum.

At the inception of the SPLA liberation struggle, in 1983, I was a very active small boy, not in school, but instead taking good care of our family’s milk-cows, goats, and sheep. My brothers and sisters and I all did the same activities, but my sisters would also do domestic and kitchen work in addition to milking and collecting firewood. When I became 13 years old, I complained to obtain cultural manhood status, which is signified by forehead scars. These marks, locally called gaar, show the assumption of manhood’s responsibilities and independence. I was given a green light by my parents to acquire the status.

In 1989, the same year I was marked with gaar, the SPLA initiated a policy of recruiting children aged 10-15 for their Red Army, whose purpose was, in part, to educate the children as preparation for the next generation. I joined this Red Army, and together with other child soldiers in the southern Sudanese Red Army participated in actual combat; some did not. Simon has deflected requests to elaborate on this matter.

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31 The date, 12 January 1976, is in international format.
32 There are five major tribal groups in South Sudan. Numerically, the Nuer are the largest.
33 About 70% of northern Sudanese are Arabs by ethnicity; the vast majority are Moslems. Southern Sudanese are mostly non-Arab Christians, with an appreciable minority of animists.
34 Anyanya One was a rebellion by southern Sudanese against the national government up north in Khartoum. Officially, the rebellion began in 1955 and ended in 1972. Khartoum continued to hunt for Anyanya One rebels for some time thereafter. The Anyanya II (not “Anyanya Two”) rebellion began in 1978. Anyanya means “snake venom.” I do not understand the relationship between Anyanya II and the SPLA. Both favored independence, and the two groups sometimes cooperated. At other times, however, they fought against one another.
35 In 1983 an Islamist government in Khartoum placed the entire country under Sharia Law. The Law was not always strictly enforced in the south; nevertheless, Christians suffered frequent discrimination and occasional persecution. This led to a rekindling of a briefly dormant independence struggle by southerners.
36 Simon’s gaar are thin horizontal scars across the breadth of his forehead. I believe there are four or possibly five; they resemble lines seen when one raises one’s eyebrows.
37 Some child-soldiers in the southern Sudanese Red Army participated in actual combat; some did not. Simon has deflected requests to elaborate on this matter.
recruits was moved to a training camp in Ethiopia. After we reached Ethiopia, I had the opportunity to begin school. This was in a military and refugee camp. There were no exercise books, pens, or pencils, so we wrote alphabets on the ground, using our fingers or sticks.

I spent almost seven years as a child soldier with the Red Army, and I continued my schooling in Ethiopia. In 1990, during this time of education, I attached myself to a local merchant who traded salt, soap, and other small cosmetics between the towns of Gambella and Itang, which are in the western region of Ethiopia. Also, I began trading between the two refugee camps of Fugnido and Itang.

Then in 1991 the Ethiopian government was overthrown by the current regime, so we refugees were displaced and fled back to Sudan. During August of the same year, the SPLA/SPLM split into two groups, the Toit Faction and the Nasir Faction. And at one point a coup was waged by Dr. Riek Machar against the movement leader, Dr. John Garang. This caused enormous conflict within the movement, and many lives were lost in that war.

At about this time I turned 15 years old. I was not in school because there was no place to go to school, so I decided to quit being a child soldier and join the actual army. I stayed almost three years in the military, defending civilians and liberating my country against the aggression of the North. Within that great struggle I was to learn about hunting animals as military food. The types of animals we hunted included buffalo, gazelle, elephant, giraffe, buffaloes, gazelles, elephants, and giraffes.

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38 In 1987 Ethiopia’s long-time military dictator, Mengistu Haile Mariam, assumed the title of President. As President, he officially allowed the presence of SPLA training camps in his country. This was unacceptable to the (north) Sudanese government, and in 1991 Khartoum instigated (or at least supported) the coup that overthrew Mengistu and established Ethiopia’s current government. Mengistu’s protection may have been critical to the success of the South Sudanese independence movement, and this was a good thing. Mengistu himself, however, was one of the most despicable characters in recent African history—and was largely responsible for a genocidal policy resulting in the death of between 500,000 and 2,000,000 people.

39 Struggles within the Sudanese People’s Liberation Army (or Movement) and between Riek Machar (1953- ) versus John Garang (1945-2005) are hard to follow. Apparently Machar favored complete independence for southern Sudan from the beginning while Garang, may have initially been willing to accept regional autonomy within a secular Sudan guaranteeing basic human rights. (Garang probably knew that the Islamist North would never abide secularization.) In August of 1991 Machar initiated an internal revolt among SPLA forces; this may have been supported by “divide and win” policies in Khartoum. Complex and deadly struggles continue to this day; see my note at chapter’s end. Torit and Nasir are place-names. At one point folks from the former area were strong supporters of John Garang while folks from Nasir were against him.

40 The Sudanese civil war is conventionally dated from 1983-2005, which makes it the longest civil war in African history. As many as 2,000,000 people may have lost their lives, both from fighting and from consequent famines. Under the Comprehensive Peace Agreement of 2005, southern Sudan became an autonomous region within Sudan. In 2011 a referendum on complete independence was held, and (according to official report) over 98% of southern Sudanese voters said Yes! Violence between north and south has not entirely ended. Religious factors are partly to blame. Also, the north has most of Sudan’s infrastructure, and the south has most of the oil.
hippopotamus, etc. Certainly this hunting was not approved of by the government in Khartoum, but we needed to hunt when there was a shortage of food for our military during our guerrilla war for independence. So that is when I began to learn about wildlife. Hippopotamus was the best meat, like pig but better.

There are many wild animals in my country, and sometimes they compete with our cattle for grazing, especially in our wetlands during our dry-season winter. Therefore, during our struggle, rebel-force leaders from the South Sudan People’s Liberation Movement (SPLM) would sit down with community leaders and discuss how to manage wild animals and cattle in the wetland areas. Community leaders then decided to divide the wetland areas into two parts—one for wildlife, one for cattle—to control grazing competition and also to prevent the transmission of disease into the domestic herds. During these struggle-times I also learned how to take fish and crocodiles, which we hunt by spring-trotlines with 500 to 800 or even more hooks. The fishing party would divide into two groups, one on each side of the Upper Nile, and we would trail the hooks downstream.

I have a great interest in learning about wildlife at Africa University because in my country wild animals are more abundant than cattle. I hope I can learn to manage wildlife for the long-term benefit of the nation rather than merely hunting wild animals towards extinction.

In 1994 I had abandoned being a soldier and was back in school—this time in Khartoum. There I started again in Primary Four and stayed for three years. Life was a struggle while I was a student. I had to take up manual labor during the daytime to sustain myself and to obtain school fees because by that time primary school was no longer free.

In 1999 I married Nyaruach Tut Kuol, paying a bride-price of 37 cattle, which were divided among her relatives. I could not have afforded the exceptionally high price except that I have a beautiful sister, who had brought many cattle to our family when she was married. My wedding was one of the joyous days of my life; it was complemented with traditional dance, song, and the ululations of the Naath Nuer.

In 2000-2001 I worked with World Vision as EPI41 supervisor in Waat District. We ran feeding programs in Jonglei State, and I also did vaccination outreaches with teams of expatriates and southern Sudanese nationals.

Later in 2001 I went back to a refugee camp in Ethiopia called Dimma. I was looking for education, which I could not receive in the North because Khartoum was practicing discrimination by religion and color. I stayed in Ethiopia until the signing of the Comprehensive Peace Agreement (CPA) in 2005. Then, after completing my secondary school in 2006, I returned to southern Sudan to celebrate with my family the outcome of peace—and to get my rank in the military.

In 2007-2008 I was employed by the state government as a teacher in Uror Country. In 2009 I was promoted to be head teacher, heading the Karam Primary School, supervising 7 teachers and 578 students. In 2010 I was assigned to Motot Primary School, supervising 10 teachers and over 500 students. In 2011 I was promoted to be Inspector of Education and

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41 In 1974 the World Health Organization established the Expanded Program on Immunization for child vaccination. World Vision is a cooperating organization.
transferred to the Yuai Headquarters of Uror County. In August of 2012, I resigned from my job as Inspector and joined Africa University to study agriculture.

Good Luck. Simon Yien Luhalpuk.

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**Ab’s memories, 29 October 2014.** My Wednesday late session of Biostatistics is over. I dump the accoutrements of the class—computer, projector, extension cord, notebook, student papers, five whiteboard markers, two eraser-rags—onto my desk. I should store everything in its proper place, but after two hours of max-energy song and dance, I’m beat! Chrissy has already returned to Staff Housing; maybe she’s started supper. I glance up. Tall and lean, Simon is standing in the doorframe.

Together we walk down the stairs and out of the ag building. Simon’s stride is usually long, but this evening he matches it to mine. “I miss my wife,” he says at last.

“She is still in South Sudan?” I ask.


“How many children do you have, Simon?” I have wanted to know this for some time.

“In my culture, such a question must never be asked,” he says. “Nevertheless, I shall answer it, if you ask again.”

But I can take a hint. I look down the open path before us, through the acacia-trees. The sun is almost tangent to the ridge beyond Mount Chiremba. Sunset has moved appreciably southward since Chrissy and I arrived in mid-August. Octobers in Zimbabwe are dry. The air is filled with dust, too fine to see. It turns the sun red.

“Someday I shall take my wife and children back to South Sudan,” Simon says. “We’ll own a house and cattle. I’ll have a job; perhaps I’ll be a wildlife manager. My children will never be soldiers.”

I look at Simon. The reds of sunset reflect off his black face, accenting the scars of his gaar.

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42 Luck would be an important vocabulary word in the English of any person from South Sudan. Even as he was writing his essay, Simon’s country was slipping deeper into a civil war between President Salva Kiir Mayardit and First Vice President Riek Machar, whom Simon mentioned above. Over two million people have been displaced in this conflict, and tens of thousands have been killed. On 15 August 2015 a treaty between Kiir and Machar was signed. It failed. In July 2016 President Kiir claimed to fire Machar and to replace him with Taban Deng Gai. Machar and his followers disputed these actions, and the civil war continued. In August of 2016 the United Nations authorized an increase of its South Sudan peacekeeping force from 12,000 to 16,000. My summaries of events in South Sudan understate the complexity of the situation and probably contain errors. For updates on South Sudan, even hardcore liberals like me suggest an internet search of the CIA’s World Factbook. (I recommend against accessing the web site of the South Sudan government; it is sporadically subjected to weird and potentially dangerous cyber-attacks.) If you want a very short summary of recent history, the New York Times says, “South Sudan must rank among the most astonishing failures in Africa…[editorial, 27 June 2015].” Of all the darn footnotes in this book, this one makes me saddest.
“Americans think that South Sudan is a desert,” he continues, “but that is the North. My country is very green. In summer there are wetlands that stretch to the horizon.”

“I shall come visit you,” I say.

“Yes, you and Dr. Chris! You will stay a long time. You will bring a rifle. We will eat hippopotamus.”

“Tastes like pig,” I say. I want Simon to know that I have read his essay.

“Like pig, but better,” he assures me.

“Will we eat an entire hippo?” I laugh.

“We will eat an entire hippopotamus EACH!” Simon grins. The four incisors of his lower jaw are missing; some incident in an Ethiopian refugee camp.

We walk for a time in silence. The setting sun is now bisected by the distant ridge. It is very red, with a thin halo of orange. Beyond, the night sky is purple.

“I can teach you to laugh like a hyena,” Simon says. He tilts his head back. He produces a series of high whoops. His eyes are shining. And I know why I come to Africa.
MISSIONARY POSITIONS

I went to America, to convert the Indians; but oh! who shall convert me?
John Wesley, Journal, 24 January 1738

I do not remember the exact words by which my fourth grade geography text described the World Heritage Site now called Great Zimbabwe. But the following is pretty close: “These magnificent stone walls and towers, covering almost two thousand acres, could not have been constructed by the primitive native peoples who now live nearby. Archaeologists believe instead that the ancient site was created by Phoenician seafarers.” This of course is nonsense. Between the 11th and 15th centuries Great Zimbabwe was built entirely by the application of Shona intellect and Shona ATP. And in January of 1996, when I first played sheepdog for American students in Africa, I wanted to atone for my childhood faith in Phoenicians. Therefore I scheduled a class pilgrimage to Great Zimbabwe.

I had taught at Africa University from August until December of 1995. (Chrissy, unfortunately, had spent the semester teaching in Charleston, generating the dollars that financed our occasional trips to Zimbabwe.) Despite email difficulties, I had maintained contact with Wofford College, and a colleague of mine—I’ll call her Charlotte because that is her name—had jumped through sundry administrative hoops so that she could bring eight students to Africa for a January short course. One of those students was a Sophomore I’ll call Sally—because that is not her name. I had taught Sally in Biology 104. I knew she was bright; I liked her a lot, and I was pleased that Charlotte had brought her to Zimbabwe. Entirely unaffected by jet lag, Sally hit the ground running. She wanted to see and do everything; she was a delight. She also found romance with a Wofford male, a Senior, who needs not be named at all. Under the African sun, love (or something like it) blossomed rapidly, and within three days Sally and her new friend had, uh, fallen into fornication, a fact that they did not attempt to conceal. Worrying as teachers tend to do, Charlotte and I privately discussed this liaison. We did not approve, but for two reasons we decided to say nothing to the young lovers. First, our course syllabus had explicitly threatened grade-reprisals for many explicit sins, but extramarital carnal knowledge was not among them. Second, we both feared that, at Sally’s age, given Sally’s opportunities, we might have behaved like Sally. Anyhow, despite our connections with the United Methodist Church, Charlotte and I did not feel that our students needed to act like missionaries’ kids. Nevertheless, we did want to make a decent impression on local folks, who were watching us pretty hard. So, although Charlotte and I remained quiet, we frowned a lot at Sally and her friend. And we kept worrying.

After the students had been in-country for about a week, the day came for our long drive from Africa University to Great Zimbabwe. The rainy season was finally in full swing, and by the time we reached our objective, the rain was falling at a rate seldom experienced since the time of Noah. In the Site’s parking lot, which was deserted by even the panhandling vervet
monkeys, we sat in our vehicles, eating bananas with peanut butter, until the downpour slackened sufficiently to permit egress. Sally, of course, was the first out, followed immediately by Charlotte and me and eventually by the rest of the troops. The students marveled appropriately at the towers, constructed entirely without mortar; I fumed about racist textbook-authors and looked for snakes. Within another half-hour the rain had ceased, and we all wandered over to the “authentic Shona village.” This was a tourist attraction consisting largely of round, thatched huts and stone cattle-kraals. On a typical day the village is populated by modern Shona people hired to look and act like ancient Shona people: plowing gardens, grinding maize, pounding sadza, carving soapstone…. Heck I don’t know the whole list because when we were at Great Zimbabwe, no modern Shona people had been stupid enough to endure the deluge for minimum wages. (Instead, they were at home: plowing gardens, grinding maize, pounding sadza, carving soapstone—but doing so in sensible clothes and raincoats rather than in costumes probably copied from National Geographic.)

Anyhow, the weather was fantastic, in the literal sense. The sky was dripping only a bit, but fog was rolling in, passing us in discrete billows, thick and white as milk, revealing and then cloaking gloomy vistas across the deserted Shona village to the looming stone towers. It was sort of like a Witches’ Scene from Macbeth, but the fog seemed alive. In its progression it was a herd of white, incorporeal elephants; it was creepy as heck. And about that time, Sally found The Hut. It was the smallest structure in the Pretend Shona Village. It was well thatched, round, and made of sundried mud-brick. It was low, it was smoky, and there was a woman in it. To me the woman looked about as old as Great Zimbabwe though of course I don’t know, and she might not have been over seventy. She sat cross-legged and brushed her thin hands across the red dust on the tamped floor in front of her. She smiled and spoke directly to Sally: “Come in, please, and I shall tell you about your life.”

Over the years, this scene has remained etched in my memory: the fog, the granite towers, the smell of eucalyptus flowering in the distance, rain upon a land that had been famished for water throughout a dry season that had lasted too long. Charlotte stood close beside me: dark hair cut short, sensible slacks, a young teacher’s worries written upon her face. I wore my stay-pressed, green army shirt and a World Wildlife Fund tie with pictures of crocodiles. Our trip to Great Zimbabwe was nine days before my camera was stolen, and I had a zip-lock bag tied with a rubber band over the lens. Most of the students were behind us, and I do not recall what they were doing. Sally stood between me and the old woman’s hut. She wore faded jeans with no belt, white tennis shoes—now red with January’s mud—and a short-sleeved cotton shirt, the bottom button unfastened. Her red hair was shoulder-length. We’d enjoyed several days of sunshine, and freckles had begun to appear on her face and arms. She had a bright, open smile, and I was proud for Zimbabweans to see that she was my student.

“Come in,” the old woman repeated. Sally looked down at her muddy shoes. The old woman smiled and beckoned. As far as I can remember, the woman spoke with no accent. None. An elephant of fog passed by; everything disappeared, reappeared. I could hear Charlotte breathing; short, sharp breaths. Her hands were fists; her knuckles were white. As Charlotte would later explain, to her the threshold of that round hut represented a frontier between my Africa, where all phenomena were appropriately represented by scientific models, and a different world, where my materialistic models were as insubstantial as a morning’s white fog.
For her part, Sally went directly into the hut and sat down cross-legged beside the old woman. I did not follow; I did not wish to trespass. Nevertheless I edged close enough to the door to see everything: I admired Sally—heck, I wish she’d been my daughter—and I wanted vicariously to enjoy her every exuberant encounter with Africa. Sally grinned at the old woman and nodded her head. The old woman nodded back and explained that from Sally she would not accept payment of any kind. Then she took up a small ceramic bowl, about eight centimeters in diameter. The bowl was glazed cobalt-blue. Its top turned inward so that the bowl was almost a closed sphere, rather like the skeleton of a sea-urchin. Toward its lip the bowl was circled by simple drawings; I think that each was composed of about nine lines. I think they were pangolins. The woman shook the bowl, three shakes, I think. Then she poured the bowl’s contents onto the floor in front of Sally. I stared through the hut’s door. Small bones, vertebrae. I did not count them. I do not know what they were, and to this day I wish I had seen them close enough to guess their species of origin. The old woman looked at the bones for a long five seconds. Then she smiled broadly to Sally and said, “You are the most fortunate of women….” Now I’m telling y’all readers, the old woman’s English pronunciation was perfect; she might have learned it at Oxford for all I know. “…The most fortunate of women. A man need merely to touch you, and you will be blessed to fall pregnant.”

Well, people, Ms. Sally thanked the ancient Shona woman with all the graciousness of any well-bred southern lady. But when she left the hut, she had turned white as a sheet. For the rest of the trip, she and her former lover scarcely even held hands. And, before we returned to the States, Charlotte asked me, “Did you pay that fortune-teller to solve the Sally-problem?” Reluctantly, I told Charlotte the truth: I had never seen the old woman before in my life. Charlotte smiled, as if she knew something of value, something that I could never understand.

Anyhow, we had a fine time visiting the ruins at Great Zimbabwe—yeah, even Sally, whose resolution of celibacy appeared in no way to undercut her joyous celebration of Africa. Furthermore, the visit allowed me to complete a professorial duty to Wofford College. I mean, although my own times in Africa mostly involve reptiles and biostatistics, I knew that I owed my visiting American students some exposure to African culture. In 1995 I fulfilled that obligation primarily by providing for my Wofford class various opportunities to interact with African people. But I also wanted the American kids to glimpse the *haut culture* of Africa’s deep past. And that is why, despite the exorbitant cost of petrol, we had driven 335 kilometers from Africa University to Great Zimbabwe.

Furthermore, I like the sound of the words, “Great Zimbabwe.” It is a fine name. It emphasizes the magnificence of the famous ruin, with its three Complexes, its conical tower, and the gigantic soapstone eagles. The name also implies, correctly, the existence of other, less grandiose zimbabwes. I think the improper noun, *zimbabwe*, is a shortened form of *dzim-dzemabwe*, which means something like “house of stones.” Archaeologists list about 200 such

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43 Also, the expedition gave me the opportunity to rant and rave about Phoenicians and the racist assumptions of my fourth-grade geography text.

44 Even if I knew the correct plural—which *zimbabwes* probably is not—using it might suggest that I spoke more than two words of Shona, which I do not.
structures. Typically, they are roughly circular stone walls, constructed without mortar. Near Old Mutare, Chrissy and I have seen two. Well, sort of—I’m not sure that the structures we’ve stumbled across were big enough to qualify as actual zimbabwes. They were just circles of rocks, more than one rock high. Both were on the tops of mountains. One was on a summit where wind seemed to blow night and day. And toward evening, during November of 1993, we saw a young man standing within this mini-zimbabwe. Shirtless and without shoes, he faced the setting sun, arms held high, and he sang. I described this event to a Zimbabwean religious scholar named John Wesley Zwumundoidita Kurewa, who explained that the ritual was probably a prayer for rain, a prayer that pre-dated the arrival of the Christian missionaries.

Dr. John Kurewa is perhaps my most famous African friend. He was also the first Vice-Chancellor of Africa University, and he continues to hold the E. Stanley Jones Chair of Evangelism in AU’s Faculty of Theology. John Kurewa’s particular research-interest is the relationship between indigenous religious beliefs and the success of the nineteenth-century Christian missionary enterprise. As I understand it, Professor Kurewa’s thesis is that Christianity spread rapidly in Africa because indigenous theological beliefs predisposed Africans to accept the Gospel. I’m not qualified to evaluate this hypothesis, but I have deep respect for JWZK. When he talks about African religion, his face radiates kindness, and his deep voice resonates with tones still heard in coastal South Carolina—and therefore, of course, I believe him.

In 2013 the distinguished Professor Kurewa presented a public lecture about his research, and I took notes as fast as I could. “In pre-Colonial Africa,” Kurewa began, “most indigenous peoples would have had a proper name for God—like Yahweh in biblical Israel—but they would also have had attributive names that address God by what God is. Two of these attributive names were very widespread. One name was Great Tree that Provides Shade to All People without Exception. And the other name was Protector of and Provider for the Poor.” Listeners at Kurewa’s public lecture said Amen, and they murmured various Shona words that Chrissy and I did not understand.

After a pause, Kurewa continued his lecture, admitting that “The success of any specific missionary enterprise is difficult to evaluate. Mere congregational size may not reflect a depth of praiseworthy commitment…” —oops, y’all know my note-taking can’t keep up; y’all know I’m paraphrasing now— “…and many years must pass before a historian can apply the criterion of Matthew 7:16.46 But my research strongly suggests that missionaries were successful when they respected indigenous beliefs and when they preached, and practiced, a Christianity that emphasized quintessential African values of care for the poor, and a great Tree that offers shade for all.”

Whatever y’all think about John Kurewa’s predisposition-thesis, the undeniable fact is that Christian missionaries made a whole, whole lot of converts in Sub-Saharan Africa. And, believe it or not, missionaries have certainly touched my life, as well as the life of the Good

45 Remember, a Vice Chancellor is the on-campus chief executive officer of many African universities; he or she is like an American university president.
46 “By their fruits you will recognize them.”
Doctor Chris Hope. For instance, on the morning of 31 October, 2010, Chrissy actually started talking like a missionary. Fortunately this mode of discourse did not last long, but it was impressive, at least to me.

During that year of 2010, Chris and I were living in a wonderful old farmhouse complete with frogs, geckos, and even an occasional spitting cobra. The farmhouse offered a spectacular view of fields, forests and mountains; however, the place did not always provide all the conveniences to which middleclass Americans are accustomed. Anyhow, on the morning of 31 October we were awakened about dawn by the marvelous sound of gurgling pipes, which meant that, for the first time in more than 48 hours, we’d have water. And Chrissy said, “We are so blessed; it’s going to be a wonderful day; we’ll be able to flush the toilet!”

OK, this essay’s title virtually promises a discussion of missionaries, and I don’t reckon I should postpone my treatment of this difficult subject any longer. In my experience every missionary is a world-class practitioner of two arts: complaining and giving thanks. Of course the complaints are composed to serve a noble purpose, and real missionaries complain only when they can inflict guilt upon their listeners and thereby generate contributions to a worthy cause. Otherwise missionaries are expected to express their gratitude for even the smallest blessings and to praise God for even the most modest successes. Here’s what I mean about missionary-thankfulness. Once upon a time an anthropologist and a missionary were being cooked by cannibals in an enormous iron pot. Terrified by the rising water-temperature, the anthropologist cried aloud, “I’m being prepped for dinner, and I failed even to discover where these primitive people obtain their iron pots.” In reply the smiling missionary turned her sun-freckled face to heaven and said, “Well, I thank God for my success, because these parishioners will certainly say grace before they eat us.”

Uh, wait! That’s the 1914 version of the story, set in the year of The African Queen. In the current Millennium’s update, the anthropologist bemoans his failure to elucidate the hegemonic meta-narrative that disempowered the Local Peoples and led them to replace indigenous appropriate technology with the alienating Objects of Global Consumerism. The rejoicing missionary thanks God that she’s taught people the importance of cooking mammal-flesh properly to defeat parasites, slow viruses, etc. Iron pots are out of fashion, and both of our heroes are being shoved into an enormous Chinese-made microwave oven.

Now friends, I cannot comment from personal observation about the ethnicity of present-day anthropologists. However, I do know a little about modern missionaries to the “dark continent”: despite the lily-white complexion of Rose Sayer / Katharine Hepburn in African Queen, real missionaries are likely to be African-born and African-raised. In 2015 the United Methodist Church found it convenient to hold its denomination-wide training and commissioning of Global Mission Fellows in Africa. And on 30 August, at Revelation UMC in Harare, 35

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47 I’ll write much more about “our” farm in the next chapter.
48 Tales of African cannibalism, which enliven a substantial body of nineteenth-century European adventure literature, are usually the products of white writers’ fertile imaginations. Much of this literature is so culturally insensitive that I feel guilty about telling the old, worn, missionary-joke. I defend myself by reminding y’all readers that the joke is about missionaries, not about Africa.
young people officially became missionaries. Only eleven of them were non-African.\textsuperscript{49} This ratio of nationalities reflects the modern-day composition of my denomination. While United Methodist congregations in the USA have been declining steadily since 1964, membership has been exploding in Africa. This fact was brought home to me in 2014, when a Wildlife student told me he was called to become an international missionary. “Where would you like to serve?” I asked. “Where I am most needed,” he replied; “probably America.”

These days it is popular in some circles to condemn missionaries, perhaps particularly missionaries to Africa. And many aspects of the early missionary movement absolutely deserve condemnation. Christianity was often presented as a religion with Four Commandments: cover your body; give up your culture; say you love Jesus, and be subservient to white people. Furthermore, the missionary enterprise was often exploited by the Euro-colonial Powers—who expected sermons about Hell to bolster social control and who employed mission-school grads to staff the lower ranks of the civil service and colonial police.\textsuperscript{50} My friend, Professor John Wesley Kurewa, was acutely aware of these travesties. But beyond the religion tainted by narrowmindedness and colonialism, Prof Kurewa has always envisioned the Christianity that proclaims and practices the Gospel of love, of justice, of service to the poor. And as he has said, by the wise grace of childhood he recognized this transcendent Christianity in the lives of Christian missionaries.

I’ve personally known missionaries only from the United Methodist Church. All have been good folks. Maybe UMC missionaries are special (sometimes I have that prejudice), but I prefer to believe that most present-day missionaries from most Christian denominations\textsuperscript{51} are more than OK and are sensitive to modern cultural realities. In other words, although the following anecdote is told about Methodists, it could be very general. According to the presumably Apocryphal story, a young man walked into the headquarters of the General Board of Global Ministries\textsuperscript{52} and asked for an interview, explaining that he’d been called to be a missionary. Taking a rare break from a million other tasks, the \textit{Jefita Herself}\textsuperscript{53} asked the young

\textsuperscript{49} This was the International Fellows class for 2015. The African location of the training probably biased the national composition of the missionaries trained and commissioned, but some were from Latin America, the USA, and the Philippines. Of the 24 new Africa-born missionaries, 12 were AU graduates. Some, I’m proud to say, were from our Ag Faculty.

\textsuperscript{50} Of course the African converts were not innocent fools, even in the early days. And some cynically “converted” in order to enjoy the power and money potentially available to Africans who associated with European colonialists on European-colonialist terms.

\textsuperscript{51} I also know that field workers from American Jewish World Service are usually absolutely great—though I don’t think they’d like to be called missionaries.

\textsuperscript{52} That’s what United Methodists now call their church’s division formerly known as the Mission Society. For years the Board was headquartered in New York City; now it is moving to Atlanta.

\textsuperscript{53} The president of the UMC’s “mission society” board of directors (2013-2016) is Hope Morgan Ward. As bishop of western North Carolina, Ward has many church responsibilities beyond her board presidency, so she would not be in Atlanta interviewing would-be missionaries, and if she were, she’d do a better than my story suggests. Remember, I warned you that the tale is not literally true. I think that \textit{jefita} literally means “small female boss.” Hispanic friends of mine use it sort of like “big momma.” I used the word just because I like the intercultural sound of it.
man, “Can you explain the nature of your calling, my brother?” The young man waxed eloquent, talking about “saving the heathen,” about “fields white with harvest” and about “my burning desire to lead the Unconverted to the Lord and Savior.” The big boss replied, “You need to update your calendar, my brother. This is 2016, and we seek missionaries with a burning desire to fix tractors, teach calculus, organize voters, and measure blood-sugar.” The young man, somewhat taken aback, responded, “But don’t you believe that evangelism is important?” The boss smiled. “We sure do! That’s why we generally leave the job in the hands of local folks, who can actually do it right.”

Now I don’t want to create a misapprehension that United Methodist missionaries are exactly like Peace Corps volunteers except for the source of their paychecks. The vast majority stand within the community of faith. Some believe (as does Charlotte, my tour-guide colleague) that beyond certain thresholds the enterprise of empirical science is merely a disguise for human vanity; some are more like me; a few may be even more materialistic. Most missionaries can quote Isaiah 6:8, and if pressed, many would explain their service within the context of Jesus’ various gospel commissions to his apostles. I reckon some would tell you that missionary comes from the Latin verb mittere, which means “to send.” However, many of today’s missionaries think that the word send implies more of a push from behind, while they feel more called forward by their Lord to the human communities that stand in front of them. Anyhow, according to the official web-site, UMC’s mission-objective is “…to make disciples of Jesus Christ for the transformation of the world.” That may not be real modest, but it does leave room for discussion and interpretation.

In Zimbabwe I’ve actually known five UMC missionaries rather well. One was an obstetrician/gynecologist from the Democratic Republic of Congo. This man’s mission-service makes African Queen sound like a pleasant paddle down a babbling brook. At one point he defied the orders of his bishop, commandeered a motorcycle, and rode unarmed into the maw of a terrorist insurgency. There, in a refugee camp along Congo’s Eastern Border, he performed surgery in ten-hour shifts, day after day: AKs shoved in his face—teenage rape victims—Caesarians—HIV—latex gloves exhausted—more Caesarians—more death threats—more HIV. “Weren’t you terrified?” I asked. The man gave a shrug, which might have been as much urban French as backwoods Congolese. “I am a doctor; they were my patients.”

The heroism of my other missionary-acquaintances has usually been less dramatic. One young woman had served as an aircraft mechanic for the U.S. Navy. She’d earned a Masters in

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54 Come to think of it, so do many Peace Corps workers, but the missionaries tend to be more vocal about their faith.
55 Yes, you bet I have a materialistic explanation for how the wise old woman at Great Zimbabwe could infer Ms. Sally’s behavior! But I’m not quite vain enough to write it down.
56 “Then I heard the voice of the Lord saying, ‘Whom shall I send? And who will go for us?’ And I said, ‘Here am I. Send me!’”
57 Some missionaries would explicitly quote Jesus’ post-resurrection instructions. See Matthew 28:16-20, which is sometimes called “the Great Commission.”
58 Chrissy and I lived for a semester with this gentleman when he was a professor at Africa University. I shall write about him again in Chapter 8.
biology, so she taught every bio and health course at a big UMC high school. She also fixed broken-down vehicles when she could get the parts.

Another missionary was an American surgeon in late middle age. He’d come to the isolated mission station at Mutambara because he wanted to have fun in life, and “…it’s lots more fun to be a surgeon in Africa than in the USA.” In 1995, when I visited, his hospital received electrical power, on average, four hours per week, so this doctor installed mirrors to catch the sun and serve as operating-room lights.

A fourth missionary is Jane Kies, whom I love like a sister. Jane teaches English to Congolese, Mozambican, and Angolan students at Africa University. She also plays Supermom to her kids—and often to other children as well. This woman showed me the true missionary spirit at 5:30AM on 1 December 2010. I was supposed to be in a Toyota Hilux headed cross-country to the Harare airport. The driver was blowing his horn and shouting that I should get my white butt into his truck NOW! Meanwhile I was dragging an enormous sack to Jane’s front door. “Make sure that nothing bad happens to this old girl,” I panted; “Gotta run, Jane; I’ll email you from Charleston.” The sack contained a python I had just extracted from the AU Broiler House. The snake weighed half as much as Jane herself. And don’t worry; missionary-Jane did her Christian duty, and the python was released in a very safe place, a long way from chicken-temptations.

The fifth missionary whom I know very well is Jane’s husband, Agriculture Instructor Larry Kies. Larry really believes in heaven (I think that most contemporary Methodists still do), but he often gets heaven confused with his birthplace of Iowa. I’ll write more about Larry Kies presently, but first I want to emphasize a take-home message about Missionary Positions concerning love and life. I believe that my five best missionary friends would be appalled if somebody said they should be bringing the Heathen to Christ. Instead, these missionaries would say that the people with whom they live and work bring them to Jesus—and, as missionaries, they hope on good days to reflect some of the abundant love and Light that surround them.

OK, OK, let me illustrate some real missionary positions by two anecdotes about Larry Kies. First anecdote. On Tuesday, 26 October 2010, amid gathering storm-clouds, a Chinese knockoff of a John Deere combine was completing Africa University’s wheat harvest. As I tried to take pictures of this major event, Larry shouted over the combine’s rumble, “Come help me gather data.” Now all y’all should know that if I have a choice between taking pictures and

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59 You might immediately understand Ms. Jane’s job if I wrote that she teaches “English as a Second Language.” However, that would be inaccurate because she usually teaches English as a third language. (And I knew one student who had learned his household language, used that language to learn Swahili, used Swahili to learn French, and used French to learn English—in the last case, with the help of Ms. Jane.)

60 In this python-rescue enterprise, I was ably assisted by Dao Van Hoang, a Vietnamese naturalist and artist who had been staying with Chris and me. Hoang captured the essence of the venture in a cartoon—captioned in English but drawn from the Vietnamese perspective. Hoang’s cross-cultural masterpiece leads the photo-essay following the present chapter. Hoang also helped Chrissy delay the impatient driver while I charged Jane with her latest missionary-task.
taking data, I’ll drop my camera in a heartbeat. Well, Larry had precisely measured a square
meter, as yet un-harvested, of AU’s wheat-field. With our pocket knives we cut all the stems to
ground level and gathered them up. “We can diagnose irrigation mistakes,” Larry said. “If the
ratio of seed-mass to total mass is too low, then late-season irrigation was skimpy. If the
numerical density of stems per unit area is too low, then we didn’t apply enough water to support
germination.” A few farm workers soon gathered to watch, learn, and help us count. “Our lower
field was a total disaster,” Crop-Supervisor Robert Soungweme said. “Yes,” Larry agreed, “but
this field is looking much better. See? Three hundred and fifty-three stems per square meter.
Much better!” Then Larry turned to me and said, “I love teaching Practical Agriculture. I just
love it. God is so good to let me do it.” And I swear that his white Iowa face seemed to reflect
the whole spectrum of African Light.

Second anecdote. That same week, despite power outages, Larry Kies managed to check
his email, and he received a request from his mission-bosses at the UMC General Board.
Visitors from the USA were coming to AU. These visitors had no official connection with the
Missions Board; nevertheless, they were potentially influential, so Larry was instructed to host
them and show them the University. Because the Kies house was already full of children and
itinerant do-gooders, Larry hoped that Chrissy and I might provide bed and breakfast for the
visitors at our farmhouse; he and Jane would feed them supper and transport them to see local
mission projects. Of course we agreed—and managed to wash an extra set of bed-linen in a
bucket of water we stole somewhere.

On the afternoon before Visitors’ Night, as I was leaving work, Larry caught me,
confirmed the evening’s supper plans, and announced, “Ab, we’re screwed. The woman is a
hygiene freak.” Now Jane and Larry keep a very, very clean house, but Cleanliness is definitely
not a fundamental Christian Doctrine with them. Furthermore, under some circumstances, on a
Real Missionary’s list of sins, excessive concern about hygiene is classified alongside of adultery
and ax-murder. With some trepidation, I relayed Larry’s report to Chris, who calmly replied that
her mother had faced similar cleanup challenges during Kansas’ Dust Bowl years. Fortunately,
we had previously “requisitioned” two more buckets of water; Mrs. Hope would have been
proud of our sweep-and-scrub job.

Knowing Larry’s sense of humor, Chris and I figured that we’d be in for some Real
Missionary entertainment at supper. And we were not disappointed. As usual, Jane had
prepared a sumptuous meal; as usual the Kies’ teenage daughter supplied intellectual
conversation while Chris and I stuffed our faces with chicken and rice. Supper progressed apace,
with the Chief Visitor repeatedly expressing her concern about the lack of hygiene in Zimbabwe.
Then, with the serving of dessert, Larry Kies slid over to sit beside the Visitor. And, with a
saintly smile, he began to relate a joke about a missionary who was initially appalled to find a
dead fly in his water—but who grew closer to Jesus and eventually started accumulating dead
flies, which he stirred into everything that he drank. As Larry’s narration of this long
parable/joke continued, his eyes began to shine with, uh, missionary zeal. Two fingers and the
thumb of his right trembled like a dying fly that spiraled within a centimeter of the Visitor’s lips
before fluttering to land at her dessert plate. Chrissy and I pretended that we were laughing at
the joke.
Overall, the visitors were interesting and super-polite. Their explication of their Africa Project (somehow connected with Rotary International) included words like *micro-loans* and *empowerment* and *gender-balance*, all concepts of which I strongly approve—though for dinner-table conversation, I much prefer jokes about missionaries and flies. After supper, to protect everyone from Germs and other Evils of the African Night, Larry loaded us all into his Toyota Raider and drove us back to the Hope-Abercrombie farmstead. Chrissy and I ended up with three overnight visitors, and, *gratias Deo*, only one was a hygiene freak.

Predictably there was no electricity in our farmhouse that night, which was probably fortunate, because by the glow of candles, our visitors could not see our resident geckos and flat-spiders. Next morning, after the best breakfast that Chris and I could provide, our hygiene-conscious Chief Visitor yawned and said, “When the power comes on, I’m going to take a long, hot shower.” Chrissy and I stifled laughter. We knew the power would not come on. Our old farmhouse had never possessed a shower. There’d been no running water at all for two days, no hot water for ten. And if suitable bath-water had miraculously appeared, Chrissy and I would have hogged it. Of course if we had been Real Missionaries, we would have somehow arranged a hot shower for our visitors. Then we’d have made them feel guilty about using it. And, playing on the guilt, we would have extracted an enormous donation so that the Poor Dehydrated Children of Africa could have all the clean water they need. The mighty Larry Kies could have done it, but he was too busy counting wheat stalks and otherwise endeavoring “…to make [agriculturist-] disciples of Jesus Christ for the transformation of the world.”

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As y’all readers have learned by now, I am deeply interested in missionaries. In part this is because—believe it or not—I was briefly mistaken for one. This happened in 1993, when Africa University was brand new, and I was first teaching there. In those days the Theology Faculty included several white lecturers, but Chrissy and I were the only pigment-challenged Americans in Agriculture. Perhaps for this reason, some students were naturally curious about why we were at AU though most of them were too shy or polite to ask. Truth was, we had come because the president of Wofford College had asked us to go there, and since he is my hero, I had said Yes! Anyhow, one day I overheard a student conversation, and because it was in English (making it a rare event), I decided to eavesdrop. And lo, they were talking about me! “I have concluded that he is a missionary,” one student opined. “That is not possible,” another student replied; “missionaries never say f*** a duck.”

Well, although the student’s generalization about missionaries was probably inaccurate, he was certainly right about me. I may have been in missionary habitat, but I never got—or earned—the T-shirt! Still, my interest abides, and in the next chapter I shall touch briefly upon the subject again, when I re-introduce Larry Kies, the very best of the new missionary-breed, with a substantial leavening of That Old Time Religion. And this time Larry will be observed in his favorite environment, which is the Africa University Farm.
Sometimes, when Dr. Chris Hope feels like Meryl Streep and I confuse myself with the young Robert Redford, we look at each other, laugh, and quote the opening line from their Karen von Blixen movie: “I had a farm in Africa.” Of course Chrissy and I never exactly had a farm in Africa. In fact, sometimes we went to Africa and didn’t even live on “our” farm. During our first semester at AU we had a flat in downtown Mutare. I hated that; we couldn’t even walk to the farm, and snake-hunting was almost impossible. Twice we were quartered in student dorms, and three times we had a room in an on-campus guest house. But the place that felt most like home was a rambling one-story house on the Africa University farm. The house was, I’m told, built in the 1950s and served as farm headquarters for forty years before AU came on the scene. It includes a kitchen, two bathrooms, three bedrooms, and two rooms of uncertain purpose. Chrissy and I claimed one bedroom; for one semester GR Davis had another, and we tried to keep the other rooms occupied by visitors to the University. The furniture in our farmhouse would be deemed unacceptable by even the most desperate American Goodwill Store, but who could care about that! Geckos patrol the ceilings. On bright mornings, sunbirds flit past the picture window. On rainy nights, treefrogs may perch on the doorknobs. The short driveway to the backdoor is flanked by flowers and shaded by incredibly generous mango trees. And the front door opens onto a porch with the finest view in the world: farm buildings, wheat and maize fields, low wildlands, and ridge beyond ridge of distant mountains. Furthermore, if those wonders are not sufficient to generate strong affection, the house also has History with a capital H because it was once the home of the Muzorewa family. Witty and optimistic, Ernest Muzorewa, who teaches agriculture at AU, has been a friend and colleague for Chrissy and me since 1993. Ernest’s elder brother Abel is somewhat more famous. Ordained a Methodist minister in 1953, he was named Bishop of Rhodesia in 1968. Active in southern Africa’s human rights struggles, he played a major role in the Internal Settlement of 1978, which ended white-only rule in his country. Abel Muzorewa then became the first and only Prime Minister of the transitional nation known as Zimbabwe-Rhodesia. Ernest Muzorewa told me that he and his brother Abel once found a Mozambican spitting cobra under their television in the old farmhouse. Chrissy and I still had the same TV set—that’s probably the closest we’ll ever come to greatness—but the television no longer worked, and, alas, we found no cobras nestled under it.

So, Chrissy, GR, and I grew very fond of the house and its grounds. Over the years we probably ate two hundred tomato sandwiches and a cubic meter of popcorn in what we called the dining room. We identified almost a hundred bird species out the living room window. And we recharged batteries for cameras and laboratory equipment in a room whose appropriate nomenclature still remains a mystery to us. In 2010 and 2012 The Incomparable Randy Babb came to visit. He built a velvet-lined flight-box so that we could photograph bats in the kitchen, and he set up a photo-aquarium so that we could photograph fish in the living room. Dao Van Hoang, our closest friend from Vietnam, spent three weeks with us, conversing in French with

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61 Abel Tendekayi Muzorewa (1925-2010) was opposed by most whites because he was black and by many blacks because of his adherence to the principles of nonviolence. In 1980 he was swept aside by Robert Mugabe’s Zimbabwe African National Union (ZANU). In 2007 a coalition of black and white Zimbabweans petitioned Muzorewa to stand against Mugabe yet again, but the aging patriot-bishop refused to enter such a potentially divisive campaign.
Congolese students and drawing snakes for a University Development Office project. Unless I’ve lost count, we had twenty-three additional non-African visitors come to stay a while with us, and I cannot even estimate the number of Africans—mostly AU students and farm kids—who enjoyed the hospitality of the old place.

Although the Muzorewa farmhouse most certainly captured our affection, Chrissy and I came to care even more deeply for the farm itself. I suppose that every farm is special. After all, every farm is balanced upon an ever-shifting intersection of biological, climatic, historical, and economic systems. That precarious balance cannot be preserved, long-term, without enormous inputs from the people who comprise a farm’s Community, and occasionally those inputs are sustained largely by an amalgam of pure cussedness and abiding love. But more on that later.

Theoretical agriculture is definitely not my, uh, field, and applied agriculture demands too much work for my taste, so I began my informal study of the AU farm from my academic safe harbor of ecology. Thus, before I write more directly about the farm per se, I should tour you readers through the local ecosystem in which the farm is located, and I should sketch out the system’s changes through the seasons. If you object to scientific names, please just read fast.

Basically I would characterize the Africa University biome as a modified, open, acacia-miombo woodland. That’s like a savanna grassland but with more trees. In our campus flatlands, the most common trees are, by God, acacias! Yeah, I know; according to the Angiosperm Phylogeny Group, the actual genus *Acacia* does not occur in Africa, but that’s a very weird opinion that no African botanist would deign to share! Locally known as thorn-trees, acacias are scarce-water specialists, typically of medium size, with frilly, compound leaves that resemble ferns. I think we have almost a dozen campus species, five of which occur in the immediate vicinity of our Ag building. Probably my favorite of these is *Acacia sieberiana*, the Paperbark Thorn, which is the symbol of Africa University. Right before the summer rains arrive, Paperbarks produce a wonderful abundance of yellow-white globular flowers, which attract so many bees that the trees actually seem to hum.

Miombo trees, more common in our rocky uplands, are members of the genus *Brachystegia*. Locally the two dominant miombo species are *B. spiciformis* and *B. boehmii*. The former is called the Msasa Tree, and the latter is called Prince-of-Wales Feathers. These deciduous trees produce a full flush of leaves in early spring, sometimes before the weather warms and always a month or two before the first rains. When they first appear, miombo

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62 Officially, according to the World Wildlife Fund classification system, most of the AU campus would be within the “tropical and subtropical grasslands, savannas, and shrublands biome.” The canopy cover is more than 50%, but the over-story is not dense, so enough sunlight penetrates through to support grass almost everywhere.

63 According to the Angiosperm Phylogeny Group, which claims control over scientific names, the actual genus *Acacia* does not occur in Africa. Without formal authority, I reject this recent decision—and for two reasons. First, as any traditional taxonomist could tell you, the decision rests on an extraordinary re-designation. The original type specimen for the genus *Acacia* was certainly from Africa, but early in the present century that status was shifted to an Australian specimen. Second, I think that the Australianization of *Acacia* is Neocolonialist discrimination against the African continent—and g’day to y’all on your kangaroo-infested, uh, island!

64 Apparently the flush of miombo trees is elicited largely by changes in photoperiod as days grow longer and the sun’s rays strike more directly.
leaves are a vibrant red, like something Americans would see in autumn, and the trees photosynthesize almost exclusively during the first half of each hot, dry day. I don’t know for sure, but I reckon the leaves are red because they selectively absorb blue-range light for their shorter-wavelength photosystem. That way the leaves can reflect more heat and manage evapotranspiration more frugally while still capturing CO₂ and photo-energy. Later, shortly before the summer rains come, the leaves metabolize the red anthocyanin they had synthesized and turn a conventional green. This botanical phenomenon intrigues me so much that I have broken my resolution and have included a picture within the text of a chapter. The specimen on the left shows *B. boehmii* in springtime, and the specimen on the right displays the later, summer colors. Meanwhile, as spring approaches, other deciduous trees begin to leaf out, and a wealth of insect-pollinated flowers enjoy an orgy of sexual activity beneath the blue, blue skies of the late dry season.

Closer to the ground, the colors of spring depend somewhat on human activities. Typically, a sea of grass carpets AU’s open woodland. This grass dies and dries over the winter, and during the late dry season people usually set it afire. I have interviewed dozens of people about the reason for the fires, and I have received many different answers. People burn because it facilitates hunting. People burn because the post-burn landscape looks prettier without the tall, withered grass. People burn to keep snakes away from their villages. People burn because if they don’t burn, the load of combustible material builds up, and eventual fires will be more destructive. People burn because the burning of winter’s brown, dead grass will encourage the coming of spring’s fair, green grass. People burn because their grandparents burned. People burn to kill ticks. People burn by accident. People burn because cattle fare poorly on residual winter-grass. People burn because fires at night are beautiful. People burn because they are malicious sons of bitches who like to destroy stuff. I believe that several, perhaps even all, of these explanations may be true. For whatever reasons, people have set fire to winter-grass across much of xeric Africa for many centuries, and dry-lightning storms occasionally burned eastern Zimbabwe even before *Homo sapiens* arrived on the scene. Thus, many of the plants in an open acacia-miombo woodland are fire adapted, and some frequency of burning is probably necessary to maintain the biome-type. Anyhow, whether the landscapes at AU burn too often, too seldom, or just right—and hey, our Faculty of Agriculture really needs to hire a fire-ecologist—40-80% of the campus is subjected to fire pretty much every year. And by the time the miombo leaves have turned green, sprigs of tender grass are growing through the ashes, renewing the carpet beneath the trees.
Some visitors to AU assume that eastern Zimbabwe has no distinct seasons, but this is just not true. Chrissy and I usually arrive at the University in August, when the hills are winter-brown and the nights are frigid. By early September the afternoons are warm—at least on sunny days, and almost all days are sunny. In October the grass-fires burn; some nights we can see distant flames advancing up the mountains, thin red lines reminiscent of Queen Victoria’s infantry in the attack. In October Old Mutare might have a drizzly day or two, but the rainfall will not be measurable. The nights remain cool, at least by Charleston standards, with lows generally in the 60s. Daytime highs may top 80°, and when they do, the locals will complain about the heat, sometimes even before I’ve shed my winter jacket. Also in October, the winter-brown hills begin to change: miombo trees are red, and other vegetation begins to green up, in anticipation of the rains. On campus our irrigated wheat turns gold, promising harvest.

During November temperatures continue to climb. Airborne dust particles and smoke from grass fires paint crimson sunsets, causing our American visitors to AU look westward and play with shutter speeds on their digital cameras. Meanwhile, if you’re Zimbabwean, you think about rain.

In the tropics around the world, seasonal rains are “summer” rains, loosely concentrated within the Inter-Tropical Convergence Zone (ITCZ). This is a sort of meteorological Equator, several hundred kilometers wide, that moves between the Tropics of Cancer and Capricorn. Because the ITCZ lags about a month behind the Sun’s north-south migrations, it spans the land (and ocean) where seasonal heat has built up to its annual maximum. The warm land heats the air above it; therefore the air begins to rise—here, and there, and sometimes everywhere—creating low-pressure zones and convectional rain. In this form of precipitation, rising air comprising a meteorological “cell” slowly cools. However, even as it ascends and cools, the rising air-mass remains warmer than the frigid, high-altitude air surrounding it, and therefore it continues to rise. As the rising air gradually cools, nanodroplets of water vapor slow their random movements. At sufficient altitude, with sufficient cooling, droplets begin to coalesce, initially around condensation nuclei (such as ice crystals or dust) and then around larger droplets. When the growing droplets become heavy enough to fall through the rising air, precipitation results. Usually it’s a thunderstorm, sometimes including hail.

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65 While teaching science courses in Africa, I try to think exclusively in metric units. But in this book, for temperatures, I reckon I should probably retreat to Fahrenheit.
66 In what follows I shall discuss the ITCZ as a band of low-pressure zones created by warming land (or ocean). The Zone is also defined by the convergence of prevailing winds from the northeast with prevailing winds from the southeast. These “Trade Winds” are largely a product to the Coriolis Effect.
67 These cells may be small or large in area.
68 As I explain above, any moisture within the rising air eventually begins to condense. This releases latent heat (captured during vaporization), which slows the cooling of a rising air-cell, relative to the temperature of the surrounding air. Remaining relatively warm, the meteorological cell therefore continues to rise and cool until it produces convective precipitation.
In Old Mutare, around the middle of November, the sun passes directly overhead on its journey towards Capricorn, and meteorologists would say that the leading edge of the Convergence Zone should be arriving. But in landlocked Zimbabwe, far from moist ocean breezes and shadowed by mountains to the east, the ITCZ is a fickle giver of good and perfect gifts. So if the first rains have not arrived by mid-November, many dryland farmers begin to worry.

Now taste the quandary of a nervous Zimbabwean farmer, blessed one November day by an excellent rain: Maybe you should put in your maize immediately; maybe this will be your best chance, maybe your only chance, to make a good crop. Or maybe that early shower is only a teaser-rain; maybe if you plant now, you’ll waste your labor and lose your seed. Of course even one rainy day provides some encouragement, and if November ends without any rain at all, the terrifying d-word begins to appear in the conversations of English-speaking farmers. And if November is dry, then what about December?

Theorists of catastrophe call droughts “ramp disasters.” This definition recognizes the irony that a drought often begins on the beautiful day when you smile at the bright sun and say, “Thank God it’s finally stopped raining.” On that blue-sky morning you begin to ascend a gentle slope of pleasant dryness. Day follows day, each more perfect than the last, until you finally notice the cracks that yawn in the dying soil, and you realize that your maize-crop has withered beyond salvation. You have climbed the ramp, and you have achieved the disaster. For the foreseeable future, modern technology will not be able to prevent droughts. Therefore, for now, ag meteorologists struggle to recognize droughts early so that people can still prepare to mitigate their eventual effects. In this worthy enterprise, scientists are still a long way from perfection, but they have made strides. For example, climatologists have learned that in eastern Zimbabwe drought-probabilities increase during El Niño years like 2015-16. With improved models, faster computers, and additional data, climate scientists may someday be able to predict oncoming droughts months before they mature. Given an August warning of a December drought, farmers could hedge their bets and plant more fields in drought-resistant crops. Ranchers could manage the size and disposition of their herds. And relief agencies could pre-position assets in anticipation of likely disasters.

But that’s enough drought-depression for this chapter! Fortunately, at Africa University, in most years, during November or December, if you look to the northeast on a hot afternoon, you can see a convective buildup of cumulus clouds. And during most years those summer clouds will eventually bring rain to Old Mutare. This is a big thing; heck, even way up north in

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69 The Tropic of Capricorn is located at approximately 23°26’ South Latitude. Old Mutare is located at approximately 18°54’ South Latitude.

70 A reliable irrigation system ameliorates much of the stress and cools some of the temptation to gamble. At AU, we have semi-reliable irrigation systems.

71 I think that Shangwa is the Shona word for drought. I think it can also mean catastrophe, disaster, or abject misery.

72 Global climate change will probably result in a continued warming of the Central Pacific, which will probably increase the amplitude of El Niño - La Niña oscillations.

73 I hate a drought. Nothing else arrives so pretty, squeezes so slow, and hurts the living world so bad.
Charleston, I get excited just thinking about it because rain in southern Africa is life! When the rains break, the world changes. In November of 1993 I was teaching Biostatistics in an old farm building with a low, corrugated roof. I was lecturing about Analysis of Variance, which I considered to be the most important thing in the world. The first raindrops hit, big and discrete, loud as shots from a .22. Then the tempo accelerated; I talked louder; the noise on that old roof continued to increase; I was shouting at the top of my lungs, and I could not hear a word I said. All the students were smiling. I looked out the window. Small children were dancing. I revised my evaluation concerning the relative importance of Analysis of Variance.

The rains of early summer can sometimes break suddenly with a ten-centimeter afternoon downpour, and when they do, Lord you want to be there! The dust settles instantly. The red mud clings to your feet, like you were in Upstate South Carolina. Teenage girls wash their short hair in runoff from their parents’ roofs. Women point to their clotheslines and laugh at their drenched laundry. Children improvise tiny boats and race them down rivulets that appear on the farm roads. Men crowd together and strategize their immediate agricultural response. And visiting biologists—well, I remember one breaking-rain of January ’96, a build-your-ark downpour by day, ceasing at nightfall. I remember mist rising from the roads; I remember the call of frogs and the smell of flowering eucalyptus. The moon, a waning gibbous, broke from the clouds a little after eight o’clock, but I saw it only briefly. Termites, with instinctive anticipation of the rains, had built tall emergence-towers from their mounds, and after our torrential afternoon downpour their mating flights obscured the night sky. Children were chasing them, snatching them out of the air, popping the insects into their mouths. “Hold by the wings,” a small boy instructed, in mission-school English; “they taste like groundnuts.” The child stared at me, so, to uphold the honor of my age or race or nationality, I squinted my eyes and ate a termite. Then I ate another and another….

With the first big rains, frogs appear everywhere in a world that had been too dry for frogs. In flooded fields, kassinas sing their melodious whistles that inexplicably remind me of breaking bubbles. Along the roads, rubber-frogs, walking not hopping, are arrayed in black and red like cheerleaders for the University of Georgia. In trees above rising ponds, *Chiromantis xerampelina* build their foam nests and mate in multiples that defy common decency. Toads of various varieties tongue up termites when they hit the ground. Golden leaf-folding frogs, no bigger than a fingernail, bump vocal sacs and fight over females. Bush-squeakers, unfindable, call from everywhere. And Mr. Mugwambe, security guard from the chicken houses, tells me, “On a night like this, snakes too may walk.”

By now I suppose you’ve taken my point. I love Zimbabwe’s rains. I believe that any biologist worthy of her or his DNA should love the rains—as, perhaps, should any dry-land agriculturist and perhaps any Christian who affirms the Resurrection. Usually the rains begin, perhaps modestly, in November. Usually they get serious in December. Usually they continue full-force through January and perhaps February. For me the summer months in Old Mutare flash by in a wonderful blur of frogs, chameleons, birdsong, termites, and happy farmers. Then, usually, the rains taper off before mid-March, as the world of eastern Zimbabwe begins to change again.

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Yes, I admit that you can have too much rain, even in semi-arid Zimbabwe. And farmers, who are worriers by profession, do worry about that possibility. On the other hand, frogs, so far as I can tell, are content.
April is typically a month of bright blue skies. Days are warm, and nights are pleasant too. Tadpoles have turned into frogs. Most birds have fledged their young, and a few pairs will be risking a second clutch of eggs. The ponds are drying, and wheat-farmers are contemplating the planting of a winter crop.

May is at least as dry as April. Some leaves begin to show hints of brown or yellow. Wildlife teachers from the American south bemoan the disappearance of snakes and sleep under blankets against the coming of cool nights. June can be cold, at least by my standards, and I consider July even worse. Most Americans would still enjoy the afternoon temperatures, but Zimbabweans huddle around campfires when darkness falls, and fancy space-heaters appear for sale in the windows of Meikles Department Store. As July turns to August, temperatures may drop below freezing on two or three nights. Banana trees suffer. Chicken farmers invent ways to heat their pullet houses. A few days bring drippy, depressing frontal rains—seldom in agriculturally significant amounts—from the south. And when the sun shines brightly, momma python basks to raise her body temp so that she can carry incubation-heat to the eggs she has stashed deep in an abandoned termite mound. Then, finally, August gives way to September. Around the 23rd, the sun will cross the Equator, headed south, to be followed, in good Novembers, by another blessing of rain.

I have tried to describe the seasons of a typical year around Old Mutare. But, increasingly, ecologists recognize the importance of distinguishing between “what the world is typically like, on average” and “what the world is really like, this particular year.” Back in 2010, during the downtime between classes and final exams, I read a book that Chrissy had borrowed from the College of Charleston library. This weighty tome, entitled *African Savannas*, included chapters by maybe a dozen authors hailing mostly from Africa and the USA. Their contributions were diverse, but two important threads were interwoven throughout the book.

One theme was ecological. Educated amid temperate-zone woodlands, many twentieth century biologists and range-management specialists historically approached the study of savannas from a viewpoint of equilibrium theory. They thought in terms of climax florae, and they wanted to diagnose the causes of any landscape’s deviation from a supposedly natural, climax-state. You know what I mean; it’s like an ecologist in Upstate South Carolina might say, “The climax system in Spartanburg County was an oak-hickory deciduous forest, which was displaced by cotton culture.”

In Africa, these stability-scientists considered fire, drought, deforestation, etc., to be pathological departures from normal. And these factors were said to “destabilize the homeostasis of Africa’s natural ecosystems”—natural, of course, being defined by the Western ecologists. In recent years, by contrast, the fashion within ecology has changed substantially, and today many savanna biologists are disequilibrium-theorists, for whom there are no normal years, and for whom “climax-states” make no sense apart from very specific contexts.

I believe that the ecological assumptions underlying both schools of thought influence the ways their adherents view African society and even African morality. Scientists who hold the “ecological homeostasis” viewpoint are likely to list African cultural practices as the Number One Destabilizing Factor that prevents savanna ecosystems from achieving their normal, appropriate climax-state. On the other hand, scientists who subscribe to disequilibrium

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75 Remember, by the World Wildlife Fund classification system, the AU biome is in the general savanna category.
ecological theory tend to interpret African cultural practices as adaptations co-evolved alongside other biota within ecosystems that are inherently instable. Thus, for the equilibrium-tribe of scientists, annual burning and high pastoral stocking-densities are counter-adaptive practices that conservationists should preach against. For the disequilibrium-tribe, fire is an adaptive tool, and high stocking density is survival-insurance against unpredictable droughts. In the context of this two-philosophy argument, I am quite willing to sound wishy-washy: I believe that the questions you ask and the context in which you ask them determine the theory that you need to apply.\textsuperscript{76} I would caution, however, that Western ecologists should be very careful if they start thinking that every question requires an equilibrium approach. Many thoughtful Africans remember equilibrium-ecology as the orthodoxy of colonial foresters and game-managers, preached as Truth to the ignorant natives and enforced as governmental policy.

The other theme of African Savannas is especially relevant to Americans who would like to understand the manner in which we typically perceive African needs. Most of ...Savannas’ authors contend that, generally, Western charities respond to “crisis narratives” that are framed largely by Westerners (or by westernized Africans). Thus, when we are generous enough to give money, we often do so because, uh, ...otherwise, the world will absolutely freaking end by tomorrow morning.\textsuperscript{77} In Chapter 8 I shall address problems that arise when we relate to Africa out of a crisis mentality. For now I simply want to say that when we react as if the world were in constant crisis, we may lose important opportunities for deeper understanding and more efficacious service. And, equally important, we may lose opportunities to establish abiding friendships with those whom we would serve.

In this context let’s briefly revisit the major topic of Chapter 2. As we have noted, during the Nineteenth and early Twentieth Centuries the missionary enterprise was a morally ambiguous undertaking. Nowadays we recognize the connections between mission-ism and colonialism. We decry missionaries’ ethnocentrism; we condemn their cultural insensitivity; we are appalled by their spiritual arrogance; we ridicule their obsessive concern about venomous snakes, bare boobs, and unfamiliar food. But in this chapter I’d like to emphasize three points in the missionaries’ defense. (1) More than a few of the old-time missionaries were able to laugh at themselves, a talent not universal amongst today’s secular “development theorists.” (2) The best of the early missionaries did not approach Africa in a crisis-narrative mode. To them the continent was not a Problem that had to be solved overnight by the rapid application of Western resources and intellect. Rather, Africa was an Opportunity to live the Gospel for a lifetime: learning and teaching, taking and giving, sharing and loving under a bright sun and a moon as big as you can imagine. (3) Although their record of accomplishment was very mixed, some old-time missionaries did some things that were really, really good. If you don’t believe this is true, do something that Americans don’t usually do: ask Africans.

\textsuperscript{76} Maybe it’s sort of like physics: for some questions you model light as a wave, and for other questions you model light as a particle.

\textsuperscript{77} Here are two historical examples of crisis-narratives. From the 1970s: ...otherwise the current generation of Ethiopia’s children will disappear. From the 1980s: ...otherwise, elephants will be extinct by the end of the twentieth century. In each case the simplistic exaggeration undercut long-term, serious efforts to understand and address very real problems. I shall return to the question of elephants in Chapter 7.
And if you do in fact ask Africans on the AU farm about the worthiness of missionaries, you’ll get a particularly favorable review of a present-day hero whom you’ve already met. Larry Kies first came to Africa with the Peace Corps, and in the drylands of Botswana he met his two true loves: Jane, whom he married, and the vocation of ag-teaching, which he also pretty much married. Upon his appointment to Africa University, Larry, in a paraphrase of John Wesley, declared that all the AU farm would be his classroom. In his Practical Agriculture class, First Year students measure fields, calculate fertilizer inputs, estimate wheat yields, milk Holsteins, and learn to drive tractors. I remember one year when Larry excused a Moslem student from an exercise in which hogs were wrestled and vaccinated. During the next lab period, two fashionably dressed female students petitioned, “Sir, we are Catholics and must therefore be excused from plucking chickens.” Larry, himself raised Catholic, explained a little bit about Cannon Law and a lot more about his grading system. And before long the young women were cheerfully carrying out their laboratory assignment.

Larry’s Practical Ag students always meet Robert Soungweme, Crop Supervisor. He coordinates with AU’s Farm Manager to decide what crops will be planted in which fields under what regimes of fertilizer and irrigation. Every morning, Monday through Saturday, Robert and his foremen get together with Larry at the machine-repair shop. Before eight AM they plan the day’s farm-work and discuss opportunities for student involvement. Sometimes Larry also tells Robert about students who are lonely or who are having a tough time with life in general. Robert and his wife Jolene invite those kids out to their house to share some home-cooked food and unhurried conversation. Once I asked Robert how many children he had. He replied, “Including AU students, I would estimate about a hundred and fifty.” That might be accurate; the man is very good with numbers, perhaps because he has to think in terms of hectares and seeding densities and the volumetric output of irrigation pumps. On the other hand, when GR first arrived on campus, Robert claimed to have eighteen wives, so maybe he exaggerates his numbers occasionally. On Sundays Robert puts on a necktie and hitchhikes to Penhalonga, where he is a big-time lay-leader in the Anglican Church. When Chrissy and I lived in the old farmhouse, the Soungwemes were our next-door neighbors. Many a night Robert and Jolene (yeah, his one-and-only wife) would come over for tea and biscuits. And, of course, we ate *sudza* at their house.

Another farm friend is Joel Nyabunze at the piggery. If you must work with hogs, it helps to like the darn things, and Joel does. He plans every breeding (sometimes strategizing about bloodlines years in advance), and he logs in all newborns, taking their weights, clipping their tails and teeth, vaccinating on an exact schedule, and regularly updating all data on his hog-status boards. If you talk to Joel, you may initially assume that his English vocabulary is somewhat limited. However, the conversation will soon turn to the husbandry of porcine beasts. And after you’ve been bombarded with words like *piglet, pig, shoat, gilt, sow,* and *boar*—all used with exact precision—you may wonder about the limits of your own English vocabulary. If Joel likes you, and he almost certainly will, he’ll eventually suggest that you should partner with him in the swine business, on some land he knows about near the town of Rusape. He will also tell you the date on which the next AU litter will arrive and demand that you drop by to admire the piglets.

There were, of course, many other farm workers, some of whom we knew fairly well, and

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78 “I look upon all the world as my parish....” John Wesley, *Journal*, 11 June 1739.

79 If you converse with Joel, you might want to remember that *hog* is the general term, referring to any living animal of the species *Sus scrofa*. Terms like *pig* are more restrictive.
some of whom we knew hardly at all. There was Mr. Dozva at the dairy, Mrs. Makute with the layers, Mrs. Zimunya at Sales. Some people worked at AU for years and years. Others passed through only briefly. Still, amid all the staying and the going, there is a solidity, a permanence, to this community. On Wednesday mornings, around six thirty, 30-50 of the farm workers gather together in an old storage building for the weekly Farm Devotional. Scriptures are read, prayers are offered, sundry hymns are sung, and some farm worker preaches a sermon. The service is almost entirely in Shona, so if you attend, and if you are white, somebody will come sit by you and translate. But in some ways the language does not really matter. You see the faces, hear the prayers. You listen to the singing, the profound harmonies. You turn and look across the broad fields, the nature of their bounty testifying to the year’s season and to the honest labor of the persons who surround you. And you can be thankful for the privilege of being on an African farm.

Of course in some superficial ways “our” farm doesn’t seem particularly African at all. It is cultivated by tractors designed in the USA and manufactured in Brazil. Its produce is hauled by trucks made in Japan. Its primary crops are wheat, from the Near East; corn/maize, from Mexico; squash, also Mesoamerican; manioc/cassava, from South America; and collards, probably from the eastern Mediterranean but maybe a direct blessing from the hand of God. Our farm’s main shade-trees are mangos (India), eucalyptus (Australia) and Chinaberries (not China; maybe the Indian Himalayas). Its livestock includes cows (ours are European), pigs (multiple Eurasian domestications), and chickens (Southeast Asian). Many technical ideas for the farm’s management were transplanted from Iowa State and U.C. Davis. At first glance, nothing could appear more intercontinental than the AU farm, which even gets occasional advice from Music City USA. Still, I assure you, the farm where we lived is profoundly African. And I shall now explain how I know that fact with absolute certainty.

In addition to numerous adult workers (some introduced above), a whole cadre of children lived on “our” farm, and we were often privileged to spend time with them. For example, late one Tuesday afternoon, Chrissy and I were walking home from work. At the point where the tar-road turns away from AU’s academic campus and towards the farm, we were intercepted by Lamech, a precocious eleven-year-old whose last name I’ll not report. The previous week, during a work-with-wildlife visit by The Incomparable Randy Babb (Arizona Game and Fish), Lamech had decided that he wanted to become a Game Guard in a National Park. To train for this profession he would miss no opportunity to manipulate artifacts of Babb-related technology—so, on the road to our farmhouse, he grabbed my digital camera, fired it up, and started shooting pictures of people, places, and things. As he photographed, Lamech told

80 If you’re American and black, they’ll probably do the same thing, but if you look right, they might assume you’re a Shona-speaker.

81 The first name, Lamech, is from the Bible. The Hebrew root from which the name is derived remains obscure, and “Lamech” could mean anything from “man of prayer” to “the striker-down.” Two Lamechs appear in the Old Testament. One is a wild man, in the doomed lineage of Cain; he sings a song of triumph when his son invents the sword. The other Lamech lives to be 777 years old. His son is Noah, who, by Grace, invents not the sword but the Ark. As for “our” Lamech....
Chris and me how he was getting along in Hartzell Primary School. “I am doing very well in choir, PE, Shona, and English. You can email Randy that I like Environmental Studies, but my very best subject is maths.” We had heard all this before; we’d even seen the report cards that verified Lamech’s academic boasts. So I figured that the boy must actually have some different matter in mind, and I wondered when he would ever get around to it. After all, sundown was coming, and I did not want to finish tomorrow’s preps by candlelight. For her part Chrissy, who understands children very well, expressed her obligatory approval of Lamech’s good grades and then made her escape: “If y’all don’t mind, I’ll hurry on home and start supper.”

Lamech watched her go; then he started walking again, slowly, taking pictures, his brow furrowed in thought. And then he began to formulate a question that was obviously of some interest to him. “Do you know that…?” Those were Lamech’s actual words, but his tone was clearly “Are you prepared to admit that…?” I waited another two long seconds for him to continue, and at last he did. “Do you know,” Lamech asked, “that white people have green blood?”

So am I startled, gentle readers? You bet! And I’m pleased of course. This conversation is gonna be worth the price of a late supper. The instant I hear Lamech’s question, I hunger to post it on FaceBook and impress my adoring public back in the USA. Ain’t my Africa-life cool, y’all? I live among kids who actually think that I have green blood. Yeah, I can work with this; just let me make sure I heard the boy right. “Green blood?” I ask, “You say white people have green blood?”

“It is true,” Lamech continues. “I know this because I have a cousin who went to America. He became a policeman.”

Better and better! Chrissy will be sorry she missed this.

Lamech is now pointing my camera toward a team of Robert Soungweme’s workers, who are struggling to redeploy our irrigation system before nightfall. One woman has a length of pipe—I doubt that I could even lift the thing—balanced on her head. “You never take videos with this camera,” Lamech says. “If I owned a camera like this, I would make better use of it.”

“Lamech…,” I say.

The boy stops. He lowers the camera and looks directly at me. I don’t know whether it’s a grin or a smirk on his face. “You never take videos with this camera,” he repeats. “I bet you don’t even know how.”

Wait a freaking minute! Somehow, the dynamics of the conversation have shifted. I actually do know how to take videos. In fact, I know lots of things that this little African boy does not! I even know about green blood. In New Guinea there is a genus of skink, *Prosinohaema*, that does not metabolize biliverdin—that’s a breakdown product of hemoglobin, in case you forgot—into bilirubin, and therefore the blood really is green, in case you couldn’t figure that out. Biliverdin is so toxic that no other vertebrate is able to maintain it in the bloodstream. As you should be able to deduce, *Prosinohaema* pays a high physiological price to perform this biochemical wizardry, but reptile malaria is super-bad in New Guinea, and obviously the poison offers some defense against the disease. The cost/benefit tradeoff is sort of like—sort of like—sickle-cell trait. I stop short. I think of pain; I think of Africa.

Lamech has acknowledged my long silence. Maybe he sees a hint of sadness in my eyes. “Soon they will burn the wheat-stubble.” He speaks softly. “Then my brother and I can hunt mice. One kind is very good to eat. White people do not eat mice.” He repeats the assertion, in case I haven’t heard. In case I still do not understand his gift. “White people do not eat mice.”
I see that Lamech is smiling again, and suddenly I am smiling too. “Of course we don’t eat mice,” I agree. “Their flesh would coagulate our green blood.”

Now Lamech’s grin is about as big as East Zimbabwe. Finally the dumb white man is on the right page! Lamech has seen my blood more than once, when we scrambled around on the rocks after lizards, when his little sister hit me with a dip-net. And he darn well knows about hemoglobin, or his science teacher at Hartzell would have kicked his skinny black butt. Ab, you stupid white SOB, you’ve been had!

“Hold up your arm,” Lamech commands. He is laughing now. He places his more or less black arm alongside my more or less white one. “Yes,” he confirms, “green blood.”

And thus, y’all, here is how I know for absolute certain that “my” farm is a farm in Africa. First, my Temporary Employment Permit says that I’m in Africa. Second, my Garmin Etrex Vista GPS says that I’m in Africa. And third—though y’all ignorant green-blooded Americans may not believe this—almost everybody here has actual RED BLOOD!

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At least in English, Lamech was the premier storyteller of the AU farm kids. But others weren’t far behind. The talent is valued in Zimbabwe—and is perhaps best expressed by highly mischievous boys and slightly less mischievous grandmothers. And for my own part, I like stories best when they include animals and are told around campfires.
PYTHONS AND THE CHICKEN TROLL

The coming of electricity brought myriad changes, mostly positive, to rural Zimbabwe. Among all these changes, the greatest was the provision of light. Before electricity, work and play and study could begin at dawn, but they would generally cease shortly after sunset. These ancient rhythms may sound soothing to over-stressed Americans who yearn for a past more in tune with Nature. However, as every competent theorist of national development will tell you, a modernizing society cannot run on a solar schedule; rather, bright light must be reliably available at the flick of a switch, 24/7.

During the near-total breakdown of Zimbabwe’s economy, Chrissy and I learned that lesson first hand. We were at AU through the last four months of 2007. As I explained in Chapter 1, these were hard times. Villagers burned their shade-trees for cooking fires and trapped our University lands for bush meat. People carried tote-sacks of inflated money but could not spend it because stores had little to sell. A loaf of bread, when you could find one, cost last week’s salary, and maize-meal was worth its weight in million-dollar bills.

It was during these hard times that Zimbabwe Electricity Supply Authority, ZESA, revved up a conservation measure called “load shedding.” Through this practice, vast reaches of the national power-grid—sometimes whole provinces, I think—would be shut down for hours or days. Of course ZESA never warned people about when they’d be blacked out; that would have allowed folks to schedule big projects for power-times, thereby hogging electricity when their section of the grid was up. Fortunately, at the Ag school we had a diesel generator. We imported fuel from nearby Mozambique, sometimes legally, and during the many, many load-shedding days, we used that generator to maintain research freezers, to bring up computers, and to run a minimal complement of laboratory instruments. But we could not power our irrigation-pumps reliably, so our wheat suffered. And at night our offices and labs were often as dark as the inside of a Holstein cow. So that was 2007. During all our subsequent semesters at Africa University, power has been available most of the time. And you better believe that Chrissy and I have been thankful for it!

I have sketched out a few hard-times memories because I want y’all readers to understand that I am not condemning modern electrification. In fact I flat-out love AC current and wholeheartedly testify that it is an important component of the African Light to which GR and I dedicate this book! But I did observe one good thing during certain dark nights of 2007. That was a revival of traditional African storytelling.

This resurgence was to be expected. In many respects load shedding returned Zimbabwe to a time before any village had a television, before children could play dodgeball, hoops, or hopscotch on dust-roads under village streetlights. More important, load shedding affected the assignment of homework. Before electrification, most rural kids did after-school chores until almost dark and then whipped through a quick page or two of homework before the daylight was completely gone. Then, in the prosperous 1980s and 90s, with electric lights available, teachers throughout education-crazy Zimbabwe assigned homework in quantities that would appall a Chinese tiger-mom. But eventually economic collapse brought load shedding, unpredictable and
Certainly some very poor families—I know of one—sacrificed food-money for study-candles so that their children could do the Abraham Lincoln thing. But during the bad days of 2007-2008, few teachers could afford such luxuries, even if their adult eyes could meet the challenges of marking homework by candle light (ask Chrissy and me about it…). Oh, and one more thing. Many Zimbabwean schools were closed for many months, so the homework issue did not even arise. So OK, preparatory to reading this chapter, this is what I want you to do. Consider a nation of children who have become accustomed to staying up after dark. Bring in load shedding, which extinguishes homework and electronic entertainment for these children. And envision a culture with a rich storytelling tradition.

GR Davis and I are dead-set and determined to include an African-story chapter in this book. Unfortunately, however, we are neither Shona speakers nor ethnologists, so we cannot discuss the genre authoritatively. But we have been to Africa, and we have sat around campfires. We have heard old folks and young spin their tales; we’ve blown on our hands against the cold and told a few tales of our own. In other words, we may be white-boy ignorant, but we know we can tell an African story. We’ve done it before; I’m about to do it again, and to tell the truth, I’m up for it.83 I’ll tell my story with respect, and I’ll make the story as African as I can without being dishonest.

Before I commence this audacious enterprise, I need to tell you how African storytelling generally looks to me. First, in my experience, stories in Zimbabwe are usually told at night. As I understand it, that’s true because children in traditional households were not expected to burn daylight in non-productive activities. Storytelling usually takes place around the dying embers of a cook-fire—close during winter, at more distance during summer. Very occasionally a narrator seems to be a person with some formal training for the act. In these cases the audience can be quite large, and the event may be planned for days before it takes place. More often, a story can arise out of general conversation. There are no apparent, fixed rules about the age or gender of a narrator, but most of the time it is an older woman, usually a grandmother or great aunt of the children who comprise the majority of her audience. Usually the story is accompanied by background noise: insects and frogs in summer, bushbabies, barking dogs, and occasional hyenas at any time of year. Sometimes a listener will play a few notes on an m‘bira, and sometimes audience participation—maybe like a Greek chorus, but how would I know?—becomes part of the event.

I don’t want to give y’all the idea that load shedding never occurred before 2007 or after 2008. The practice had been, and still is, a familiar part of Zimbabwean life, at least in the Old Mutare area. But power outages did become particularly common during the bad times. I should also explain that the 1980s and 1990s were not universally prosperous. Some people in Zimbabwe suffered substantially throughout those “good years.” Furthermore, in the worst city slums and the most remote “communal areas,” times have been and remain uniformly hard. One year was basically like another; electricity, hopscotch, and homework were distant mirages, perhaps to be glimpsed but not to be anticipated.

I do believe that I have one particular qualification for spinning my tale. My father was a great storyteller. He also claimed to have African blood, and though that might be just another story, he did make the point that most good tales have crossed a whole lot of water.
Chrissy and I never felt free to sit close in a storyteller’s fire circle; the performance would have switched to English, and none of the real participants would have had much fun. But we have observed briefly, from the periphery. And, while we lived in the old farmhouse, on numerous occasions, groups of visiting children would reverse the usual age-roles and tell stories to us older adults. Bible stories were often presented. The 41st chapter of Ezekiel was popular; surely you remember: “…prophesy to the bones…” the Sovereign Lord commands. And our farm kids would make the dry bones come together.84 We also heard about Samson destroying the Philistines’ temple and about David slaying Goliath.85 And, on one memorable occasion, our young visitors acted out the story of Holy Week. The performance was complete with letter-perfect recitations of King-James scripture passages, with scourgings, with two crowings of a cock, with an Ascension, and with the brief appearance of Mary, clad only in one of our bath-towels.

Our farm kids also told stories that did not follow Biblical themes. Stories about animals were popular. How did elephants get their trunks? Apparently Mr. Kipling had it wrong; the nose was hyperextended when Lion pulled Elephant out of a pitfall trap.86 Why do you seldom see a road-killed goat? Why does the baboon’s backside look the way it does? Why is a file-snake more to be feared than a black mamba?

We also learned why a muzungu (spelled correctly, which it probably isn’t, the word would mean “white person”) is unlikely to be an effective revival-preacher. I really wish I could repeat this story, but it is much too complex. It’s a theological tale involving heredity, physical endurance, and the fact that white people generally live on dark continents. I do not think the story is universally believed, but I can testify to its occasional truth.

We learned how to banish—maybe—the bad spirits that may catch you on moonless nights in the most distant communal lands of Zimbabwe. To quote Lamech, whom you met in Chapter 3, “You can sometimes escape a ghost if you use English and say, ‘In the name of Jesus Christ, be gone!’ But I would have no problem with ghosts if you gave me the fine torch that you use to search for snakes.”

And my own tale? Well, like so many stories that I heard from AU farm kids, my tale will be populated by snakes, Zimbabweans, and muzungu. The story will be told in three parts; that’s not unusual either. The parts will be united by some common characters, but new elements will also appear, and event will not follow event in a logical, linear progression. Like most grandmother-stories that I’ve heard, my story will contain a moral lesson or two—which, of

84 We have also observed that this scripture passage is popular in Zimbabwe’s adult preaching. I have been told that the dry bones represent families separated by distance or even by death; the book of Ezekiel presents the possibility of a community being healed. Ezekiel has also been important in African-American preaching: consider the fracturing of communities during the hideous Diaspora of slave-times; consider wheels and wheels and the possibility of revolution.

85 I’ve never seen a Bible-times, centrifugal sling in Zimbabwe, but as far as I know, every little boy (and some little girls and some adults) sometimes packs a slingshot—or as Zimbabweans would say, a catapult.

86 I heard the complete version of the elephant-nose story not from an AU farm child but from a student in my 2014 Wildlife Management class.
course, will not be particularly clear. As a personal quirk, I’m struggling to stick with the literal truth in these African stories; that’s unlike most real storytellers, who artistically manipulate mere facts in pursuit of Larger Truths. Now keep your ears open for the appearance of a Wise Elder, who is traditionally present in the local genre, and who can help us understand how the world works. The Wise Elder won’t appear every time we need him, and that’s a shame, but life and African stories are like that. Please be careful not to tread on my pythons. And never lose sight of the Chicken Troll, who will appear prominently in every story. Or is this character really the same from story to story? Such questions can arise, in Zimbabwe, on dark nights. For me to attempt a narration in Zimbabwean style would be vanity. But if you are capable of major mental gymnastics, pretend that the words are Shona and that you understand them as the language you imbibed with your mother’s milk. You are sitting cross-legged around the embers of a cook-fire on the Africa University farm. I am a silly old grandma who still believes that nice girls must have short hair and who thinks that Twitter is a conversation among birds. And we are about to commence into three successive nights of ZESA’s load shedding, so yo’ mamma she say you got no entertainment option but to sit yo’self right here and listen (though, gentle reader, you may actually skip to another section of this book).

Hush, child. Push another msasa branch into the fire; let the sparks fly as high as Chirimba—and no, there are no hyenas—but on a night this cold, I’d sit close, and I would not walk alone.…

ONE: MIKE-UNIFORM-GOLF-WHISKY…

Even in the shortest winter grass, a large python is almost impossible to see—until you see her. A glint of yellow-brown scales here and another way over there, she can look like stitches in a yellow-brown garment; she sews the landscape together. This is akin to a role of Python in some Shona mythology. She is the grandmother. She knits the hearts of the people together. She is especially important to women, though when her kindness is dominant, she has been known to save young men from their enemies. The python, or shato, is the totem animal for some Shona groups.87 I think that every Shona person has a totem, which is shared with some relatives. In the old days totems were important in preventing intermarriage (you could not marry somebody of your totem) and in arranging funerals. Today, for some Zimbabweans, totems are considered relics of the past. Conservation groups, however, love totems because totemic animals are likely to be given legal protection. Zimbabwean law prohibits the killing of pythons, and we know of violators who have been sentenced to hefty fines and jail time.

87 A Shona totem is a special animal or part of the human body that serves as a collective symbol for a group of people. Totem, an Ojibwa word now Anglicized, is foreign to Africa, so it is not quite correct. The Shona might say mutupo, which I’ve also seen spelled mitupo and motopo; I certainly wouldn’t know which might be correct, and I wouldn’t know how to explain totem beyond the definition given in a regular old dictionary. Shona totems can cut across regional and clan groupings, so they may help discourage hardline political factionalism in Zimbabwe.
Africa has basically two kinds of pythons, small and large. Small pythons come in two species, the poorly known *Python anchietae* and the Ball Python, which is now common in the American pet trade. The other type of python, the big kind, was once considered to comprise a single species across the entire continent. Now, however, southern and northern populations are split into separate species. All of Zimbabwe’s pythons are formally known as *Python natalensis*. The specific name is from the South African province formally known as Natal (now KwaZulu-Natal). *Natal* is a Portuguese word for birth or birthday. As a proper noun, it means Christmas. I like that a whole lot because I can think of AU’s pythons as Christmas Pythons.

To persist, a python population needs three things: water, shelter, and food. These requirements are shared by all wildlife species, but with pythons the resources must be scaled to an animal that hatches at about 30cm and can grow to be—well, I’ll write about maximum size later. By luck or the Grace of God, Africa University includes a whole lot of excellent python habitat. Two perennial streams plus a few ponds and irrigation seeps provide water throughout even the driest years. Crevices, abandoned mines, and particularly termite mounds are fine shelters. Mice, rats, guineas, and even small antelopes are available for food. So Chrissy and I have been able to make frequent contacts with good old *P. natalensis*. Over the years we’ve found six or eight pythons on our own. Farm workers have led us to about that many more, several of which were exploiting the bounty of the University’s chicken houses. Most of our pythons have been between two and four meters long. We’ve put radio transmitters into four pythons, which have served as ideal teaching-animals for Wildlife Management students who needed to learn the art and science of field radio-telemetry.

In the year 2000, near the Mutare River, at the base of Africa University’s far mountain-ridge, I had a python encounter that is hard to explain. I was teaching Wildlife Management that semester and had implanted a transmitter into a python. The snake was barely over two meters long, but my students and I proudly showed off the animal to quite a few local Zimbabweans. Most were, or pretended to be, appropriately impressed. But one day an old man—I hadn’t seen him before; surely he couldn’t be the Wise Elder—smiled and said, “Wait until you see the six-meter python.” A condescending American herpetologist, I whipped out my field guide and showed this ignorant villager that Zimbabwean pythons never really got that big. The old man nodded his head politely and said, “Yes, Sir, of course, Sir”; then, seemingly chastened, he walked into the gathering dusk. But that’s not the end of the story. I saw the python. She was, as my American students would say, “big with a capital F.” She was also wonderful. All my life I had longed to see something like her, but I had not believed it could exist. She warmed my heart, strangely, with African Light. “Te Deum laudamus….”

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88 I know the python was female because all big ones in Zimbabwe are. But she was, really, beyond description. I know that because I’ve already made the effort, in a book about AU. I shan’t repeat that narration here because it was inadequate and because the event is too important to routinize by excessive tellings. Besides, you can always buy the book through the AU Development Office in Nashville, which is locatable by Google-search; proceeds from sales go to University scholarships. Anyhow, I’m sorry, y’all readers, but only Chrissy—and perhaps the Wise Elder—will ever know how big I believe the grandmother of all pythons really was.
Now, my grandchildren, I am cold, so let us pull our circle closer around the fire. On winter nights like this—Blessing, gal, would you please add another msasa branch to the embers—yes, yes, Blessing, you are correct; two branches would be better—on winter nights—on winter nights like this, sometimes even our most joyful stories carry whispers of sorrow. But that is not the case with this first tale; every part of it makes me smile. Yes, Patience, I have talked with your father; I know you have already seen the Python. But have you met the Chicken Troll? Yes...

Once upon a time, back in 2010, when Chrissy and I were teaching our usual AU courses, the Incomparable Randy Babb came to visit us in the old farmhouse. Surely y’all must know the Incomparable Randy Babb. He’s head of Arizona Game and Fish’s “Watchable Wildlife” program. He’s led expeditions for National Geographic, and he’s made nature-films for the BBC. Heck, Randy’s even been to jail in Mexico and Vietnam. And he took some of the finest photographs in this book. Anyhow while the Incomparable Randy Babb was with us in Zimbabwe, on most nights we lugged 50kg of camera gear up the near ridge to photograph bats—and to look for pythons of course. On each of these photo-missions we had to hike by the Layers House, and every time we passed, we would be accosted by the chickens’ security guard, who inevitably begged money for his son’s school fees. We usually gave the guard something—not much—but his tiny depredations on our finances eventually became so annoying that Randy dubbed this man “the Chicken Troll.”

Three years later, in 2013, Chrissy and I were back at AU, and during the early part of the semester we visited the Chicken Troll several times. Some of our visits were social calls, and others involved snakes. For instance, in mid-September, at dawn, we deployed to the Layers House and pulled a 2m python out of the drainage ditch. After we had secured the animal in a snake-bag, we heard the Troll’s radio break squelch, and AU’s Central Security Operator demanded that the Layers Station authenticate. The Troll raised his handset to his lips and replied, “I authenticate as Mike-Uniform-Golf-Whisky-Alpha-Mike-Bravo-India.”

“What was that all about?” I asked.

“When we are asked to authenticate, we spell our name with strange words like that,” the chickens’ guard replied, reaching out to touch my shoulder.

And suddenly, in the morning mist, python-bag in hand, I realized that although I had given the guard small money on dozens of occasions, I had never bothered to learn his name. But the Chicken Troll does have a name; he is Mike-Uniform-Golf…; he is Mr. Mugwambi.

Our most stressful 2013 visit to the Layers House occurred on Sunday morning, 29 September. Larry Kies, AU’s missionary/ag-scientist, banged on our window at about 1:20AM. (He’d been awake anyhow; Saturday was the Zimbabwe equivalent of Senior Prom Night for his only daughter.) “There is a snake in the Layers House,” Larry said, waving his cell phone. “They think it is a big cobra, and they sound quite frantic.” Groggy and about half scared, Chrissy and I grabbed our equipment and piled into Larry’s 4X4 to careen cross-campus toward the Land of
Threatened Chickens. Upon our arrival we could see Mr. Mugwambi, grinning like a possum, and motioning with both arms that we should follow him into the chicken-house. Pumping my snake-stick over my head, I shouted, “Mike-Uniform-Golf-Whisky…,” and Mr. Mugwambi grinned even bigger.

At this point in my fire-circle story, I wish I had the Zimbabwean grandma’s gift, so that I could transmogrify the tale into a saga of epic peril, titanic struggle, and undaunted heroism. However, the cobra—an enormous and beautiful female, pushing three meters in length—cooperated perfectly with Chris’ and my intentions, so she was easily bagged, and we were soon on our way home.

On the sedate drive back to Staff Housing, I told Larry Kies about our 2010 encounters with Mr. Mugwambi, about his countless requests for school-fees money, about our chronic annoyance with the Chicken Troll. Then I added, “This year Mr. Mugwambi always appears delighted to see us, but he never asks for a single penny.”

“Of course not,” Larry replied; “no more school fees. Mugwambi’s son finished high school and is acing his courses at AU. In a couple of semesters he’ll have his Bachelors in Education.”

By 2015 Mugwambi the Younger had indeed graduated from Africa University. For most of y’all Statesiders gathered around my fire, well, you can have no idea of what an accomplishment this graduation was—nor of the sacrifices requisite to it. Chicken Troll Mugwambi wears only tattered clothes. Ninety percent of the calories in his diet come from ground maize, and he’s skinny as a Ribbon-Snake. The Mugwambi house can’t really be called a house at all. It’s barely a shack—smaller than your bathroom—because for years the Mugwambi money went into (you guessed it) those school fees that kept the son in primary school and high school and allowed him to win entry to Africa University. So, you generous American visitors who may have given the Chicken Troll… uh, Security Guard Mugwambi a dollar or two, I reckon those dollars might have been the most important you ever spent.

This has been, as I have informed you, the absolute happiest true story that I can tell about my times in Africa. I still rejoice to remember it; in my experience, nothing can trump the Unveiling of the Chicken Troll. I just wish that the Wise Elder had been present with Chrissy and me throughout the joyous events. Perhaps he could have told us how to distill the happiness, how to determine its chemical formula, how to replicate it in vitro in order to inject it into every nook and cranny of the Bright Continent. We would need that.

TWO: THE CHICKEN TROLL AND THE QUESTION OF KEEPING KOSHER

The fire burns too hot tonight, and I am tired from a day with irrigation-pipe balanced on my bony old head. You children should watch the television-machine and I should sleep—but the damned ZESA—so, Lamech, child, if you are such a damned smart mission-boy, then tell me why we moved the damned irrigation-pipe; do fools think electric pumps run on damned air? No matter. Yes, I have a story for you. It is a short one, but it is difficult to understand. I must tell
of things about which I perceive only one side. You know what the Wise Ones say: whenever Man tells the story, he kills the lion, but whenever Lion tells the story.... Oh, no matter. Don’t crowd so close. Tonight I am as ignorant as a whiteman, and I do not care whether you hear me or not.

The Wise Elder appears. His name is Yossi Leibowitz, and he is Rabbi of B’nai Israel Temple in Spartanburg, South Carolina, which is a place across the Atlantic Ocean. The temple is over a century old. It was founded by the “trading Jews” who spread inland from the much older Jewish community in Charleston. Spartanburg has only one Jewish congregation, and its official spiritual leader has traditionally been known, to Rednecks and Black Folks, to Christians and atheists and a handful of Southeast Asian Buddhists, as, simply, The Rabbi. Back in 2009 GR Davis and I invited The Rabbi to address our January Short Term class. We needed somebody to talk about the religious dimensions of environmental responsibility, and Rabbi Leibowitz addressed the task admirably, offering a brief, insightful meditation on that complex topic. Then, during the question-period that followed, a Wofford student asked what was required for food to be kosher.

“Kosher food....” The Rabbi nodded his head. He is not a small man, and food is obviously important to him. “To be kosher is to be pleasing in the sight of God. [More nodding.] Many Jews follow detailed food-rules, which are summarized in what you call the Old Testament. Furthermore, even though they are killed, food-animals must be treated humanely. But the most important requirement is that every person involved in the preparation of the food be treated fairly.” And at this point The Rabbi raised his voice, sounding more like an ancient prophet than a Twenty-First Century Jewish intellectual: “No matter what it is, no matter how it is prepared, no food can be kosher if it is the fruit of human injustice!”

In Old Mutare, Zimbabwe, during the second week of October, 2013, I was initially unaware that the Wise Elder would be looking over my shoulder—and that he would not be happy. In the early evening, Chrissy and I made a social visit to the Layers House to see Mr. Mugwambi. “How is your night, Mike-Uniform-Golf...?” I asked.

“I am very hungry,” the Security Guard replied. “We were scheduled to be paid ten days ago, but they are not paying any of us. So I am guarding thousands of layers and broilers that will provide food for others, but my own stomach is against my backbone because I have nothing to eat.”

I did not know how I should reply to Mr. Mugwambi; nor am I sure what I should tell you readers to put his plight into context. Throughout 2013 Mr. Mugwambi walked about 10km to and from work, and most weeks he worked five twelve-hour shifts. His salary (when he was paid) was approximately fifty cents per hour. Chrissy and I spend about that much when we’re at AU, but the University provides us with free lodging, and we are exempt from deductions for taxes, etc.: Mr. Mugwambi, of course, enjoys no such perquisites. All things considered, I reckon that, in Old Mutare, thirty dollars per week may be a living wage, but it must be carefully budgeted across pay-periods, so a ten-day delay in payment can result in serious hunger.

Over many semesters at AU, Chrissy and I have learned that the depth of our ignorance about local affairs is profound. Thus we do not know why security guards’ salaries were not promptly paid in mid-October, 2013, or why this became a recurrent problem. Furthermore, to be honest, I expect that if some big boss set us down and explained the Real Reasons for the delay, we would sigh and nod our heads and express our new-found Understanding of this regrettable lapse.
Therefore, assuming that *Understanding* was possible and exculpatory, in October of 2013 Chrissy and I did the obvious, easy, American, patronizing thing. At our first opportunity we brought a big tote-sack of food to the Layers House and gave it to Mr. Mugambe. Predictably, his gratitude was embarrassing, allowing us to remain blissfully sheltered under our umbrella of Potential *Understanding*. However, *Understanding* does not fill stomachs sustainably, and a few kilos of rice plus some canned goods donated to one man will do nothing for other people who have been—probably for good, *Understandable* reasons—made to suffer hunger.

I meditated on these things the next time I was in the AU dining hall, the next time I ordered my daily chicken. As I stared at my heaping plate, I knew exactly what People More Knowledgeable Than I would say: “Don’t worry about things that have not been explained to you fully. Enjoy your chicken. People have worked hard to prepare it. You have paid the fair price for it. Good food is a gift of God and is pleasing to him. Eat in peace. We promise that it will TASTE JUST LIKE CHICKEN.”

And y’all know something? The More Knowledgeable Ones were 100% right. The meal was great, and it did taste just like chicken. But Rabbi Leibowitz, I admit that the aftertaste was redolent of CHICKEN SHIT.

*Pour water on the damn fire, children. It is time for bed.*

**THREE: THE CHICKEN TROLL AND THE WONDERFUL MACHINE**

*Do you know the seasons, children? This is the last week of October, and it has become very warm, praise God. Did you observe clouds in the northeast, over Mozambique? My eyes fail, but God sees everything, and maybe we shall enjoy early and reliable rains; maybe no child will go hungry. Would you like a piece of chicken for Christmas? Yes, I bet you would! And it could happen this very year, praise God. The fire is now perfect, so push back or draw near; it does not matter. I tell you the world is silly, praise God, and tomorrow night ZESA may bring you television. But tonight, if Kudzai will bring me just a little tea, I shall explain the whiteman’s silliest invention.*

For Chrissy Hope and me, the last week of October, 2013, was a time punctuated by small things, and that’s always good when you are teaching in Old Mutare. My students attended class, mostly. Our wheat-fields escaped the worst ravages of a violent hailstorm. And the *Manica Post* finally dropped its long-running headline: “Bush-Sex Prophet Confesses, Apologizes.” Sadly, however, at the end of the week two visiting colleagues, Sarah and Jeff Holmes, would have to leave us and return to the States. Jeff is a field ecologist; Sarah is a medical scientist. Together they improved our classes, our labs, and our senses of humor. Chrissy and I would miss the Holmes, as would our students.

Throughout the week our two radio-bearing pythons continued talking to us—*beep, beep, beep*—and from the larger animal my students were obtaining a thermal profile sufficiently dense to bear robust statistical analysis. And the smaller animal, bless his little three-chambered heart, led us on a merry chase, which Jeff insists was worthy of narration in this book. On
Saturday night, 26 October, the Holmes-Hope-Abercrombie team all walked down the farm road to Chicken World, toting beans and bags of rice for Security Guard Mugwambi, who was quite grateful although he had actually received half of his back pay and therefore had a reasonably full stomach. (Thank you for your prayers, Rabbi Leibowitz.) While we were in the north area of campus, we climbed the near ridge to confirm the location of Python Number Two, which had recently been hiding under a room-sized boulder at the foot of a tree-<i>Euphorbia</i>. But since our last visit the snake had made a long-distance move, and from his former location our radio-receiver could not pick up one single beep. At Jeff’s suggestion I continued searching for signal as we clambered down the power-line cut from the ridge-crest. This was unpleasant because electromagnetic radiation leaking from the overhead wires produced constant, screaming-loud static. Nevertheless, as we approached the Layers House, we detected a faint beep within the noise. Jeff said, “The snake’s in the chicken compound; I’ll run tell Mr. Mugwambi, and you can hand me the receiver over the fence.” Well, sure enough, Jeff was correct; the python had evaded the watchful eyes of every security guard (they had not been issued flashlights) and penetrated Chicken World. We finally localized the python’s radio-signal to a patch of super-dense grass, maybe ten meters by two…

<i>Now children, as you sit around my excellent fire, extend your imaginations and visualize how dense this grass-mat must be. You know the place; the grass grows along the drainage-seep from the upper House, thus exploiting all resources needed for its photosynthesis. In case your Biology teacher at Hartzell Primary School was negligent in her duties, I shall inform you that those resources are water, sunshine, CO<sub>2</sub>, and a constant flow of partially dissolved chicken manure.</i>

…so Jeff worked the receiver/antenna while Chrissy, Sarah, Mr. Mugwambi, and I searched through the grass. For a while we moved grass with sticks, but that availed nothing, and Jeff informed us that Mr. Python was moving back and forth under the matted vegetation. So in semi-desperation I got down on my knees, scratching with both hands. Throughout this procedure, I kept telling myself, “A bite from a seven-foot python won’t hurt very much; a bite from a seven-foot python won’t…” Then, suddenly, a thought struck me: I hope some ginormous cobra hasn’t eaten my python—and transmitter! Of course, in such a case, the bite probably would not hurt for very long, but Chrissy would be stuck with two extra ag-classes and lots of paperwork. Anyhow, we eventually found the python: Jeff pointed the antenna; Sarah and Mr. Mugwambi rolled back a mat of grass; Chrissy saw a yellow-brown glint of snake-skin; I grabbed the varmint, and he was in the bag.

Security Guard Mugwambi was extremely impressed. “That machine,” he said, pointing reverently at our receiver, “that machine is wonderful. It sees everything!” Jeff, an excellent teacher, explained in substantial detail the actual radio-mechanics of python-telemetry: “We had a radio the size of a kidney-bean; we implanted it into the python; now the python’s radio transmits a signal. The receiver picks up the signal—those beeps that you
heard—and the directional antenna receives best when its cross-members are aimed as tangents to the radio-waves’ broadcast sphere. That way we know when the antenna is pointing at the snake.”

Mr. Mugwambi gave Jeff the “Zimbabwean Look,” which is occasionally broadcast by a Zimbabwean who has heard too much BS from too many white people for too many years. “Radios talking from within a python?” Mr. Mugwambi shook his head and pointed again at our receiver. “That machine is wonderful,” he repeated; “it sees everything.” For a long moment Jeff was silent, as if he were contemplating the relative positions of visible light and of VHF radio-waves upon the one great Electromagnetic Spectrum. At last he nodded. “We are both right, Mr. Mugwambi. This wonderful machine actually can see things that we cannot.” Then Jeff grinned and touched the shoulder of our Chicken Troll. “But without the five of us, the damned thing would have never bagged the python.” In the blackness overhead I could see as many stars as most Americans will see in a lifetime. But they were very far away, and the five small human beings below stood very close together.

Later, Sarah Holmes told me that the evening we spent with the Chicken Troll would always remain a magic time for her. For some inexplicable reason it also marked, approximately, the onset of numerous changes in Mr. Mugwambi’s life. Of course no sane observer would attribute the subsequent cascade of events to a Wonderful Machine or a totemic Radio-Python or even the laying-on of hands by our saintly Jeffrey Holmes. I merely point out the temporal correlation: since our awesome October night at the Layers House, the Chicken Troll has definitely experienced good times and bad.

Although Mr. Mugwambi would disagree, we Americans would dismiss many of the events as small stuff. In early 2014 some missionary-visitors bought him a new tire [excuse me, “tyre”], which he had long desired, for his 1976 English bicycle. Thereafter, when he was particularly fatigued, he could ride the bike to work. During the July winter of that same year, he received a hand-me-down coat. And, through Larry Kies, Jeff and Sarah sent him a high-dollar state-of-the-art flashlight [excuse me, “torch”], which we hoped would make his work safer.

Other events were Big Deals, even by American standards. Shortly after Christmas, a vicious hailstorm took the roof off of the Mugwambi shack. Asbestos [yes, asbestos] roofing is hellaciously expensive in Mutare, but the Troll found enough money to buy a couple of new sheets, and he jackleg-patched some of the old ones, so for the rest of the rainy season he stayed dry, mostly. In June, our Troll’s son, Mugwambi the Younger, was graduated in AU’s Class of 2014. Subsequently he found a good job and a great wife. This delighted Mugwambi the Elder, who swore that God would keep his old heart beating strong until he could enjoy his grandchildren. This preservation of life may have required active intervention by the Almighty because Jeff’s so-called “tactical flashlight” did not make Mr. Mugwambi safe enough—and one night the Troll was set upon by would-be chicken thieves. These miscreants thought they had killed our hero when they slashed his throat, but somehow they had missed both jugulars and carotids, and help arrived before Mr. Mugwambi bled out. An emergency run to the clinic fixed him up, though there were many stitches and enough blood to gag a vampire.
Doctrinaire materialists like me attribute Mugwambi’s survival to the ineptitude of Zimbabwean cut-throats and the superior suturing speed of Zimbabwean medics. But on the other hand there was one true miracle that even I cannot deny. Over the years Mr. Mugwambi probably heard about a million Methodist sermons, and their cumulative effect may have done the trick. Or perhaps our Troll intuited the existence and phone number of Spartanburg’s Wise Elder, whom he distance-dialed on a Nokia-X2. In any case, by grace, bestowed through whatever intermediaries, Mr. Mugwambi has started attending general University meetings! That’s almost never done by low-level workers, but Mr. Mugwambi does attend, sitting towards the front, wearing shabby work-clothes amid the theology PhDs and stylish secretaries in their high heels and wicked-city power-skirts. Furthermore, Mugwambi takes notes about policy, which he later shares with other workers. And he asks questions about fairness. Think about it: a self-empowered Chicken Troll: that’s more than a miracle; it’s an embryonic social movement, incubating in the warmth of African Light.

Now look, children, ZESA has pity on us and renews the power. See? The lights have come on in Jolene’s house. Go ask her to let you watch the story of those Indian people who dance too much and talk too fast. No, Charity gal, that’s all right. You can leave me here with the fire. The wood will last until midnight, and the sparks will still ascend to the height of Mount Chirimba.

Meanwhile, back in South Carolina, the white boy who is trying to create a book would like to write something of an epilog. Therefore, gentle listeners, if you desire an update about chicken trolls and pythons, then gather around whatever campfire you can find and read on. During Chris’ and my 2015 recent visit to AU, Mr. Mugwambi officially retired. As of this writing, he continues to work, two or three nights a week, as a University security guard, but he no longer spends his shifts with the chickens. Instead, he has access to Joel Nyabunze’s office in the piggery. From this more comfortable (if equally odoriferous) post, he serves as a sort of elder statesman, ready to provide advice, reinforcement, or English-language assistance to the young trolls-in-training who have been hired to guard AU’s chickens, pigs, hay-barn, and Holsteins. Mr. Mugwambi also draws a tiny retirement pension, most of which he spends to support his mother, who, I believe, turned 101 in 2016. Perhaps because Mr. Mugwambi no longer patrols to protect the poultry every night, during our 2015 visit we received no nocturnal telephonic summons to the Layers House. This did not mean, however, that the semester was devoid of python encounters. One Wednesday morning we skipped the first half of Farm Devotional to evict a python that was too small to eat chickens. We didn’t move it far, and I told the workers that it might come back to reduce the local rat population. On a Tuesday afternoon some miners on the back side of campus invited us to come see a rather large animal that lived in a jumble of boulders near their camp. They did not want the python moved; they just thought, correctly, that we might want to admire her beauty. And then, two weeks later, we had our most entertaining python adventure of the year.
As usual, Chrissy and I got to our office at about 0630. The Internet was running well, so I answered a note from my Kansas City sister-in-law. She was elated because some sports-team named “The Royals” would be playing in the World Series. Despite my inherited aversion to professional baseball, I was able to share Ms. Rosemary’s enthusiasm because several of my students had actually heard of the World Series, and all had heard of “The Royals,” who are known to be a bunch of old white people living in London. Anyhow, about the time I hit “Send,” two security guards showed up and announced, “Python at the Farm Sales Point!” Chrissy and I had a very busy work-day ahead of us, but of course we hit the road anyhow, thankful that the snake was at the near-by Farm Sales Point. But alas, the python was not at the F.S.P; only the man who had found the python was at that convenient locale, and the snake itself was a couple of clicks beyond, almost to the edge of campus. So we kept moving. I had a hard time keeping up with our informant though he was carrying a 20kg (about 45 pounds) bucket of water on his head.

The tarpaper shack where the python-finder lived was about 4mX4m, smaller than our office. The python was almost at his door, but way up in a tree. The immediate environment was perfect for pythons, but the man and his partner said they would kill the snake if we did not remove it. I climbed eight or ten meters up the tree, and I consider this an achievement for three reasons: (1) There were no branches close to the ground. (2) The scientific name of the python’s arboreal refuge is *Acacia polyacantha,* which roughly translates to “many-thorned thorn-tree.” (3) I was three days short of my 71st birthday. As I pursued, the snake climbed on up into branches that would not support me, and I was at a loss for plans. Therefore Chrissy headed back to campus to fetch my Wildlife Management students. They would all return about two hours later. Meanwhile, I was afraid that I’d never be able to climb the tree a second time, so I waited, perched on a comparatively thorn-free branch.

While Chrissy was gone, one of the locals talked with me for a good while. He and his partner were what is termed “artisinal small-scale gold miners,” or ASMs. Early in 2014 the two men had found what they considered to be a propitious site, so they built their shack and went to work. Several months before the arrival of the python, the miners had discovered a paper-thin intrusion crack in the broad quartz vein that had originally attracted their attention. Sometimes gold is expressed in such cracks, so with picks and shovels and sweat they followed this fissure straight down. As of Python Day, their hand-dug vertical shaft was 23 meters deep. Given the nature of the soil, the abundance of rocks, and the hardness of quartz, well, for me even a one-meter dig would be the achievement of a month’s hard labor. Furthermore, as geologist Terry Ferguson has eloquently explained to me, one cave-in would mean certain death. Predictably, the chief metal in the intrusion-crack was iron; nevertheless, with enormous labor, the miners had managed to scrape out a fingernail or two of gold. But of course, for all their strength and endurance, these rural Zimbabweans were not experienced in the cut-throat world of precious-metal dealers. Whenever they would actually find a sliver of gold, they did not know how to profit appreciably from it, so they would sell it to “the white man who is at the big mine”

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*89 Yes, that really is a technical term from the Development Literature. In Eastern Zimbabwe, it typically refers to people who dig exclusively with hand-tools and have no established market for any precious metals they may find.*
near Penhalonga.” Chrissy and I know a little about the big mine, and I’ll return to that subject shortly.

Eventually, Chrissy returned with my students to save the day. I tried to shake out the python, and I poked at her with a long pole, but she just pulled up a bit higher, farther out of reach. At that point Chris Namilonga, a Wildlife student from Zambia, borrowed an ax from the miners. With a few moans and groans I climbed down from my perch. Then Mr. Namilonga swung the ax with the practiced power and precision of a headsman in the employ of Henry VIII. The tree was down in no time. The python hit the ground running and made a couple of strikes at three of my bolder Wildlifers—to the vast amusement of more cautious student-onlookers, who were videographing the procedure with sundry phones and “surfaces.” I seized the animal by the tail, and when it turned to confront me, Tikky Giorgio (our token Kenyan) got a noose around it so that I could grab the head. And the python—probably less than 4m—was quickly bagged. Later that same day my students and I released the python in good habitat, at a respectabe distance from miners as well as from AU’s chicken- and rabbit-projects. Additional videos were taken, and as far as I could tell, a good time was had by all.

That is the end of the python story. Still, from their respective distances, Rabbi Leibowitz and Chicken-Troll Mugwambi are whispering to me about social justice. Therefore, another matter, even more important than the welfare of a lovely python, must be raised. As I wrote above, Chrissy and I know a few scraps of information about “the white man who is at the big mine near Penhalonga.” The mine is enormous. It is a scrape-and-crush operation that has denuded a vast area of acacia lowlands and msasa hillsides. Think about the battle of the Somme; pretend it was fought upon the surface of the moon….

There are actually several white men at the big mine near Penhalonga. They are Russians, and they manage the Penhalonga mine for a transnational Russian syndicate. They care about their syndicate’s bottom line. I cannot personally testify that they care about anything else. The two artisanal miners on the northeast edge of AU’s campus—and hundreds of other Zimbabweans like them—bring in a few flakes of gold, every once in a while. It’s just a few flakes, but multiply that times a few hundred miners: over time this adds a hundreds of grams of gold to the syndicate’s bottom line. The Russians give the finders just enough money to keep them from starving, so that they can find a few more flakes, or find their graves at the bottoms of vertical shafts driven by desperation, guts, and ATP into the rocks of Mother Africa. Somebody smarter and braver than I am should invent a strategy to shine a bit more African Light into the bottom of those dark holes.

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As I write this book, I am acting under the admittedly questionable assumption that American readers enjoy snake-tales. And of all African snakes, black mambas may comprise the absolute Quintessence. So their tales must be worthy of note—or at least they remind me of cottonmouth stories from the days of my youth.

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90 On 19 October, 2016, gold was priced at $40.88 per gram.
BLACK MAMBA
Or, Homage to Betty Sue

According to the iconic snake-story of my Southern adolescence, Betty Sue Harper was wearing a lime-green two-piece and waving to the boys at Barnett’s Landing when she misjudged the boat’s wake and tumbled off her slalom ski into a patch of lily pads along the south shore. Her daddy, who was driving, swung ‘round quick to pick her up, but she’d fallen into a nest of water moccasins, which went at her like Bluetick hounds on a buttermilk biscuit. And by the time Betty Sue was got into the boat, she was swole up so bad that they couldn’t do nothing for her over to County General. ‘Course I wasn’t there to see it personally, you understand. But I know the story’s true because my preacher’s oldest boy said he changed the sparkplugs on Mr. Harper’s outboard less’n a week before Betty Sue passed. Said it was a 1965, 33-horse Evinrude Ski-Twin short-shaft.

I hope y’all readers realize that nothing about the account is factual, except maybe the part about the sparkplugs and the outboard motor. I reckon I’ve seen over two thousand water moccasins, or cottonmouths. One of these snakes was absolutely as mean as hell. Maybe a dozen were right snappish. Many were a bit defensive, but most were entirely laid back. And I can say for sure that none ever attacked, and none co-occurred in densities I could properly call a nest. In other words, by very extensive personal experience, I have learned to discount all tales about the diabolical aggressiveness of South Carolina’s *Agkistrodon piscivorus*. No less an authority than Doctor Sam Seashole, who has managed to get his fool self bitten three times, absolutely agrees.

In Africa, the most frightening tales of snakes’ diabolical aggressiveness attach themselves to the black mamba, *Dendroaspis polylepis*. According to report, this snake can run faster than a hotrod Chevy. It has the IQ of a Cal Tech physics major. It is sneakier than a Japanese carrier-admiral. It is more vicious than my second-grade teacher, and one drop of its venom could kill all 40,000 elephants in Hwange National Park. Of course I don’t believe any of that; the mamba’s reputation in Zimbabwe sounds too much like the cottonmouth’s reputation back in South Carolina. On the other hand, I have not seen over two thousand black mambas, so I make no claim to real expertise. Furthermore, when a mamba rears up to give you the once-over, you may remember a second-grade teacher like the one I had—and tremble with fear.

Myths and legends abound, but one thing is for sure: the black mamba is a big snake, with a maximum length of over four meters. It’s not particularly fat, and it’s not particularly black (except the inside of its mouth, which you probably don’t want to see). Most Zimbabwean

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91 I warned y’all in my introduction that I tell too many snake-tales. And now it occurs to me that, given the prominence I allocate to such stories in this book, some readers might conclude that Africa University is a very snaky place. That has definitely not been Chris’ and my experience. Three months’ snake-hunting near Old Mutare typically rewards us with about the same number of snakes as three days of equivalent search in South Carolina, Florida, or Arizona. If you really want to see snakes (obviously a laudable goal), then it’s hard to beat the USA.
specimens are gray, with an overall cast of olive green, and they are proportioned about like an American black racer, though perhaps a little fatter. When baby black mambas hatch out—around mid-summer, about 90 days after egg-deposition—they are maybe 50cm long. If they find sufficient food, the babies grow very rapidly, often reaching a length of 2m in a single year. Adult mambas are usually solitary, though males may fight early in the spring breeding season. Most snake species exhibiting male-male combat are sexually dimorphic, but female mambas are about as big as the males. Throughout their lives these snakes are active hunters, patrolling across extensive home ranges and taking a wide variety of prey, typically small to medium in size, typically warm blooded. Like most big snakes, mambas surviving into adulthood probably live about five to fifteen years.

Mambas are members of the cobra family and are armed accordingly. Although their venom is a complex cocktail of bioactive substances, and although it may vary somewhat from place to place, it is composed primarily of neurotoxins. Physicians who have treated mamba bites often report the disruption of neural communication to the diaphragm so that a bite-victim loses the ability to breathe. Extrapolated from mice, LD$_{50}$ for subcutaneous human envenomation is said to be about 0.3mg/kg. Bites accompanied by envenomation typically inject about 100mg (though the measured record is 400). According to these numbers, unless you weigh more than about 650 pounds, a hot mamba-bite, untreated, is more than likely to kill you. Nevertheless, actual envenomation is not inevitably fatal, and my friend, herpetologist Johan Marais, writes that “Early administrations of antivenom have been highly effective, even in severe cases.” Of course this would be more comforting if antivenom were actually available in any appreciable portion of the black mamba’s range. Fortunately, black mamba bites are rare. A study in South Africa from 1957 to 1963 recorded 900 bites by venomous snakes. Of these, only seven were inflicted by our new friend, Dendroaspis polylepis.

In addition to their venom, black mambas are famous for their speed. The myths invariably proclaim, “faster than a racehorse,” which is nonsense. Just for fun, to take a break from writing, I ran a Google search for “black mamba speed,” and a box jumped up to report 20km/hr. Knowledgeable herpetologists are skeptical about that claim, and I personally don’t believe that any snake could achieve such speed without divine assistance. Nevertheless, black mambas are probably the fastest of all terrestrial snakes, and speeds approaching 11km/hr have actually been measured.

Despite contradictions among authors, I was happy to summarize for y’all the literature about mamba size, venom, and speed. These are, after all, characteristics that can be objectively defined and sometimes even measured. On the other hand, black mambas are also said to be highly intelligent and extremely aggressive. And although I feel compelled to comment on these less definable qualities, I’m uncomfortable doing it. As y’all know, human intelligence has been

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92 Dendrotoxin, the dominant neurotoxin in mamba-venom, reflects the snake’s scientific name. Supposedly some analyses have also demonstrated the presence of important cardiotoxic components. I wouldn’t know.

93 The LD$_{50}$ of a substance reports the concentration (usually per unit of victim-mass) that would be expected to kill 50% of subjects receiving the dosage.

studied for many generations, and yet scientists are only beginning to understand the many dimensions along which this character might be evaluated. Mamba brains, by contrast, have hardly been studied at all, so we know almost nothing about them. They are of course very different from human brains: they are tiny—about the size of a black-eyed pea—and they have no cerebral cortex that is remotely comparable to our own. These objective facts do not support the legends of mamba-intelligence. Nevertheless, a mamba’s brain is plenty big to contain billions of dendritic connections, which are metaphorically comparable to the binary switches in a computer. Furthermore, extending this computer metaphor, we can say that many mamba-behaviors are pretty much “hard-wired,” thereby conserving “programming space” for complex neural processes such as learning and the processing of visual information. Anyhow, both zoo keepers and observers of mambas in the wild corroborate the idea that mambas are unusually smart—at least for snakes. Thus we can conclude that the mamba’s anecdotal IQ is high; perhaps that’s because mambas are intelligent—and because observers of mambas want them to be intelligent.

Aggressiveness is another characteristic that is difficult to define. Overall, I am skeptical that a species evolving on a continent full of large, dangerous mammals would be likely to develop hair-trigger attack behavior, especially since its only weapon is a venom-system that cannot kill anything big within less than about half an hour. Furthermore, most seasoned observers report that under almost all threat-conditions a mamba prefers to run, a talent that is highly developed in the species. Nevertheless, in some circumstances a mamba will most definitely bite a person; some self-styled authorities expand: “…a person or two or three.” I’d guess that, throughout all of Africa, black mambas probably kill more than a hundred people per decade. Undoubtedly, stupid human activities are associated with many of these deaths; indeed, under Florida-type “stand-your-ground” laws, honest juries could convict very few mambas of outright murder. So here’s my advice: if you are ever fortunate enough to see a black mamba in the wild, allow the animal some behavioral option that does not involve killing you.

I hope y’all have detected my reluctance to write about mamba intelligence and aggressiveness, based on other folks’ anecdotal information. On the other hand, I have no such reticence to present my own anecdotal information—which, at least, I know to be true.

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95 I suppose it might be argued that mambas evolved attack-to-disable-then-run defense, but I consider this unlikely. Few human bite-victims are physically impaired within less than 30 minutes (an hour or two is more common), and typically a bite is not immediately accompanied by appreciable pain. Indeed, in one case a student (not mine!) who eventually died initially believed that the mamba’s strike had missed him entirely.
96 This is a wild guess, based on limited data from South Africa. Incidentally, across Africa as a whole, one species of snake causes more human fatalities than all other species put together. This is not the enormous, terrifying black mamba but the West African carpet viper (*Echis ocellatus*), an animal that never reaches even a meter in total length.
97 I’ll let y’all readers guess whether I intend my silly sentence to defend mambas or to criticize stand-your-ground laws.
98 I believe that many black Africans practice an avoid-the-mamba strategy with admirable discipline and consistency; this is a matter that I shall discuss toward the end of this chapter.
I have seen black mambas only ten times in the wild, and two of those observations probably involved the same snake. My first AU encounter was near the northwest corner of campus. I heard a rustle of dead leaves in a tall eucalyptus sapling and looked up to see what was going on. A medium-small mamba—about two meters long—was turning in the upper branches. Snakes in trees typically seem oblivious about events on the ground, but this one was different: when I moved left or right, the mamba’s head tracked my movements exactly. Interesting, I thought; most species of snake apprehend the world largely through chemoreceptive senses, but this animal appeared to be highly visual in orientation. While I was meditating about sensory modalities, the mamba was sliding down the eucalyptus, head first, at a very modest speed. I was about 4 meters from the base of the tree, and I stepped back another meter or two so that I would not frighten the snake, which I wished to observe a while longer. The mamba was on the ground now, and it was crawling in my direction. I told myself that the snake must not have seen me after all—I mean, if the animal knew where I was, it would obviously go in another direction. Yeah, that’s what I told myself; but I wasn’t believing it. In fact, I was viscerally certain that the mamba saw me clear as day, and to tell the truth, I wanted to run. Problem was, I’d already heard a dozen tales about mambas giving chase. Of course I knew that a mamba could not run as fast as a racehorse, but then again, neither could I. So I just stood and watched and worried. The snake continued in my direction, approaching to within about two meters. Then it stopped and reared. In retrospect I realize that the animal’s head was only about thirty centimeters above the ground, but at the time, it looked about 99 feet high. The mamba did not spread its hood. It just looked straight at me for about ten years—or maybe it was about ten seconds—and then it lowered its head and crawled away, entirely without haste. Previously I had observed that same approach-and-look behavior several times, with black racers and coachwhip snakes. That was back in the USA, and those observations never even made it into my field notes. But this was a mamba, and it was in Africa, and I needed an Africa-story for folks back home.

On other days at AU, I saw other mambas. Once The Incomparable Randy Babb and I glimpsed a large snake far ahead of us in a mineshaft that we were exploring. Using a telephoto lens and a long-range flash, Randy snapped a picture. Thus we were able to confirm the identification we had suspected, so Randy and I abandoned the mine to the mamba. A couple of weeks later, when Vietnamese artist Dao Van Hoang was visiting, we saw a big mamba at the fisheries brood-house. I don’t know for sure, but I think this was the same snake that Randy and I had already encountered. Perhaps it was hunting foam-nest frogs. I do not think it noticed our presence, and that was OK with Hoang and me. On another day I was crawling into another mine, looking for bats. A squadron of paper-wasps was guarding the entrance. I suffered a few stings as I penetrated their defensive cordon, so I was cussing wasps when I should have been more aware of my surroundings. Then, from the corner of my eye, I caught movement. A small mamba was coiled on a narrow ledge, perhaps a meter from my right ear; the animal tongue-flicked twice more but otherwise remained motionless. I had no further concerns about wasps.

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99 Mambas can spread distinct hoods, but these are narrower and less impressive than those of cobras. Black mambas may also gape to exhibit the black lining in their mouths, a feature that may have given the species its English common name.
What I’m saying is, on the peaceful campus of Africa University, when mambas and I
countered one another, we were usually able to go our separate ways. Such, however, has not
always been the case.

The date was 3 November 2010. After Wednesday chapel, Chrissy went to the library to
prep for her class while I stayed in our office, revising my notes on radio telemetry. I was typing
something about wavelengths and antennas when the Dean’s secretary knocked on my door: “A
telephone call for you,” she said. In 2010 Chrissy and I neither received nor expected telephone
calls, so I decided that this must be an emergency. “Please don’t let it be Holly,” I whispered.
Now y’all, I’ve loved Holly Hope since 1972. She is the world’s smartest, nicest, cutest, most
sarcastic sister-in-law (though in my wife’s family she has competition in each category). She is
also the person who could and would ferret out our Dean’s telephone number if we needed to
hear bad news from the United States, and Chris’ mother had not been doing well. So as I
followed my Dean’s secretary back to her office, I kept thinking, “Not Holly; please not Holly.”
And when I picked up the telephone, the first words were exactly what I had feared: “You must
come as quickly as you can.” But the accent was not West Kansas; it was East Zimbabwe. And
the second sentence was, “There is a snake.”

Relieved, elated, and hoping for a python, I ran out of the secretary’s office toward the
stated Venue of the Snake-Event—which was the University car park, right at the center of the
academic campus. High winds had ripped the biggest limb from an ornamental tree, and, thus
disfigured, the tree was being sacrificed for firewood. (I was not sorry to see it go; it was some
invasive Asian species that I could not identify anyhow.) A crowd of spectators had gathered,
and I was directed towards an enormous pile of severed, leafy branches. “In there,” a man said.
Still hoping for a python, I peered into the leaves and gingerly moved a few limbs. Then I saw a
flash of snakeskin—light gray, with a hint of green. “I’m afraid I’m gonna need some
equipment,” I said.

A car and driver were immediately procured, and I was rushed back to the farmhouse
where Chrissy and I lived. As the vehicle sped along AU’s farm road, I asked myself, “Do I
really want to catch a black mamba?” The answer was not affirmative, but I didn’t have much
choice. Too many folks had gathered for me to leave the snake amongst ‘em. Furthermore, I
had already decided that I would not try to kill the animal. I’d preached too many AU sermons
against destroying Wild Things simply because their destruction might be convenient. More
important, killing snakes is just not who I am. So, anyhow, I got back to the Venue, armed for
what I hoped would be non-mortal combat. I moved limb after limb, dragging them to a second
pile about six meters from the first. Finally I was down to the last limb—there was the mamba—I
snatched with my clampstick—missed—zoom! The snake zipped about six meters, right into
the new branch-pile. “Faster than a freaking racehorse,” I swore. The spectators were laughing
and whispering something about a contest of Speed and Intelligence; I was glad that most of the
comments were in Shona.

I re-booted the mamba hunt, this time dragging each branch fifteen meters from the pile.
And OK, folks, any good adventure writer would try to develop some suspense at this point. But
you already know how the encounter turned out: after all, I am around to write the story. I
moved all branches again. At the last branch, the snake reappeared; I snatched at its head; I
captured it at mid-body. Now here’s the interesting part. Securely clamped, the mamba did not
struggle at all. It did not writhe, it did not thrash around, and it certainly did not bite the invulnerable aluminum clampstick. Instead, it looked at me, it looked around, and then—I’m not making this up—it relaxed. I dropped the snake into my stick-bag. (This is a large sack fixed to a hoop at the end of a long pole. One sturdy onlooker had volunteered to hold the apparatus for me.) Then I took a meter of parachute-cord and tied the sack with so many knots that it looked like macramé.

Later that same day Chrissy and I moved the snake beyond the near ridge and released it. With dispatch but no particular haste, the mamba glided into a tangle of vegetation and was gone. Oh, by the way, AU staff who work near the car-park were relieved when I reported that radio-telemetric studies in South Africa showed that translocated mambas do not often return to their places of capture.

Now all right, as I have told you, that embarrassing event occurred in 2010, and for quite some time thereafter I considered myself The (almost) Fearless Master of Mambas. But five years later I hummed a different tune.

In 2015, Chrissy and I arrived at AU in late August and suffered through 49 days without seeing a snake. But around mid-October things started to improve. On Tuesday the 13th we saw a beautiful adult python, which I’ve already mentioned, amid admiring miners, on the far ridge of AU’s campus. The following Sunday we glimpsed a small mamba poking its inquisitive head out of a hollow tree on the farm road; we had no reason to bother the snake, so it had no reason to bother us. Three days later Joel Nebundza summoned us to the Layers House, where we rescued a juvenile python from a gaggle of annoying hens. We had the snake bagged in time to attend the farmworkers’ morning devotional.

But the next day things got a little trickier. At 11:15AM I got a call from the Layers House. I don’t really like to receive such calls after about 9AM because our pythons and even our cobras don’t usually show themselves during Big Day. And this midday snake-report sounded pretty frantic. So Chrissy headed immediately towards Chicken World while I ran back to staff housing for our snake paraphernalia. By the time I was back to the farm road, I realized that I’ve grown older—or the cardiac pills don’t work as well as I’d thought—because a run of only a couple of clicks had me panting like a rutting billygoat. I jogged on past the old farm buildings, both hands full of sticks, bags, etc.; there was Chrissy, ahead of me, reaching the Layers House just as I caught up. We were both on the case.

When we arrived, a modest-sized crew of farmworkers had assembled, but none of them were actually inside the Layers House, and none of them were saying the wonderful word, “Python.” One older woman, more daring than the rest, led us inside and pointed to the rafters, where we saw the snake.

And immediately I thought of the Incomparable Randy Babb, who always says, “It’s not really an adventure unless you have at least a 10% chance of dying.” Well Randy, I thought, this probably qualifies. The black mamba was very large, and it was watching me, quite calmly it seemed. I knew that Chrissy would never desert the mamba-scene because if we left, the local chicken-defenders would have to attempt something dangerous. Thus understanding the impossibility of retreat, I quantitatively assessed the prognosis of attack. I figured that if I tried
to kill the snake, I’d have a Randy Babb adventure. If I tried to catch it, I’d have 1.5 Randy Babb adventures. So, obviously, under such circumstances a would-be Christian asks, “WWJD?” I evaluated quickly according to that criterion,\(^{100}\) and Chrissy promptly agreed that we would try to catch the animal.

Now I must tell you that the previous Friday night, missionary Larry Kies had invited us to watch Jurassic World on his video TV. In my opinion the film sets new records for “bad reptile movie,” but it did introduce me to one clever phrase, “Containment Anomaly.” Well, when I jumped up and snatched Ms. Mamba off the rafters with my clampstick, and when I dropped her into the oversize bag that Chrissy was holding, we had a Containment Anomaly: the snake whipped out of the snakebag like a steel spring. So I grabbed again, and the contest was on….

The mamba was a spunky opponent, giving us three more Containment Anomalies, each accompanied by a deafening cacophony of boos or cheers from several thousand panicked hens. And the mamba treated my aluminum clamp stick like a two-finger caress, easily twisting free whenever she wanted to. So I kept chasing the old girl around the chicken house, and I kept grabbing her, and I kept stuffing her into the stick-bag, and Chrissy kept flipping the bag until finally Ms. Mamba was trapped in the sack—which we tied, retied, and double-knotted with my necktie. (Yes, I wear a tie almost every day that I lecture at AU. And I was gratified to be rewarded for my outmoded sartorial habit.)

As Chrissy and I left the Layers House, encumbered by snake and equipment, the older woman who had pointed out the mamba thanked us profusely and asked what she could do to repay us, now or in the future. I answered, “Next time you see a snake like this one, call somebody else.”\(^{101}\) I think that my South Carolina accent must have become more generally understandable to Shona speakers because the whole farm crew laughed.

We kept the mamba overnight in our house,\(^{102}\) locked in a closet, double-bagged then triple-tied with rope and duct tape. Also, the innermost snakebag was still secured by my necktie; hell no I didn’t remove it. The next morning, a bit before Day-Clean-Broad, Chrissy and I packed up the mamba and toted her to the farthest corner of campus. When we released her, I got a good look at the snake. On the day of the capture, a young farm worker had estimated her length at four meters; having read the book, I did not think she could be over three.

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\(^{100}\) As every South Carolina field herpetologist knows, the “J” in my evaluation would stand for Jackie, Jeff, or Joey Holmes. Jesus, the usual referent of WWJD, was a First-Century small-town Jew and the Son of God; being neither of those things myself, I am unable to say what he would have done in a Methodist chicken-house in 21\(^{st}\) century Zimbabwe. (For y’all Bible-readers who might cite Mark 16:18, I would caution that many biblical scholars believe the book’s entire 16\(^{th}\) chapter to be a later add-on of uncertain authorship. Of course, in my heart, I do venture to hope that Jesus would have approved, and I’m almost certain that he would have enjoyed watching.)

\(^{101}\) I was teasing, mostly. On the other hand, for the first time in a life blessed with many thousands of serpents, I was actually afraid of a snake. Fortunately our mamba made absolutely no attempt whatsoever to bite though she probably had at least two opportunities.

\(^{102}\) Our housemate, a delightful but somewhat skittish young woman from South Korea, was not informed of our temporary guest.
Nevertheless, as our snake crawled away—at a dignified, stately pace, I might add—I decided that the farm worker estimated her length better than I had. She was one magnificent animal, and I shall always be thankful that I got to see her.

You now know all of my personal black-mamba stories, and perhaps you’re curious about why I have written about this species at such great length. Certainly mambas are big, interesting snakes, but pythons are much bigger, and, from the herpetologist’s point of view, several small snakes are much more interesting. Mambas are said to be pretty smart, but clearly they could not compete in intelligence with mole-rats or white-toothed shrews, which, though abundant at AU, are neglected entirely in this book. For sure black mambas are potentially deadly snakes, but according to recent venom-research, their bite is no more dangerous than that of some Lowcountry canebrake rattlesnakes. So, why mambas? Well, here’s my confession. I’ve focused on *Dendroaspis polylepis* for reasons more sociological than herpetological. The species seems to be largely the concern of a tiny but fascinating minority of people.

In Zimbabwe, about 95% of the people Chrissy and I have met are black, but every mamba-story I’ve heard was told by a white person. This is not because the snake is unknown by black locals; indeed, the species has at least three Shona names (all reported to me by white people). In Manicaland, the most common of these names seems to be *rovambira*, which means something like “bites the hyrax.” Of course I’ve asked black Africans again and again about the black mamba, or the *rovambira*. Everybody knows the snake, and almost everybody has seen at least one. Everybody wishes the snakes could be banished from Zimbabwe, and almost everybody wishes they were all dead. “But do you try to kill them?” I have repeatedly asked. This question interests me particularly because I knew of a large mamba that haunted the edges of the AU farm. And although the snake occasionally cruised amid the workers’ houses in broad daylight, I’d never known anybody to harass it in any way. “Try to kill them,” my informants would reply, “no, not really.” I asked why the mambas were not hunted down, and workers said things like, “We have other things to do.” “They are just here.” “We have more serious problems.”

Of course I also asked an obvious follow-up question. “Do you know of anyone who has been bitten by a black mamba?” About half the time, the answer was Yes: “I read in the *Post* that a little girl near Rusape encountered such a snake in a pile of old thatch…” “There may

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103 Canebrakes, *Crotalus horridus*, are noble snakes with very long fangs that are capable of deeply injecting large quantities of venom. Toxicity varies greatly, even among sub-populations: some venom-types are not very hot, but other types, dominated by neurotoxic components, can be as dangerous as that of a black mamba. On the other hand, in the South Carolina Lowcountry, medical care is seldom far away and antivenom is available. These conditions do not obtain in most of Africa.

104 A hyrax is a mammal about the size of an over-fed cottontail rabbit; an adult would be a near-impossible meal for even the largest mamba. (Taxonomically, hyraxes comprise a mammalian Order that is distantly related to seacows and elephants.)

105 I am sure that black Africans often kill mambas, but I have never witnessed an attempt to do so, and I’ve never heard a first-hand report of such a thing. (At AU most other snakes, including cobras and boomslangs, both of which are venomous, are smashed whenever it’s convenient. Pythons, which are legally protected, are almost never killed.)
have been a game ranger in one of the national parks….” “My uncle’s mother-in-law said that a white man in Zambia….” But I could never elicit any local stories; I never heard anything first-hand. So, maybe if you leave mambas alone—uh, Chrissy says maybe we need to remember that avoidance strategy.

By contrast, almost every white person in Zimbabwe seems to have a black-mamba story that will be related at minimal provocation. This includes even short-time visitors, who gladly tell me what they have learned from books about missionaries, mercenaries, or ivory-poachers:

“There was a sixteen-footer that lived in the Anglican cemetery….”
“The bugger stretched all the way across the dust-road, but he was gone before I could run him over….”
“Now I tell you, that’s a snake with a hellova brain behind the eyes….”
“Faster than a racehorse….”
“They have no mercy….”
“The mamba had been seeking an African child for hours, but then it saw The White Tourist—Betty Sue Harper, who was wearing a lime-green two-piece and a safari pith helmet….”

I could go on and on, but that’s enough mamba-madness for one essay. I am prepared to admit that this kind of white-folks-Africa-talk might be harmless fun if it referred only to snakes. Sadly, however, I have often heard non-snake tales within the same basic genre. A two-week “missionary” repeats impossibly high HIV-infection stats. A traveler reads a blurb about poaching and forecasts the imminent extinction of Africa’s elephants. A tourist photographs a school’s bare cement floors and extrapolates to mass illiteracy. A newly-minted Expert, with PowerPoint slides, shows some skinny kids playing soccer and speaks about starvation. These sorts of pronouncements suggest a failure of understanding—almost a contempt—that saddens many thoughtful Africans. Nigerian author Dayo Olopade is entirely familiar with what I’m calling Africa-talk. And in The Bright Continent, she pointedly reminds American tourists that children marching in uniforms are probably school-kids, not child soldiers.

Africa is beset with very real problems. A sensitive American visitor will catch glimpses of them. And I understand the temptation to exaggerate any tale that makes the “Dark Continent” look so much darker—probably y’all readers have caught me at it, once or twice—because that way we ourselves appear to shine so much brighter. But please remember, GR Davis and I want y’all to go to Africa, and we want you to see it all, and we want you to sing sad and joyful songs about everything you see. But if you pack a Dark-Continent mentality in your travel-bag, or if you return with it as your favorite souvenir, then you may miss seeing the brightest rays of Light: African endurance, African courage, African humor, African creativity, and African love. So here’s my modest suggestion: when you absolutely must impress your friends with the wildness of your African adventure, just repeat the following sentence. “Consider the black mamba; it can run faster than a freaking racehorse.”

Oh, incidentally, of course you can believe MY black mamba stories. After all, I’m a 100% qualified expert because Betty Sue Harper’s cousin’s boyfriend almost registered for my South Carolina Herpetology class.
I have discovered, much to my surprise, that some American tourists in Africa prefer to avoid encounters with black mambas. Nevertheless, visitors are generally aware that the continent is rich in watchable wildlife, and most visitors agree that this is a good thing. In the following chapter, I’ll suggest some reasons why Africa possesses extraordinary biodiversity. And I’ll mostly refrain from snake tales.
Note: I fully intend to have *African Light* completely reworked before Interim, 2017. And I can do everything on my own except this chapter, which I cannot complete without assistance. I have rewritten the chapter’s text, but it still refers to photographs of 8 mammalian species/subspecies. These animals exemplify the process of allopatric speciation in Africa, which is a primary theme of the chapter. Within the current draft I have illustrated my points by place-holder photographs that I copied, without attribution, from various Internet sites. (See pages 7-11 below.) Before students receive copies of our text, these pictures should be replaced by photographs to which we can claim copyright. I do not have such pictures. I am, of course, willing to rework the chapter around relevant species of which we do have photographs, and we certainly can (should?) reduce the number of example-taxa; indeed I’d be willing to try with as few as two photographs.

“By respect for life we become religious in a way that is elementary, profound and alive.”
THE DANCE OF EVOLUTION

In 1968, when the Army sent me to Vietnam, I fell in love with tropical biodiversity. This was a natural romance for me because throughout my childhood I had rejoiced in the biodiversity of coastal South Carolina, where snakes and alligators abound, where palmetto trees, bromeliads (“Spanish Moss”), and morning mists create an atmosphere that is almost tropical.

Twenty-five years after Vietnam, the United Methodist Church sent me to Africa, where bromeliads are very rare—106—but reminders of the South Carolina Lowcountry are otherwise ubiquitous and biodiversity is otherwise astounding. Today the Lowcountry remains the place where my roots grow deepest. But I do have a second home: it is in tropical Africa, where sounds and smells and sunrise whisper “Welcome home!” to any child of Sand and Palmetto.

Thus, as a South Carolinian arriving in Africa, I was emotionally predisposed to believe that Africa’s tropics were particularly wonderful. Now, after years in Africa, my predisposition confirmed, I shall argue that Africa should be very special to y’all readers too, even if you are a Yankee from someplace like Charlotte or Nashville. Experienced first-hand, Africa quickly delights your eyes and captures your imagination. Then Africa insinuates Poetry into your language. In my case this is not a good thing because my poetry is pretty bad. Still, I cannot seem to banish it, especially when I talk about my intellectual true-love, evolutionary biology.

Therefore, when I regale my AU classes about the specialness of Africa’s biota, I rush past important topics like diversity indices and phylogenetic diagrams. I give my students little time to copy down tables or formulas or geological terms. Instead, I talk louder, spread my arms wide, and testify that evolution in Africa is a great dance in which the continent’s music is ever-changing. In Africa the species-dancers swirl in kaleidoscopic patterns: dividing, interacting, disappearing, emerging, dying, giving birth. In Africa—I be preaching now—at the coming of the rains, frogs call from underground or breed in ephemeral puddles or build nests in trees. In Africa, pythons of ancient Australian lineage grow to aboriginals’ Dream-Time size. In Africa, termite species that evolved with the savannas eclipse the moon. And in Africa, sisters and brothers, only in Africa, we can still glimpse the Pleistocene biolandscapes that made our species fully human! … At about this point in my AU lecture, students will raise their hands and ask, “Sir, will this be on the final exam?” And if I am extremely lucky, the students will grin to let me know that they comprehend African truths far more important than final examinations.

In other words, when I have taught biology in Zimbabwe, my highest priority has been to convince my students that the biodiversity of their Africa is extraordinary. Furthermore it is my belief that this lesson is not for African biologists only, because understanding African biodiversity and glimpsing the abiding processes that gave birth to it are intellectual steps guiding us on a pilgrimage that transcends intellect. I believe that Africa teaches us reverence for Life; I believe that Africa still makes us more fully human. So if I could just flat give y’all readers one insight in this chapter—you know, by magic—then I would conjure up for you a spectacular vision, Evolution’s Dance on the Continent of Light. But unlike my grade-conscious AU students, y’all are not my captive audience, so I cannot hijack you into field trips and

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106The one native bromeliad species, *Pitcairnia feliciana*, is restricted to West Africa.
sermonize at you through a fourteen-week semester. Therefore, I am forced to use ten pages of dry words to tell y’all the most interesting thing I know.

Every person who loves nature should live for a while in the tropics—if for no other reason than to compare tropical biodiversity with our familiar biodiversity in the temperate zone. Let me illustrate this statement with two tables. The first reports mammalian diversity in three geographical areas where I have worked—the South Atlantic USA, Vietnam, and Zimbabwe. As you can see, in all taxonomic categories, the tropical areas hold a substantial numerical advantage, and in the tropics, Zimbabwe is ahead of Vietnam.

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<tr>
<th>Mammalian Diversity: the Temperate Zone versus the Tropics</th>
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<td>Place</td>
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<tr>
<td>S. Atlantic USA</td>
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<td>Zimbabwe</td>
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<td>Vietnam</td>
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The second table considers another vertebrate group, the snakes and lizards. We’ll count varieties of these animals in South Carolina and in my second home, Old Mutare.

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<thead>
<tr>
<th>Snake &amp; Lizard Diversity: the Temperate Zone versus the Tropics</th>
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</tr>
<tr>
<td>South Carolina</td>
</tr>
<tr>
<td>“Old Mutare”</td>
</tr>
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</table>

Note that Africa’s numerical lead in reptilian biotypes is as impressive as its advantage in mammalian diversity. I am less familiar with birds and insects, but I’m told that intercontinental comparisons within these groups show similar results. Indeed, African biodiversity is impressive across a wide range of living taxa—and although other continents surpass Africa in the diversity of some biotypes, these are exceptions, not the rule. Assuming we are agreed that Africa’s biodiversity is impressively high, I shall list and then discuss two related reasons why such should be the case. First, refugia in Africa have preserved more species than one might expect, judging by comparison with other continents. Second, evolution in Africa has created more species than one might expect, judging by comparison with other continents.

I shall address the preservation factor first because it is super-important and is very easy to understand. As most of you know, post-dinosaur Epochs have witnessed the flowering of countless mammalian, avian, and reptilian species. Yet the vast majority of these species have

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107 Marine mammals were not counted. The South Atlantic USA is defined as South Carolina, North Carolina, Virginia, Maryland, and West Virginia. Because of ambiguities about range, introductions, extinctions, and taxonomic status, my numbers are somewhat inexact.

108 Data on lizards and snakes are from field guides. A species was considered resident in Old Mutare if I thought a range map for the critter came within 50km of the town. If a published range map colored any part of South Carolina, the referent species was credited to the State.

109 For many taxa, other tropical areas are typically about as rich as Africa. Measured on a per-area basis, South American biodiversity exceeds Africa’s for frogs, fish, some invertebrates, and many plants. Of course Africa’s richness in mammals weighing > 100kg is unmatched.

110 Chronologically, creation (or in-migration) of a species obviously precedes its preservation. However, these factors are easier to understand if discussed in reverse order.
become extinct; extinction has been the typical pattern. Therefore, a continent that broke the pattern—i.e., a continent that preserved a disproportionate percentage of its ancient species—would be disproportionately rich in biodiversity today. In general, the key to species-preservation is biogeographical size, to be “big” enough so that, when the world changes, critical habitats do not entirely disappear. I shall argue that Africa has been the species-presenter par excellence because she is “big” in two ways: (a) because she spans a wide range of both latitudes and altitudes and (b) because African latitudes are approximately centered on the Equator.

In a sense the theme of this chapter-section could be, “Why is Africa biogeographically bigger than Eurasia?” In raw geographical area, Eurasia is, of course, is much larger (about 1.8 times as large). Furthermore, both Africa and Eurasia have approximately the same amount of latitudinal spread (about 70 degrees from north to south in each case). However, Eurasia runs basically from the extreme Arctic to about 10°N, with most of the continent lying between the North Pole and 35°N. On the other hand Africa extends between roughly 35°N and 35°S.

Now consider the effects of the Pleistocene’s climatic fluctuations, and contrast what happened in Eurasia versus Africa during the Ice Age. The most dramatic features of these times were the vast expansions of continental glacial sheets, which extended southward to about 40° (see map below). During this Ice Age much of the world—even beyond the glaciated areas—became colder and drier. However, such climate changes were least extreme in equatorial regions, which always remained Earth’s warmest and wettest areas.

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**Pleistocene Glaciations: Africa & Asia**

**Note:**
1. Africa has no appreciable ice sheet.
2. Southeast Asia, like Africa, is a potential species-presenter.

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In other words, during the Ice Age, much of northern and central Eurasia was repeatedly covered by 3-4km of ice; furthermore, large swaths of unglaciated Eurasia experienced an inhospitable climate comparable to that of today’s Siberia. Only in the Indian and Indo-

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111 Leaving aside India and the Malay-Indochinese Peninsula (both of which are special cases, in many ways biogeographically similar to Africa), and the Arabian Peninsula (which is dry and biotically depauperate), the southern latitude of Eurasia is not far different from the northern latitude of Africa.

112 Remember, although most geologists speak of a single Pleistocene Ice Age, there was actually a succession of cold-time glacial expansions and warm-time interglacial contractions.

113 Climate changed little at the poles, but that is irrelevant to this chapter’s story.

114 Many parts of southern Eurasia were cold-temperate in climate, a bit like southern Canada. We should of course remember that cold lands are not devoid of biodiversity. Typically, however, they do not rival the tropics in number or variety of species.
Malayan margins did Asian tropical habitats persist, and even there the tropical refugia tended to be small and somewhat ephemeral. In Africa, by contrast, the tropical biomes were compressed towards the Equator, and their north-to-south widths narrowed; however, they always persisted. Thus, throughout the Ice Age and its interglacials, no major African habitat-type was ever in danger of complete disappearance. So, here’s a take-home message: Africa’s vast latitudinal extent, centered on the Equator, helped preserve the continent’s many, diverse, habitat-biomes. And because Africa preserved her habitats, Africa also preserved her species.

Africa’s equatorially centered north-south breadth was the primary factor in maintaining the continent’s species diversity. But we must also recognize the importance of altitudinal variation in preserving islands of habitat within a sea of environmental change. As you know, both temperature- and moisture-regimes vary with altitude, and mountain ranges create microclimates on their slopes and in their shadows. Furthermore, African landforms vary tremendously in altitude, ranging from below sea level to almost 6000m. Thus, during a particularly dry period, moist environments would persist on mountaintops or along windward slopes. Conversely, when the general climate was exceedingly wet, residual patches of xeric habitat would still be found within the rain-shadows of mountain ranges. Given Africa’s complex mosaic of altitudes, when changing climates altered the general environment across a vast biome, patches of the old habitats would usually be preserved. In other words, during the Pleistocene’s dramatic fluctuations in temperature and rainfall, dominant habitat-types might disappear from vast stretches of Africa, but altitudinally localized habitat-patches would preserve every African biome, at least on a small scale. And within these microclimate “refuges,” many species of fungi, plants, and animals managed to survive.

Thus, as world climates shifted repeatedly between warm and cold, between wet and dry, many elements of the rich Eurasian mammal fauna were pushed into extinction by habitat loss—while African species were able to remain in suitable habitat by adjusting their latitudinal or altitudinal ranges. So Africa retained more of its pre-Ice-Age flora and fauna than did Eurasia.

To this point we have discussed why Africa preserved an unusually high percentage of the biota that evolved there (or immigrated to Africa from other continents). Now we should consider why Africa, the great species-preserver, has also been an extraordinary species-creator. For this new discussion we need to share a bit of jargon, the term *allopatric speciation*. The

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115 This is why Indo-Malayan Asia is, biogeographically, a “little Africa.”
116 In U.S. schools, the conventional view of the Pleistocene is based upon the geo-history of the Northern continents and therefore highlights climate-shifts between warm and cold. In Africa, however, the most important fluctuations were between wet and dry. That is why I emphasize Africa’s preservation of moisture-defined habitats.
117 Of course there were many exceptions (Asian survivors, African extinctions) to this generality. Note that arguments for Eurasia also apply to North America, which might be considered as part of a great Amer-Asian supercontinent (sometimes named as the Laurasian Landmass). The small, isolated continents, South America and Australia, are special cases, rich in some taxa, poor in others, suffering/enjoying complex patterns of extinction/preservation.
118 Literally, *allopatric* means “of a different fatherland.” Allopatric speciation can occur when a parent population of some organism has come to occupy two (or more) geographically separate areas. Speciation can also occur within a population not separated by topographical barriers
basic idea is that geographic isolation can be a primary step in species-creation. That is, topographic interruption of gene-flow across a parent population allows two daughter populations to “fine tune” their adaptations for their two separate environments. If the genetic isolation persists long enough, the daughter populations can pursue separate evolutionary trajectories to the point of becoming separate species. To understand allopatric speciation in Africa, we need to know how various parent populations were split in two. This requires us to consider again the peculiarities of African climates—and to learn how these climates changed during the Pleistocene sequence of ice-times and interglacials.

Eventually I shall touch upon the complex issues of allopatric speciation at a fine-scale resolution. But let us begin with the big picture, the continental level. As an initial simplification, we should visualize two ecotype-belts that, as the Pleistocene climate fluctuated, bisected Africa at different times in different directions. This climate-fluctuation model is illustrated by the pair of maps below and is explained in the two numbered paragraphs that follow them. (I’ll warn you in advance that my delineation of wet and dry environments is very approximate.) Note that these wet periods and dry periods typically lasted for many thousands of years, during which time allopatric speciation could take place.

(sympatric speciation) if gene-flow is interrupted by some other mechanism such as strongly non-random mating or (especially among plants) mutation to polyploidy. But most authorities still agree that allopatry is particularly important in the origin of species.

By “fine-scale,” I mean blocks of less than about 10,000km².

When we discuss the distribution of African rainfall, we should remember that East Africa is usually drier than one might expect, given the region’s latitude. This is because of the “monsoon effect”: during most climatic epochs, the summer warming of the enormous Asian landmass diverts moisture-bearing east-winds northward. This robs East Africa of much summer rain.

Geological times commonly called Ice Ages are not brief events! The single Ice Age of the post-dinosaur Era has lasted since about 2.6 million years ago. During this time it has been interrupted by a number of “interglacials,” which usually lasted 15,000-20,000 years. Today’s climate-scientists recognize that “glacials” included occasional runs of warm years (just not enough to cause major ice-sheet retreats) and “interglacials” included occasional runs of cold years (but not enough for ice-sheet advances). Students interested in the biogeography of African flora and fauna should realize that warm-cold, wet-dry shifts profoundly affected dispersal routes between Africa and Eurasia, thus influencing the biodiversity of both continents. But that is a story too long and complex for this chapter.
1. An east-west axis of rainforest expansion and contraction. During warm, moist interglacials, rainforest extended as a broad belt from the Atlantic all the way to the Indian Ocean (the green belt in the left-hand map above). But during glacial maxima, rainforest was limited to patches along Africa’s west coast and in the center of the continent—plus a few tiny refugia close to the Indian Ocean. **Oversimplification:** During wet times, a barrier of rainforest splits parent populations of arid-adapted species into “islands” of dry habitat; therefore allopatric speciation of these species is relatively likely.

2. A northeast-southwest axis of arid-land expansion and contraction. During glacial periods, when so much water was tied up in ice sheets, a band of desert extended all the way from Namibia to Somalia (the red belt in the right-hand map above), sundering what at other times was a vast stretch of rainforest. During moist Interglacials, as explained above, the relevant deserts were confined to the Somali Arid Zone in the northeast and the Namib Arid Zone in the southwest. **Oversimplification:** During dry times, broad barriers of desert split parent-populations of rainforest species into “islands” of moist habitat; therefore allopatric speciation of these species is relatively likely.

This is the part of the chapter requiring a few pictures as well as substantial rewriting based on the selection of photographs available.

During our present-day Holocene Interglacial, Africa’s rainforest dominates (slightly) and more or less bisects the arid-land belt. Happily, my coauthor GR Davis has photographs of XXXXX living biotypes with disjunct populations in the two present-day “islands” of dryness. Consider, if you will, their allopatric separation into the Somali (northern) and Namibian (southern) Arid Zones. (Note that YYYY of GR’s examples are related species-pairs. The other ZZZZ are subspecies-pairs or comprise genetically isolated populations without formal, separate taxonomic status. The range of one biotype (the giraffe) may not be completely bisected.)

a. The genus *Oryx* (different species-sets in north & south; a northern variety is shown):
b. The genus *Gazella* (different species-sets in north & south; a northern variety is shown):

c. The giraffes (four species with highly complex geographic distributions; a southern example is shown):
d. The “white” rhino (one species; 2 subspecies or geographical races; the very modern distribution of the white rhino has been disrupted by over-harvest and restocking; a southern example is shown):

e. The Grevy’s zebra and the mountain zebra (two ecologically similar species; a Grevy’s zebra, the northern variety, is shown):
f. The aardwolf (one species; a southern example is shown):

![Aardwolf](image1)

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g. The bat-eared fox (one species; a northern example is shown):

![Bat-eared fox](image2)
h. The black-backed jackal (one species; a southern example is shown):

Now that y’all have enjoyed GR’s photographs, here is my one-sentence review of the continental-scale picture of the Big Dance. According to my simplistic model of Pleistocene habitat disjunction, above,122 Africa’s vast continental bands of moist forests and arid lands experienced repeated bisections and reconnections, caused by the alternating expansions and contractions of the two habitat axes discussed above. And now let us focus in a little tighter. Simultaneous with these cycles, a similar phenomenon was occurring on smaller geographical scales throughout much of Africa. As the continent generally dried out, islands of moist habitat

122 I admit that my model might be considered over-simplistic, and I hope that the following long footnote will to some degree assuage the ire of my geologist and mammologist friends. Today the Pleistocene is often dated between 2.6 million years before the present (MYBP) and 12,000 years before the present. During the earlier Pliocene, a weak, inconstant, global cooling trend, which had begun much earlier (during the Eocene, 56-34MYBP), intensified, eventually bringing the Pleistocene and its Ice Age. (Geologists formerly included the initial ice-sheet expansion within the Pliocene, but the Plio-Pleistocene boundary has been redefined to include that event in the later Epoch.) I have concentrated our discussion on the Pleistocene’s thermal sequences because they help us understand Africa as a species-creating “machine.” However, readers particularly interested in African biodiversity should also consider the evolution of African savannas—and of cellulose-processing animals that exploited their grasses. These developments were most intense from the Miocene Epoch (23-5.3MYBP) into the Pleistocene.
could persist on the tops and rain-slope sides of mountain ranges. As Africa became wetter again, these humid refugia would expand and dominate—while arid habitats would contract to islands within the rain-shadows of mountain ranges. Thus, throughout the general climatic fluctuations, populations of some taxa could cling to their habitat-niches by adjusting their distributions up and down the slopes of Africa’s numerous mountain ranges. In other words, throughout all the changes, Africa retained remnant habitat islands, strips, and pockets—all with varying degrees of isolation, all potentially affecting the exchange of genetic material within populations of fungi, plants, and animals. And don’t forget the basic point: if it lasts long enough, genetic isolation can lead to speciation.

The figure immediately below diagrammatically illustrates how climate-change over geological time can affect both altitudinal and latitudinal ranges of animal species—in this particular case, of hypothetical species adapted to cool-temperate habitats. The horizontal axis of my diagram represents a north-to-south cross-section of southern Africa, roughly along the 30th meridian of longitude, extending from about the northern border of Zimbabwe (left) to perhaps the latitude of Durban, South Africa (right). Note that altitudinal topography is enormously exaggerated and very approximate. With the onset of a warmer climate during post-Pleistocene times (lower diagram), hypothetical populations in northern Zimbabwe (left) have been separated from populations in east-central South Africa (right) by perhaps a thousand kilometers of hot, dry low-veld. Clearly gene-flow is absolutely interrupted, and, given time, the separate populations could respond adaptively to differing selective pressures in their respective ranges. Thus allopatric speciation would begin.

Because my sketches are rough, because my topography is exaggerated, and because my ranges are approximate (and also because ranges of actual species can reflect complex ecological factors we have not considered), I have labeled my diagrams as hypothetical. This, however, is not entirely the case because a substantial number of organisms do in fact have geographical
distributions like the ones I show in my sketch for the post-Pleistocene. For example, consider snakes, the African group that I know best. Today almost two dozen snake “species” have ranges that are predominantly South African—and also have relict populations far to the north, in Zimbabwe’s Eastern Highlands, basically like my diagram.

One of these species is a snake that interests me greatly, the rinkhals cobra, *Hemachatus haemachatus*. Rinkhals are stocky snakes, less than a meter long. They have a reputation as chronically disgruntled creatures, and if you approach one closely, it may strike at you but is more likely to spit at your eyes and then play dead. Thus bites are uncommon, and when they do occur, they are seldom fatal to adults. Among cobras, rinkhals are unique because they do not lay eggs but rather bear their young alive. I think this is an adaptation to the species’ cool-temperate habitat; in Zimbabwe’s Nyanga Highlands, eggs laid in soil or under rocks would not be warm enough to develop properly. However, rinkhals are experts at behavioral thermoregulation. And a gravid female, basking with eggs safe inside her, raises the embryos to ideal incubation-temperatures for an hour or more each day. I like to think about rinkhals seeking their patches of sun in the misty environs of Mount Nyangani. I like to wonder whether they originally occupied cool-climate habitats because they could not compete successfully with more conventional cobras in the warmer lowlands. I like to speculate that Zimbabwe’s rinkhals, separated by a thousand clicks from their South African relatives, are adapting over the millennia to the mysterious Eastern Highlands—and are becoming a new species of snake. Alas, however, Zimbabwean rinkhals suffer at least three conservation-challenges. Their populations have never been abundant. Most people kill these rare snakes at every opportunity. And their unique preferred habitat (stunted miombo woodlands amid montane grasslands) has been largely replaced by inhospitable pine plantations. For these reasons most herpetologists doubt that Nyanga’s populations will survive even another thousand years. But Africa’s Dance of Evolution doesn’t always read the experts’ books, so I shall hope that someday a worthy snake-hunter in a more perfect world will hear dance-music and find a new kind of rinkhals. Oh—you ask me whether I have ever hunted for rinkhals. Of course I have; I’ve sought them again and again, high in the Nyanga hills. But I have never found one.

Oh, well, I guess that’s enough about snakes, and I guess I should recapitulate the main points of this chapter, so here goes. With each Pleistocene climate shift, some African species expanded their ranges, some contracted their ranges—and some were forced into or released from genetically isolated refugia. In a sense, the Pleistocene alterations turned Africa into a gigantic speciation machine. Of course this was true, to some degree, for every substantial piece of real estate—including many aquatic habitats—on God’s blue-and-green Earth. I have argued, however, that for terrestrial vertebrates, the *species-birth / species-death* ratio was generally

123 For animals, my Pleistocene-Epoch distribution-map really is a bit more hypothetical. It is constructed largely on the basis of known habitat-requirements of living species and paleo-botanical evidence for the Pleistocene’s geographical distribution of habitat-types.

124 Here’s some herp vocabulary for you. Oviparous animals lay eggs. Viviparous animals have internal embryos that are nourished throughout pregnancy by some connection to the female’s body. Ovoviparous animals retain eggs (usually unshelled) within their bodies but do not provide appreciable nourishment after fertilization. Eventually the eggs sort of hatch inside the female, so that the young are born alive. Rinkhals are ovoviparous.
higher in Africa than elsewhere. And I have suggested that y’all should visit Africa and observe for yourselves the current configuration of the great Dance.$^{125}$

And yet, despite my efforts, I see this chapter as so boring, so dry, so mechanical. I think of my African students, sitting before me in Classroom F21, taking their notes, asking their obligatory questions, checking the time on their cellular phones. A young Zambian glances out the window and whispers, “A sun bird.” I look up, catching a glint of violet iridescence against scarlet chest-feathers. A heartbeat, and the sunbird has vanished…. I am silent. I understand that not one student in ten will recall the dates of the Pleistocene Epoch two days after my final exam. I understand that my dull words cannot truly capture even one vibrant step of evolution’s glorious dance. I understand that Africa has overwhelmed me once again. And I rejoice because the day is hot; clouds are building in the northeast, and tonight ten thousand frogs will gather to sing about the Dance—uh, more specifically, they’ll sing about sex—in the rains of Africa.

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Within the compass of her astounding biodiversity, Africa’s most important animals are people, their domestic stock, tsetse flies, Plasmodium, and a few mosquito species. But elephants almost make the list. They are intelligent. They are interesting. They are big. And they cast enormous shadows.

$^{125}$ In this chapter I have emphasized the role of climate-change in creating the spectacular biota of Africa. However, climate-change can increase biodiversity only if substantial numbers of species are able to survive it. As I have argued, this can happen when the change is sufficiently gradual, when refugia (large and small) offer escape from the destruction of habitat, and when organisms can move to (or persist in) those refugia. But the anthropogenic climate-change of this century is a very different phenomenon from the changes of the Pleistocene. Today’s climate-change is extremely rapid, with some regions reporting temperature increases of more than 1°C in less than a decade. Biota—especially most plant species, which are fundamental to the creation of habitat—cannot shift their ranges fast enough to escape. Isolated habitat-patches that might comprise refugia are threatened by direct and indirect human destruction. And people have radically altered regional landscapes—with highways, cities, monoculture-farms—thereby constructing barriers that block corridors along which organisms could retreat toward potential refugia.
Oh gentle readers, I apologize in advance. This essay will be almost twice as long as any other chapter in the book. I tried as hard as I could to be concise, but I finally realized that I could do elephants short, or I could do elephants honest. I decided on the latter. And to organize the results for you, I have divided the chapter into five sections:

1. Introduction
2. Elephant biology
   - Size
   - Legs
   - Trunk
   - Teeth
   - Brain
   - Society
   - Food habits
3. Too few elephants: The quagmire of poaching
4. Too many elephants: Challenges, tragedies, and opportunities of elephant management
5. A ray of African Light: Creativity and some crazy AU students

If you are really interested in elephants, I guess you might read the whole essay carefully and then email me your suggestions on how to improve it. If you are sort of interested in elephants, just read any sections that sound fun—or lightly peruse the whole thing. If you are not interested in elephants, skip forward to the next Student Interlude.

1. INTRODUCTION

Many teachers at AU take seriously the connection between our University and the United Methodist Church. I am proud to count myself among this happy throng, and I confess that I share the irritation of these colleagues towards a certain species of American visitor to the Bright Continent. I speak of those tourists who board special safari-buses at International Airports and make antiseptic, cross-country journeys to National Parks or hunting concessions where big mammals can be shot with a telephoto lens or, occasionally, with a .375 H&H. Now don’t get me wrong. I applaud what these people actually do: I’ve certainly enjoyed my own share of photo-hunting, and I wish that I could afford the gunpowder version of the safari experience. I

126 The Family Elephantidae includes more than a dozen species. All but two or three are extinct. African and Asian elephants are similar in many ways but have followed independent (though parallel) evolutionary trajectories for perhaps five million years. Depending on your taxonomic preferences, African elephants can be divided into two subspecies or two full species; the latter classification is increasingly popular though I am reserving judgement. Forest Elephants occur in closed-canopy vegetation across West and Equatorial Africa. The somewhat larger Savanna Elephants inhabit East and Southern Africa, including Zimbabwe. Although much of what I’ll write could apply to elephants in general, I am personally familiar with only Savanna Elephants, which therefore become the main subject of this chapter.
am, however, appalled by what the animal-only tourists fail to do. Making a two-week sightseeing trip across African landscapes without truly meeting African people? That indicates willful blindness to the spectrum of African Light.

Most of y’all readers would guess that hardcore Methodists in Africa can get judgmental about airport-to-Park tourists. But now I’m going to let you in on a secret. The missionaries, medicos, and AID workers with whom Chrissy and I hang out—well, some of us get just as irritated with inflexible “evango-tourists” as we do with the safari-only crowd. You know the type: Momma and Daddy spend two Africa-weeks painting parsonages and singing “Kum Bah Yah” when twelve-year-old Susie and John want to see some animals! Think about it: if you’re rich enough to dump eight thousand dollars on family airfares, you can damn well afford another eight hundred to show your children the most awe-inspiring biota on God’s green earth. I mean, I be preaching at you—as I have done before—that Africa is our native world, and our own species became fully human in environments shared with large mammals! Some of us biologists call these charismatic creatures “the Pleistocene Megafauna.” They include hippos and rhinos, as well as a few big predators plus a magnificent suite of hoofed mammals such as antelopes, buffalo, hogs, giraffe, and zebra. But the greatest of all are the elephants. So in my opinion, if you take a kid to Mother Africa and do not seek elephants, you are flirting with child abuse. And let the people say Amen.

2. ELEPHANT BIOLOGY

To comprehend the basic biology of an elephant, you need to know at least a little something about the animal’s size, its legs, its trunk, its teeth, its brain, and its society. So let’s get started.

Size. The basic elephant ecological strategy is to eat enormous quantities of low-quality plant food, but elephants never evolved the highly specialized digestive structures characteristic of super-efficient mammalian herbivores such as cows, sheep, antelopes, etc. In terms of plant-eater physiology, if you’re not picky about your food, and if you’re not a digestion-specialist by anatomy, then you better be really big. And that’s how elephants deal with cellulose; “big” is their digestive specialization. Indeed, elephants are the largest living land animals. A calf will weigh roughly 100kg at birth, and big bulls occasionally exceed 6000kg, which is about like the curb-weight of two F150 pickup trucks.

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127 Besides, for an authentic “Kum Bah Yah” cultural experience, you should come to coastal South Carolina where the song originated and has been sung amongst the Gullah people for over a century. That would save you a lot of airfare money, which could be expended on worthy (or frivolous) enterprises, either in Africa or closer to home. Oh, and here’s another secret: Africans would love for you to help them paint a parsonage or school, but they really can do that kind of job without American assistance.

128 Cows, etc., are known as ruminants. They have four-chambered “stomachs” in which symbiotic microorganisms ferment cellulose, thereby making calories metabolically available. Note that elephants, too, can process cellulose only with the assistance of microbial symbiants. Elephants just don’t have high-quality, cow-like anatomy for maintaining and exploiting this fermentation-flora. But, as I shall explain on the next page, if a mammal is big enough, its digestive efficiency is less important.
Here is a brief partial explanation of why large size facilitates the elephant’s ecological strategy. It is a mathematical truism that, given similar shapes, big animals have smaller surface-to-volume ratios than little animals. This is particularly significant for endothermic, or “warm-blooded,” creatures. Because all objects “store” heat in volume and “lose” heat through surface, large endotherms (with their small surface-to-volume ratios) can conserve heat and thereby economize on calories burned to stay warm—which for most endotherms is a major physiological expense. In other words, larger mammals typically burn less food per unit-mass than smaller mammals. For example, on a per-gram basis, an African Elephant needs roughly 0.03 as many calories as a South Carolina Least Shrew. In many habitats elephants do actually eat enormous amounts of food. But that food is pretty wretched stuff, and elephants can survive on it only because they do not need to absorb many usable calories from each mouthful of it.

**Legs.** As you might expect, elephant legs are specialized for carrying heavy weight. The bones are massive, and, at rest, leg bones are lined up directly on top of one another, thereby reducing strain on knee- and elbow-joints. Elephants’ feet have five toes, which are spread broadly and are connected by elastic tissue. The animals walk on the tips of these toes, with their heels supported by spongy pads comprised of fibrous sheets interspersed with pockets of adipose tissue. These pads distribute an elephant’s enormous mass across a large surface area and also absorb the shock of footfall. Unless you have observed elephants in the wild, you may not believe how quietly the great beasts can walk on their big, flat, round, feet. On a misty night, in a forest strewn with leaves and twigs, an elephant could walk an arm’s length behind you—and I promise that you would never hear it unless it wanted you to. Rudyard Kipling wrote that elephants walk “…as silently as a cloud rolls out of the mouth of a valley.”

Because they are so heavy, elephants can’t exactly run; even their padded feet and massive leg-bones could not withstand the rapid pounding of so much weight. Nevertheless, in most environments elephants must occasionally move fast and far to meet their prodigious food requirements. Long legs make this possible. An elephant walking leisurely approximately matches a slow human jog. When elephants “walk” at top speed, they assume a gait that I don’t know how to name, their front legs moving at a semi-trot while their rear legs basically just walk very fast. This apparently works pretty well; I have read that they can achieve speeds of about 40km/hour for short distances. I don’t really believe 40, but if the speedometer on a 1986 rental Fiat was accurate, I know they can hit at least 20.

**Trunk.** We know that elephants have long legs. They also have short heads and necks. Therefore their mouths are a long way above the ground, so in order to graze, they need some kind of tool. This is the trunk, the characteristic nose-lip that more or less makes the elephant an elephant. The trunk of a modern elephant is incredibly complex, with over 50,000 muscles and a veritable network of sensory and motor nerves. The trunk is also a tool with many uses. It manipulates the environment, plucking grass from the ground, breaking branches from the tops of trees, drawing water and blowing it into the elephant’s mouth. It is a sensitive organ of smell; the popular nature-books like to say it’s four times better than a bloodhound’s nose. And the trunk serves in at least three ways as an instrument of communication. (1) As a trumpet, the trunk amplifies and modulates important vocalizations. (2) As a visual communicator, by its
position the trunk indicates social status or emotion. (3) As a touch communicator, the trunk helps structure elephant society: a caress can calm a fearful offspring, or a blow can discipline a rebellious youngster.

**Teeth.** Tusks are second upper incisors. They are employed as tools—to dig or to break branches, for example—and as weapons, particularly in combat between adult males. Among African elephants, both genders usually possess long tusks, which are extensively used in social interactions by males and females.\(^{129}\) Elephant tusks, of course, are the world’s primary source of ivory, and as we shall see, this is not altogether a good thing. For an ecologist meditating on the elephant’s coarse-vegetation nutritional strategy, an elephant’s post-incisor teeth are as interesting as its tusks. The occlusal surfaces of these cheek-teeth are perhaps 25-35 centimeters long and about a fifth as broad. They are covered by numerous transverse ridges that shred leaves or grass and grind small branches. From root to crown, the teeth are also very deep, which increases their longevity. And indeed each tooth needs to last a long time. More than thirty-five million years ago elephant-ancestors began to evolve a unique pattern of tooth replacement that allows long, deep chewing-teeth to fit into short jaws. At any given time, only one tooth is fully emerged in each quadrant of an elephant’s jaw. As this tooth wears away, the next tooth in line (initially, each jaw-quadrant has 6 teeth) develops fully and emerges (diagram). When the sixth tooth is completely worn away, the elephant can no longer chew its food, and it soon dies.

**Brain.** As my students eventually realize, I like to present vast oversimplifications. For example, I shall now hypothesize that large mammals tend to be smarter than small ones. Here is a loose argument for why my hypothesis might be correct. For well-known physiological reasons, large mammals typically live longer than small ones. During a long lifetime a mammal will confront numerous different conditions and situations, and no set of inborn (instinctive) response-patterns could possibly prepare it to deal with every such contingency. Therefore, flexibility, intelligence, and learning are particularly important for large mammals such as elephants. Furthermore, if it matures within a complex social context, a long-lived mammal may have time to learn indirectly, from the experiences of other members of its species.

\(^{129}\) In Asian elephants, few females have visible tusks, and some males are also tuskless.
In other words, elephant ecological and socio-demographic strategies placed a premium on learned (as opposed to instinctual) behaviors—and therefore rewarded the evolution of the large, high-quality brain that typifies modern elephants. Now I hope that y’all readers will forgive my continuing reluctance to evaluate in specific terms the intelligence of wonderful creatures such as mambas, people, and elephants. I’ll just say that elephants have really big brains (bigger than our own), and at least within their ecological niche, they are plenty smart. If you wish to immerse yourself in an ocean of information that varies widely in quality, just do a Google-search for “elephant intelligence.” Personally, I am more interested in the ways that elephants have created complex socio-ecological worlds.

**Society.** Like people, elephants are highly social. The gestation period for an elephant is about 22 months, so Momma has plenty of time to get used to the idea of pregnancy. When the baby is born, it immediately becomes part of a group comprising its mother, her female relatives, and everybody’s immature offspring. For about the first six months of its life, a newborn elephant is closely watched all the time by its mother, the quintessential “helicopter parent,” who is almost never more than a trunk-length away. Although Momma may begin weaning her offspring at 6-8 months, most baby elephants continue to nurse at least occasionally until they are about a year and a half old. A young elephant seldom gets another sibling until it is 5-10 years old, and until that time it typically stays within about 10 meters of its mother.

Eventually, of course, the young elephants begin to grow up. In one salient respect the maturing males are like teenage human boys: when an adolescent of either species is about 13-15 years old, his thoughts will turn increasingly (constantly?) toward sex. Then the elephant-boys start hitting on their female cousins and even their younger aunts. For a time the older females in the elephant group may tolerate such mischief, but when the males become truly obstreperous, the adult females chase them away. Alone in the wider world, the evicted teenage elephants eventually work their way into the loosely structured society of males.

Nobody knows too much about the sociality of adult male elephants. Bulls can be solitary animals, but they can also pal up with another elephant or two for a while, and they almost certainly recognize every elephant living within the landscapes that they traverse. In general, males within a particular area will establish a dominance hierarchy. Position within this hierarchy will typically reflect size and health, but a male’s temporary hormonal condition can elevate him above his usual status. Mating opportunities are largely a function of status; in one study, among 160 adult male elephants, the highest-ranking 19 individuals were responsible

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130 At adulthood an elephant’s rate of skeletal growth slows to near zero, but apparent bulk can continue to increase throughout a male’s life. Although a male’s general status reflects his age and size, the male hierarchy is often disrupted by a temporary hormonal condition called *musth*. This phenomenon is not entirely understood but is worth comment. Males enter *musth* only when they are full adults in good physical condition. Unlike female estrus, *musth* does not appear to follow any definite periodicity. Onset is marked by visible secretions from the temporal glands. The penis becomes distended; it swings back and forth, and it drips a greenish substance whose composition is unknown by me. Perhaps more important, serum testosterone levels skyrocket: as a consequence, aggressiveness is high. No sane person would want to mess with a bull elephant in *musth*—and neither do most other bulls. It is as if they decide, “If I leave that bad boy alone and let him breed, I won’t get killed, and maybe it’ll be my turn next year.”
for 65% of the copulations.\textsuperscript{131} Our hypothetical teenage male, recently cast out of the female-group into which he was born, will rise only slowly within the male hierarchy, and he will probably be 30-35 years old before he fathers his first calf.

Female elephants are more fun to study than males because the gals always hang out in well-defined groups whose social dynamics are fascinating to observe. Starting on the day of her birth, a female calf becomes familiar with the elephants in her group. She knows her mother from the beginning, and she soon meets her aunts, her cousins, maybe a brother or two, and her sisters. Eventually she will learn to recognize all these individuals by their appearance, by their smells, probably by their vocalizations, and perhaps by their particular mannerisms. The young elephant also meets the group matriarch, who is likely to be her grandmother. The matriarch is usually large. Also, she is often old—but not always, because when a matriarch dies or is killed, she is almost inevitably succeeded by a daughter, even if there are older females in the group.\textsuperscript{132} In my limited observations, most matriarchs are not bossy leaders. Rather, elephant-groups usually seem to decide what to do and when to do it by a sort of consensus: the elephants are eating and resting in one area, and then, over the course of, say, half an hour, they wander more or less together to some other area. But under conditions of stress or confusion, a matriarch will apparently make leadership decisions. She may for example walk her group towards a distant thunderstorm and then keep them in the rain-drenched area for days, until a new flush of tender vegetation can emerge. Or, if predators threaten, the matriarch usually appears to decide whether the group will fight or run. Or, if a waterhole runs dry, the matriarch will probably be the elephant that leads the group to a more reliable supply.

Most elephant biologists believe that every matriarch is a repository of elephant information. She has lived a long time; she has experienced many changes and has successfully confronted situations with which younger elephants are not familiar. The importance of a matriarch’s learning, memory, and leadership are underlined by elephant demography. Among mammals, as far as I know, females routinely outlive their reproductive years only among elephants, people, and two species of whale. From a narrow selfish-gene point of view, such longevity seems counter-adaptive: when a female can no longer produce daughters, she should die quick so that her daughters and granddaughters will be able to exploit the resources the old spent female would otherwise consume. Given that simplistic model—which does not work for elephants—we should ask how post-menopause-longevity genes are able to increase in frequency among elephant populations. My answer is that a post-reproductive female elephant presumably contributes more (to the reproductive success of her relatives, of her genotype) than the resource-cost of her extended lifespan. In other words, what an old female elephant knows and the way in which she leads must be valuable.

The solidarity of matriarchal families is maintained through a large repertoire of social signals. Perhaps the most important of these is the “greeting ceremony,” in which one elephant sticks her trunk into the mouth of another. Elephants also produce many different vocalizations. Some of

\textsuperscript{131} Furthermore, in almost every case the copulating male was in musth.

\textsuperscript{132} Because every group-female knows the identity of every female’s mother, this fixed familial succession avoids ambiguities (and possible conflicts) about who will lead the group.
these are emitted at frequencies too low for people to hear. Many elephant biologists now suspect that the purpose of these deep, low rumblings is long-range communication.\textsuperscript{133}

**Food habits.** This will be brief. Just for fun I’ve often asked Zimbabwean students what elephants eat, and students from elephant country inevitably give one of three answers: “Elephants eat anything.” “Elephants eat trees.” “The %%#$&* elephants eat villagers’ maize crops.” Each answer is correct. If you observe elephants at length in enough different habitats, you will discover that they’ll eat almost any plant material (plus fungi, if available), and you will correctly conclude that their basic feeding strategy is to focus on quantity rather than quality. As you have already read, the strategy reflects elephant anatomy. That is, because elephants did not evolve the specialized digestive structures characteristic of mammalian super-herbivores such as cows, antelope, and so forth, they cannot exhaust the nutrients available in what they eat. Instead, they run food rapidly through their digestive system, extracting a modest amount of calories from each of many, many mouthfuls. Thus, every day an elephant will typically consume about 100-200kg of food—and will expend twelve to eighteen hours doing it.\textsuperscript{134} I do not believe that elephants have any special fondness for trees in general. However, in Zimbabwe’s national parks elephant densities can be extremely high.\textsuperscript{135} Therefore, in some areas the animals wipe out their preferred sources of food. And if an elephant exhausts the food it loves, it will learn to love the food that remains. In recent years, American visitors to Hwange and Gonarezhou have told me, “The place looks like a war zone.” Basically, this means that you can scan across a hundred hectares of landscape and see no trees that have escaped the ravages of the elephants.\textsuperscript{136}

\textsuperscript{133}Low-frequency sound waves can be propagated over very long distances. Studies suggest that elephants can respond to these low rumblings at up to 10km. A few authors claim that elephants hear other elephants rumbling at 100km. These more extreme claims are interesting, but supporting data are far from conclusive.

\textsuperscript{134}In case you’re wondering, production of waste is commensurate. Furthermore, because of elephants’ digestive strategy, their feces are rather high in residual nutrients and support fascinating communities of dung beetles.

\textsuperscript{135}Later in this essay I shall address the issue of elephant over-population in national parks.

\textsuperscript{136}We should not exaggerate the long-term damage done by elephant depredation on trees. Some savanna-species are coevolved for life with elephants, and damage that might appear fatal actually affects the tree little more than a radical spring pruning affects your azalea bushes. (Except under conditions of near-starvation, elephants seldom eat the trunks and roots of mature trees, and even if all the branches are broken off, some damaged trees do recover.) Furthermore, African landscapes are dynamic: loss of trees facilitates flushes of grass which support grazing herbivores which may eventually lead to recovery of tree-communities. Nevertheless, in some Zimbabwean parks the loss of trees to elephants has resulted in substantial ecological degradation. Note that although elephants evolved to subsist on low-quality bulk diets such as dry dead grass and small tree-branches, they are highly intelligent creatures and definitely have other preferences. As my AU students know, these preferences include almost every food-crop (except hot peppers) cultivated by African agriculturists. And therein lies a problem that we shall eventually discuss.
Population status. Of course nobody knows the exact population status of African elephants. My own guess would place their total between 400,000 and 500,000; I’m reasonably confident about the bottom number, but my top-end estimate could be pessimistic. These however—many elephants are distributed quite unevenly across sub-Saharan Africa. I have found no convincing estimates for population-sizes in heavily forested nations of western Africa, so I can’t tell you anything about them. Elephant numbers are reasonably well known for Kenya and Tanzania; in both countries the species appears to be recovering fairly well from depressing lows in the 1980s. Zambia and Mozambique have decent elephant populations though poaching in those countries has been serious in the past and could become serious in the future. Populations in Democratic Republic of Congo and in countries to the north are probably declining because of ivory-poaching. South Africa and Namibia manage their elephants reasonably well, and poaching is not a serious threat at the population-level. Roughly half of Africa’s elephants probably live in Zimbabwe and, especially, Botswana. I know Zimbabwe’s elephants best, and even for these animals I could not say with authority whether the population is increasing or decreasing. Reports that I trust indicate that elephants greatly over-populate the enormous Hwange National Park—and, by contrast, have been almost extirpated across vast areas of the Zambezi Escarpment. But, considering the nation as a whole, I can promise you that the species’ population is not exploding and that it is not plummeting toward extinction.

When my AU classes discuss elephant population status, we always claim that the species’ ecological importance is enormously disproportionate to its raw numbers. Then, for fun, we take field trips that verify our classroom insights. On All Saint’s Day, 2014, Chrissy and I accompanied two classes to Gonarezhou National Park, which is about 150 road-kilometers southward from Mutare. About a year later, with different students, we made the trip again. During both visits our observations were basically the same, so combining them does not lose any information that is relevant to this essay. Both years we drove the Park’s challenging road in AU’s regular old street-vans, which were not ideal vehicular platforms for observing wildlife. Nevertheless, we saw a total of 682 mammals, not counting people. These varmints comprised 12 species, of which impala—350 individuals—were numerically dominant. Some of my students said that impala-meat was delicious; alas I do not know. On our rides through Gonarezhou, no other mammal even approached impala in the absolute number of individuals observed. But an ecologist is trained to think in terms of biomass or caloric consumption, and in these categories the 350 impala were completely overshadowed by

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137 This number and all those that follow are approximate. The raw counts come from my field notes, which compiled student notes and, therefore, involved decisions about which individuals might have been counted twice. The biomass summaries are based upon average masses/weights from field guides; for sexually dimorphic species I did consider gender when I could. The caloric-consumption figure was based on the Kleiber Curve and on Kenyan biologists’ estimates of mammalian digestive efficiencies.

138 Impala are lovely antelopes, typically about the size of a whitetail deer. The males have black, lyrate horns, circled along their length by annular ridges. The females, somewhat smaller, are delicate and graceful. Impala are astoundingly successful animals in part because the constituency of their symbiotic gut-flora changes to suit the dominant vegetation of the season. In other words, given almost any old dried-out source of cellulose, an impala can eat it gainfully.
111 elephants. These wonderful creatures made up about 83% of the mammalian zoomass. And the elephants probably consumed roughly 77% of the calories eaten by the Gonarezhou mammals we saw. In fact I estimate that elephants probably take in more calories than all other Gonarezhou mammals put together. Of course that figure is probably dwarfed by termites, but I wasn’t thinking about insects during two glorious mammal fieldtrips.

In 2014, back at AU, in my Wildlife Management classroom, I asked my students, “If you were in charge of managing Gonarezhou National Park, which mammal species would be of particular concern?” Of course the students answered, “Elephants!” So I pressed, “How do you know?” And a student from Mutare answered, “Because, in the Shona language, Gonarezhou means the place of elephants.” Clearly, when you are managing “the place of elephants,” you have to think about elephants. But you also have to think just as much—or maybe even more—about another mammal-species, Homo sapiens.

Before we bring people into the elephant-equation, I should, as a matter of full disclosure, emphasize yet again that I am very fond of elephants. In this I am not alone; indeed, surveys have shown that among middleclass Americans, elephants are the ultimate flagship species for save-the-critters money-raising campaigns. If you are surprised that elephants beat out dolphins, koalas, and giant pandas, then visit an elephant orphanage and revel in the mischievous affection of a hundred kilo calf that will steal your sandwich and your heart. Or, in the field, take time to observe the social interactions among elephants. In Gonarezhou, for example, I saw two adult females (probably a mother and her sister) accompanying a youngster across a stretch of rough terrain. The young elephant was walking in front, but sometimes the mother, following close, would reach forward with her trunk and gently guide her offspring slightly to one side or the other. It was as if she were telling the kid, “Yes, of course you can lead. But in a place like this, you need to go a little to the left.”

So there’s no doubt about it: the more I see elephants, and the more I learn about their natural history, the more I like them. Of course biologists should avoid the sin of anthropomorphism, but when you watch a mother elephant with her baby, it’s hard not to use the word love. In times of danger, elephants appear to risk their own lives to protect other elephants. In times of stress, they sometimes seem to comfort one another. And the behavior of elephants towards their dead looks an awful lot like human reverence. Yes, we Americans—including me—tend to get a little crazy about elephants. And perhaps for that reason, two unassailable facts about their African populations should concern us. In some places there are too many elephants, and in some places there are too few. In my opinion, nobody has yet invented a good solution to either problem. Nevertheless, I have to address both in my AU Wildlife Management classes. Here I shall begin with the “too few” conundrum.

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139 This conclusion incorporates a bunch of semi-educated guesses about observability, nocturnality, and cross-landscape distribution of mammals.
3. TOO FEW ELEPHANTS: THE QUAGMIRE OF POACHING

Everything I have thus far told you about elephants can be found on-line or in more than a dozen fine books about African wildlife. Nobody argues about the basic facts; nobody gets mad when the elephant-discussion is restricted to simple natural history. On the other hand, when elephant conservation is the topic and real-world management decisions must be made—oh, my; the associated bickering makes American-Election-2016 look like a Sunday School conversation! People who know me well can testify that I’ve been a conflict-avoider throughout my life; I’ve never seen a controversy from which I did not want to run. Nevertheless, I am forced to discuss elephant management every time I teach at AU, so I reckon that, for y’all readers, I can do it one extra time.

Along with 95% of my acquaintances, I wish that Africa had more elephants. We are agreed that they are wonderful beasts. We are disappointed that they are absent from vast tracts of their earlier species-range, and we are saddened that they continue to be threatened in many areas where they still remain. The reasons for the overall elephant decline are exactly known: people have killed them and have appropriated their habitat. Probably human beings have hunted elephants for the better part of 100,000 years, but exploitation in Sub-Saharan Africa did not become a real conservation threat prior to the arrival of white Europeans. In 1497 the Portuguese explorer Vasco da Gama reported elephants from near the Cape of Good Hope (the southern tip of Africa), and shortly thereafter, European exploitation began. Elephants and their ivory were considered mere curiosities in Europe through the 1500s, but in the late 1600s ivory became commercially valuable, and elephants became a commodity in world capitalism. By the early 1700s ivory was an important incentive for European expansion into the African Interior—and indeed ivory largely financed Voortrekker (= white Dutch) settlement in the Transvaal.

The impact of unlimited hunting (even with primitive firearms) was severe, and by 1755 there were probably no elephants near South Africa’s south-coast, from Port Elizabeth all the way to Cape Town. Driven by greed and wanderlust, the great white hunters thereafter expanded their activities northward, and from 1700-1800 the ivory trade largely motivated and financed most European enterprises in interior South Africa and Mozambique (then Portuguese East Africa). After elephants had become rare in Mozambique, ivory hunters began to work the Zimbabwe plateau, where elephants persisted at high density into the 1870s. But although Zimbabwe’s elephants were plentiful in 1875, by 1885 these animals were largely gone, and by 1900 fewer

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140 My favorite elephant account is an oldie but goodie: pp. 1-75 in Volume IIIB of Jonathan Kingdon’s masterful *East African Mammals* (Chicago University Press, 1979). I tried to summarize Kingdon plus several more recent authors in my just-for-students mammalogy textbook. Some of this essay was taken from that very long document.

141 Later in this essay I shall write briefly about pre-European-type elephant hunting.

142 For a couple of centuries harpsichord keys had usually been made of wood (or occasionally bone) rather than ivory, but the invention of the piano, around 1700, for some reason enormously increased the demand for ivory.
than 5000 elephants remained in the whole country. In other words, by the beginning of the twentieth century, elephants were commercially extinct throughout much of southern Africa.\textsuperscript{143} As elephants were extirpated throughout vast regions of Africa, their habitat was largely converted to ranches and farms. Of course elephants were not generally readmitted to these “productive” lands. However, in some areas (usually in regions less suitable for agriculture) the European Powers established national parks. In most of these parks elephants were legally protected, and where the laws were enforced, elephant populations began to recover by as much as 5\% per year, which is close to the species’ biological maximum rate of increase. Elephant population recovery in what is now Zimbabwe was quite dramatic, but perhaps it was not atypical. Remember, at the beginning of the 20th Century, the whole country probably had about 5000 elephants. A hundred years later, there were probably about 100,000.

In the Africa that I sort of know, virtually all elephants live on land that has been set aside at least in part for their conservation.\textsuperscript{144} In Zimbabwe, some protected lands are designated as safari areas, where limited elephant hunting may be allowed. Other elephant-lands are national parks, where the animals should, in theory, be safe from human hunters. However, as we shall see, their ivory remains commercially valuable—especially in comparison to median African incomes—and poaching has become a very significant problem. When I teach at AU, I spend a great deal of time discussing this issue with students in Wildlife Management class.

The proportion of elephants killed by safari hunters is small; the proportion killed by poachers is much larger. Throughout tropical Africa a few elephants are poached by people who intend to eat them, and more are poached so that their flesh can be dried and sold in urban markets. But the majority of poachers are out for ivory. Some ivory-poachers harvest elephants by poisoning waterholes, and during 2013 over three hundred were killed by this technique in Hwange National Park. More often poachers use cable leg-snares. If such a snare is attached to a heavy log, the elephant may be unable to break the cable or detach it. Dragged cross-country, the log produces an obvious trail. A team of poachers will follow and eventually dispatch the elephant with gunfire, probably from one of the millions of military assault rifles that seem to float all over the continent. Overall, although snaring is common, the usual poaching technique is just to find elephants and shoot them.

Although data about ivory-poaching are neck-deep in imprecision, inaccuracy, and controversy, designers of management strategies absolutely must wade through this depressing swamp of fuzzy truths. Here’s one thing that is known: the demand for ivory and ivory artifacts is largely (though not exclusively) Chinese, and, despite ongoing improvements, Chinese law enforcement is nowhere close to controlling the illegal trade. Here’s another truth: most African elephants are worth a whole lot of money when they are dead. As you probably recall, both genders of African

\textsuperscript{143} Healthy elephant populations persisted in the delta region of the country now known as Botswana; Namibia probably also had quite a few elephants. For Zimbabwe (then Rhodesia) in 1900, the figure of 4000 is usually cited.

\textsuperscript{144} Unfortunately elephants sometimes wander off into areas where they are not wanted, and these animals almost inevitably get into trouble.
elephants typically bear ivory\textsuperscript{145}—though not as much as they did a couple of centuries ago, when enormous bulls toting 100kg still patrolled the savannas. Today the average mass of tusks harvested by poachers is unknown within the law-abiding world. In Zimbabwe, honest, licensed professional hunters write like this on their websites: \textit{As my client, you may take a tusker with more than fifty pounds per side, but a more realistic expectation would be twenty to thirty pounds per side.} If we convert “pounds per side” to “kilograms per elephant,” and if we round down a little, we might estimate that poachers’ ivory-bearing kills would average about 20kg of ivory.\textsuperscript{146}

Obviously, to understand the economics of poaching, we should know how much a kilogram of ivory is worth. Internet estimates vary by a factor of 10, but here is one hard fact. In 2008 a CITES-permitted auction of legal ivory took place. Prices averaged $152 per kilogram. In that same year, a reasonable-sounding estimate for the price of illegal ivory was $800 per kilo.\textsuperscript{147} There have been no further legal, large-scale sales since 2008, and prices of illegal ivory have been super-difficult to estimate. Nevertheless, here are some 2015 numbers offered by \textit{National Geographic}:

\begin{itemize}
  \item Price in “the bush,” $165-$583 per kilogram.
  \item Price in a “major domestic market,” $1091-$1940 per kilogram.
  \item Price in Asia, $2081-$10,186 per kilogram.
\end{itemize}

As I shall explain later, I have some quarrels with the article, but the ivory-prices appear more reasonable than others I’ve read, and I have no reason to dispute them. Now, to place those very fuzzy figures in context, I’ll mention two more numbers. For 2012, the annual GDP per capita was $479.50 in the Central African Republic and was $418 in the Democratic Republic of Congo. (You’ll read more about those two countries below.) In other words, regardless of how you estimate the weight and price of its tusks, one dead elephant is likely to be worth many years’ salary in much of central Africa. Please keep this fact in mind as you read on.

Poaching occurs in every African country with a substantial number of elephants—and also in some nations where elephant populations have been drastically reduced. In southern Africa, most poaching involves cooperation between dirt-poor people and somewhat richer entrepreneurs. Occasionally poaching is facilitated by a government’s benign neglect; very occasionally it receives active governmental assistance. The poachers’ usual objective is eventually to sell ivory to Chinese procurers and make money—in order to survive or to achieve and solidify a fragile middleclass existence. The cost to elephant populations is not trivial, and human social costs can also be substantial. Nevertheless, when we’re talking about southern Africa only, I can’t make myself get super-excited about elephant-poaching: in some areas

\textsuperscript{145} Among African elephants, most males usually do carry more ivory than most females. Tusksless animals of both genders are not super-rare.

\textsuperscript{146} This assumption is likely to be way, way off, but it’s the best I can do. Also, note that poachers kill quite a few tuskless elephants. When you’re out to gun down every valuable elephant in a group and the four-ton matriarch decides to kill you, then, whether or not she has tusks, you’ll shoot.

\textsuperscript{147} There are many reasons for the price-disparity; I know only a few of them.
elephant numbers exceed environmental carrying capacities, and furthermore, many other conservation-problems and people-problems are much more pressing.

On the other hand, the world is different across two million square kilometers of central Africa, including portions of Chad, the Central African Republic, Sudan, South Sudan, and the Democratic Republic of Congo. In this vast region, according to the U.S. State Department, “political instability” is rampant. Less euphemistically, this means that religious, ethnic, nationalistic, and economic conflicts are reinforced by tradition, vindictiveness, anger, and fear—and are driven toward their flash-points by poor folks’ desperation and rich folks’ greed. This means that broken societies create lawless factions of national armies and spawn rebel groups with minimal respect for human life. This means that bewildered fathers are shot, that anguished mothers are driven into refugee camps, that little boys become hardened soldiers, and that little girls are repeatedly raped until their minds are shattered.

As y’all already know, the weapons enabling this nastiness are not manufactured within this African zone of “political instability.” They are, by and large, made in Asia though they are often merchandised through the Horn of Africa or the Middle East. Of course, the weapons are seldom provided free of charge. To run a central African death machine you need AK-47s, RPKs, RPGs, and literal tons of 7.62X39 ammunition. All these things cost money. Now think about 20kg of ivory per elephant times a whole lot of dollars per kg of ivory. So, you might ask yourself—I have certainly asked myself—whether ivory-money might be used to support hideous levels of violence in central Africa.

This is a difficult, important question, and I believe that you should be very cautious in evaluating answers that are offered to you. According to National Geographic, there is a strong connection between terrorism and illegal ivory. In 2015’s September issue, award-winning author and journalist Bryan Christy published an article entitled “How Killing Elephants Finances Terror in Africa.” The article sketches a dismal picture. According to Christy, some terrorist groups (for example, Joseph Kony’s blood-soaked Lord’s Resistance Army) have actually maintained long-term poaching camps within central African National Parks and have used ivory-money to finance their more general campaigns of terror. Furthermore, according to Christy, the Sudanese government shelters the terrorist-poachers and probably facilitates their international ivory-sales.

In Africa, when I picked up the National Geographic article, I was already having a bad day, and when I got to the part about illegal ivory & Sudanese terrorism, I almost exploded with rage. After a couple of minutes Chrissy reasonably suggested that I had to calm down; probably she got tired of shouted references to oedipal sex and ducks; besides, there was nothing immediate that we could do anyhow. Furthermore, as Chrissy reminded me, whenever conservation biologists surrender to anger and emotion, they desert their vocation, and if they lose their hunger for new information, they cease to be scientists at all. Anyhow, I really wanted some

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148 Yes, this is the article from which I extracted the ivory prices quoted two pages ago.
149 I believe that Sudan’s President Omar al-Bashir is the only sitting chief of state indicted by the International Criminal Court for genocide/crimes against humanity/war crimes. I am less certain that he should be charged with the lesser offence of abetting elephant poaching.
perspective on that *National Geographic* article. Therefore, lacking other research opportunities, we struggled onto the Internet and began sifting through the elephant-poaching literature. The most relevant information we found was from the International Union for the Conservation of Nature (IUCN) and from Britain’s Royal United Services Institute for Defense and Security Studies (RUSIDSS). Somewhat surprisingly, both of these internationally respected organizations cautioned against assuming direct ties between ivory poaching and terrorism. That calmed me down a little, and, for three reasons, I have come to believe that the warning is important. First, claims of major connections remain, in my judgment, unsubstantiated, and at the very least we know with certainty that ivory-money is not the major source of gun-money for most of the horror in central Africa. Second, when we label every despicable, violent act as terrorism, we devalue the utility of the term. By and large, big-time elephant poachers and ivory traders are unprincipled thugs who respect dollars more than they respect the lives of elephants or people, but no study with which I am familiar has shown these criminals to be political extremists, and if they are religious zealots, their religion is the worship of money. Third, the terrorism-narrative diverts attention from the actual dynamics of the nasty ivory-trade and over-emphasizes the need for/utility of militarized anti-poaching operations.

The law-enforcement response to poaching has been uneven and is difficult to evaluate. Naturally the Media pay most attention to incidents that involve gunfire—and these, alas, are not infrequent. If wildlife rangers have aircraft, radios, and automatic weapons at their disposal, and if the rangers have been trained in small-unit air-assault tactics, they will be more than a match for any poachers. But few African countries can afford the luxury of arming and training park-guards as if they were American SEAL Teams. In Zimbabwe, not so very long ago, I saw a ranger armed with a World-War-II rifle. Furthermore, many of today’s wildlife rangers were hired during better economic times, and their ranks have not been sufficiently replenished: the man I saw with the .303 Enfield was about my age, which is a bit old for infantry combat. The poachers, by contrast, seldom have aircraft, but they are usually well armed, and they are often young men with recent combat experience. A few years ago *The New York Times* (31 December 2012) reported a particularly poignant event from Chad. Six rangers were on leave from Zakouma National Park. Together with their cook, they were at Morning Prayer, outside, facing

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150 I am not sure what I should say about the *National Geographic* article *per se*. Of course it is exquisitely photographed, and, despite some minor technical errors, it is well written. On the other hand, it is substantially more sensationalistic/emotional than anything I’d previously read in that famously understated magazine. Certainly Christy demonstrated that at least one tusk passed through the hands of unsavory people who might also deal in illegal weapons. Overall, however, the article did not convince me of substantial ties between poaching and terrorism. Nevertheless, if this subject interests you, then you should read the *National Geographic* article for yourself. And you should also read RUSIDSS’s *An Illusion of Complicity: Terrorism and the Illegal Ivory Trade in East Africa*. As far as I know, both are still available online.

151 Yes indeed I am susceptible to the seductive appeal of confronting presumed terrorist-poachers by a display of shock and awe. Upon first reading Christy’s article, during my emotional meltdown, I conjured up a vision of American parachutes eclipsing the sun over Khartoum. Given the nature of Omar al-Bashir’s regime, I’m still not sure that’d be a bad idea, but it would not have much to do with elephants and conservation.
Mecca and the beautiful African daybreak. The poachers approached silently, from the west, of course. The worshipers touched their foreheads to the ground, and suddenly—textbook-perfect assault with short, disciplined bursts from AKs—one ranger was missing, five were dead, and the cook was left alive to explain what would happen to rangers who interfered with poachers. Of course the national government deployed more rangers to hunt down the poachers; of course I do not know whether the killers were ever found.

Given African economics and the price of illegal ivory, I am doubt that search-and-destroy operations alone will ever prevail against elephant poachers. On the other hand, policy changes in China—some of which may already be afoot—could make a real difference. And economic development within Africa would to some degree undercut the incentives to hunt elephants for money. Furthermore, if villagers considered elephants to be valued resources (as opposed to five-ton rats that often destroy their maize-fields and occasionally stomp their children), then rural people could become stakeholders in the enterprise of conservation. In that case, few poachers could escape report by busy-body grandmothers, mischievous kids, and bored teenagers—who have comprised the world’s best surveillance networks for thousands of years.

Anyhow, I hope you get my point: conservationists who would protect elephants against unlimited slaughter need to develop a creative mix of strategies.

Thus far the most ambitious anti-poaching policy has been an international prohibition against commercial trade in ivory. This policy grew out of a conservation crisis in Kenya and Tanzania, where poaching had caused precipitous declines in elephant populations from the 1950s through the 1970s. The crisis *per se* was geographically restricted, mostly, but any general ivory ban would affect almost every nation in Sub-Saharan Africa—with radically varying consequences. In other words, international prohibition of the ivory trade would become, simultaneously, an enormous success and a discouraging failure. And to understand this is to unravel many mysteries associated with the conservation of elephants in Africa.

The roots of ivory-ban ambiguities are deeply imbedded in publicity campaigns to institute the policy. In the early 80s, conscientious field-biologists confirmed that East African elephant populations were in serious trouble, and East African conservationists knew that somehow the slaughter had to be curtailed. Therefore, they wanted an ivory ban, and they worked towards this goal using every legitimate means at their disposal. There were true heroes in this struggle, and in my opinion, most of them were from Kenya or Tanzania.

Meanwhile, on the broader international stage, several save-the-elephants protectionist groups suddenly materialized. And by the mid-1980s, some of these organizations were supporting their pro-ban positions by means of largely emotional arguments such as the following, quoted from an ad in the *New York Times*:

“The last elephant to die will likely be a baby. ... The last thing this baby will see before it dies will be its mother being killed and mutilated by a chainsaw.”

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152 The ad, entitled “African Chainsaw Massacre,” was placed by the International Wildlife Coalition.
In a similar vein, the following appeal, though of purportedly African genesis and signed by the president of the African Wildlife Foundation, was actually prepared by a California fund-raising consultant.

“With great sadness I find I must write to tell you that the plight of Africa's wild elephants is far more desperate than I could have ever imagined.”

Although such statements were largely divorced from African realities, they had strong propaganda value, and they generated dollars. Meanwhile, top-level decision makers in the powerful World Wildlife Fund, Washington, argued in-house for more than a year about whether or not to support a complete ivory ban. In general, WWF’s academic ecologists tended to oppose a worldwide ban, but the organization’s fund-raisers and membership-recruitment specialists argued that WWF needed to support an ivory-ban for basically political reasons. Eventually, fearful that WWF would be perceived as anti-elephant and would consequently lose members to more radical protectionist organizations, the World Wildlife Fund came out in favor of the ivory ban.

Thus, by fair means and foul, effective international opposition to the ivory-ban proposal was broken, and on 16 October 1989, in Lausanne, Switzerland, with strong support from the United States and other western nations, CITES listed African elephants on Appendix I. The ban had become reality.

Initially the ivory ban most definitely bore worthy fruit. Ivory prices plummeted, perhaps because demand was undercut by protectionists’ aggressive publicity campaigns. Poaching declined measurably, and elephant populations began to increase, albeit gradually, throughout much of East and Central Africa. Kenyan elephant aficionados were predictably delighted, and indeed the ivory-trade ban may have forestalled the extinction of elephants in their country. Real success had been achieved. On the other hand, viewed over a quarter-century and across a wider geographical area, the overall effects of the ivory ban are more difficult to evaluate. As far as I know, the ban did not

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153 Officially the organization is now known only by the initials, WWF, but for sentimental reasons I hold onto the old three-word name. In my opinion the World Wildlife Fund is among the most honest and most efficient of all international save-the-wildlife organizations. I am a big WWF fan; it is the only charity (except the United Methodist Church) to which I regularly contribute. (Uh, full disclosure: I’ve also accepted grant money from them.) Still, I believe that conservation organizations should base their wildlife-management policies on scientific evidence, and I suspect that WWF’s decision to support the ivory ban had appreciable political components.

154 CITES (pronounced sort of like SIGH-tees) is the Convention on International Trade in Endangered Species. Most nations (180 in 2015) are parties to this multilateral treaty, which regulates cross-border trade in threatened and endangered plants and animals and in products made from them. Species listed on Appendix I are accorded the highest level of protection. Furthermore, national laws usually reflect CITES decisions about which taxa to protect. Thus (at least as far as I know) all species listed as CITES Appendix I are nationally protected under the U.S. Endangered Species Act.
substantially impact poaching in D. R. Congo or other equatorial nations. Also, I have not been able to learn how elephants throughout West Africa were affected. Without a doubt, however, the CITES listing of elephants eventually disrupted ongoing, and reasonably successful, wildlife-management programs in Botswana, Namibia, and Zimbabwe. These countries all had plenty of elephants (in some areas, as we shall see, too many elephants) and had designed management strategies based on their sustainable harvest and financed largely by the international sale of their ivory. At least at first, many responsible elephant biologists affirmed the importance of these harvest programs. With this scientific support, CITES, which had been formally committed to sustainable exploitation strategies for over a decade, permitted four African nations limited exceptions to the trade ban. As long as their management plans met CITES criteria of sustainability, Botswana, Namibia, South Africa, and Zimbabwe could harvest restricted numbers of elephants, and some of the harvested ivory could be legally moved in international commerce. And I like that because in principle I am committed to the sustainable use of natural resources in developing nations. But I also wonder, would widespread sale of legal ivory divert trade from illegal ivory, or would it merely whet the appetite of Asian consumers for more ivory than all of Africa’s elephants could sustainably produce? As y’all have probably gathered, my own feelings about the CITES ivory ban are mixed. On the one hand, it may have saved elephant populations in East Africa. On the other hand, it has undercut management programs in the south. At the Lausanne Conference that established the ban, hard science took third place behind emotional appeals and the horse-trading of international politics. Nevertheless, outlawing the commercial ivory trade has allowed Chinese conservationists to make some progress against illegal Asian markets. But meanwhile, in international commerce, poached ivory commands its highest prices ever. And, across Africa, wildlife managers wonder why decisions about a uniquely African natural resource are largely made by politicos who have never set foot on their continent.

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155 Economic and legal risks associated with the ban probably forced some DRC, etc., poachers out of the business. On the other hand, anti-poaching success in Kenya and Tanzania might have caused Congolese ivory prices to spike, and poaching might have increased. Effects, whatever they were, might or might not have been similar in West Africa. I certainly don’t know.

156 Here the international politics become Byzantine. Botswana, Namibia, and Zimbabwe were joined by Burundi (one wild elephant at the time, but large stockpiles of confiscated ivory) and Swaziland (ruled by a somewhat unpredictable absolute monarch, and possessing a herd of fewer than 100 elephants) in requesting “exceptions” (= limited exemptions from the ivory ban). In this they were supported by ivory importers in Japan and Hong Kong. South Africa’s elephant-management program was inarguably efficient; 95% of the animals lived in Kruger National Park, which was protected by the South African army. Therefore South Africa’s request to be a CITES-exception was granted. At a comfortable conference in neutral Switzerland, Black-Power Zimbabwe made common cause with Apartheid South Africa, which undoubtedly supported elephant-poaching in Zimbabwe as a way to destabilize Robert Mugabe’s confrontationalist government. The legal ban on international trade was vehemently supported by outlaw-state Somalia, which sold tons of poached ivory and probably didn’t have any elephants of its own (uh, no sane biologist was willing to go look). Are y’all getting all this?
4. TOO MANY ELEPHANTS: CHALLENGES, TRAGEDIES, AND OPPORTUNITIES OF ELEPHANT MANAGEMENT

At Africa University, as our Wildlife Management class works its way through elephantine complexities of biology, natural history, economics, law enforcement, and conservation-politics, we must eventually confront a bit of very good news that brings with it enormous problems. The troublesome Glad Tidings are this: some Zimbabwean Parks are seriously over-elephanted. Take Hwange National Park, for example. As I have already indicated, nobody knows how many elephants live there. I’ve read estimates ranging from 30,000 to 60,000. Meanwhile, the carrying capacity of the Park is estimated at 15,000 to 25,000 elephants, and unless you have seen the place, you can hardly imagine the habitat-destruction these animals have wrought.

There is no good way to handle this problem of elephant over-population. In part this is because Zimbabwean National Parks largely exclude the mammalian species that was the apex-predator in the evolving ecosystems of the African Pleistocene. African elephants, you see, co-evolved with human beings, and people have hunted African elephants throughout both species’ evolutionary history. During most of these many millennia, the slaying of an elephant was not a trivial enterprise. Consider Colin Turnbull’s description of elephant-hunting among Mbuti people in Congo’s Ituri Forest. Having stalked his prey to a favorable location, the hunter, who is very small and very smart, carefully selects routes of approach and withdrawal. Then he dashes beneath the elephant and stabs directly up into the animal’s lower abdomen with a short-handled, long-bladed spear. He may stab more than once, and he may jerk the spear around to inflict extra damage. All this is guaranteed to irritate the elephant. Therefore, to maximize his survival-probability, the hunter must beat a timely and nimble retreat. Of course nobody can outrun an elephant, so the hunter will probably try to dodge around trees and stay out of the elephant’s line of sight. When the wounded animal finally bleeds out, the BaMbuti will butcher it, largely from the inside, and the band will be well fed.

Other non-industrial peoples have hunted elephants in other ways. On some continents—perhaps the Americas and Eurasia—such exploitation may have irreversibly damaged elephant populations. In Africa, however, the situation was different. In good habitat, at reasonably

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157 Savanna elephants’ populations are best estimated by aerial survey, but for years Zimbabwe Parks and Wildlife has been unable to afford the flight time. Furthermore, the size of Hwange’s elephant population often changes as elephants wander across the Zimbabwe-Botswana border.

158 Colin Turnbull, *The Forest People*. © 1961; Touchstone Edition 1968. I think that Mbuti is an adjective and BaMbuti is a noun, but don’t bet on it. The BaMbuti are a gatherer-hunter people, very small in statue, indigenous to the great central forest of the Democratic Republic of Congo.

159 Anthropologists argue about the impact of hunting on elephant populations during the Pleistocene. I believe that pre-modern peoples might have hunted some elephant populations to extinction. However, I contend that this was possible only where climate change had fragmented elephant habitat, and I suspect that human depredations were truly catastrophic only when human in-migrants appeared as novel predators upon previously naive elephant populations. Note that neither of these conditions existed in Africa.
low densities, African elephants probably have a maximum population-increase rate of roughly 5% per year. As larger populations begin to degrade habitats appreciably, that rate decreases towards 2.5%. I believe that, for millennia, many African peoples exploited elephant populations somewhere between those two rates. Demographic models suggest that, under such conditions, relationships between elephants and vegetation and people would have been sustainable. Of course I cannot argue that pre-modern hunting kept Africa’s elephant populations in perfect balance with their environment. Indeed the very idea of “balance” is a convenient fiction that ecologists increasingly distrust. But Africa is a very big continent, and if the “balance” between elephants and environment and people became too skewed in one geographical area, all concerned species could flow down the eco-demographic gradient into another. No vast area would have looked like Hwange, 2015.

In other words, I contend that in pre-modern Africa, elephants could respond to local population stress by migration, and that elephants’ overall increase-rates were damped by the co-evolved, human, apex-predator. Such conditions do not exist today; furthermore, for two reasons, they cannot be re-created. First, modern Africa is a settled continent, dominated by agriculture and human extractive enterprise; therefore, regardless of the demographic pressures elephants may create, they cannot migrate beyond the limited areas in which they are allowed to live. Second, human beings no longer hunt elephants within a co-evolved predator-prey system. This is true for reasons both ballistic and capitalistic. Unlike the Mbuti hunter with his long-bladed stabbing spear, most modern Homo sapiens who choose to kill elephants do so in relative safety. And whereas the dried meat from one elephant would stuff the stomachs of a tribal band for weeks, the bank-account of the modern hunter cannot be filled to satiety.

Modern methods for hunting elephants are many and varied. The professional safari-guide typically maneuvers his client in close—not Mbuti-close, but probably within fifty meters. The client is usually instructed to make a brain-shot. The target is not small—an elephant’s brain is about three times the size of a person’s—but it is encased within an enormous, honeycombed skull. Therefore the client will have been drilled in advance about external anatomical markers that, from various angles, are requisite points of aim, so that the bullet will carry deep to the brain within. A round from a big-bore rifle like a .458 Winchester Magnum will obliterate the elephant’s brain, and most safari hunters are reasonably good shots. Nevertheless, when the client fires, the guide will probably shout “Reload!”—meaning chamber another cartridge as quickly as possible—and will certainly have his own rifle at his shoulder. If the elephant moves, it will be shot again, probably more than once. Most often, it drops where it

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160 As we know, Zimbabwe’s elephants are largely restricted to national parks and surrounding buffer areas such as safari concessions. In other countries of southern Africa, the demarcation of elephant habitat may be somewhat less precise. In equatorial and western Africa, elephants inhabit dense forests, including areas not set aside as wildlife preserves. Nevertheless, throughout Africa, increasingly, elephants live only where people decide that they may be allowed to live.

161 According to report, a few BaMbuti still hunt elephants in the old way. Perhaps other people do too, but overall such depredations are demographically irrelevant.

162 The vast majority of hunting-safari guides, usually called professional hunters, are male; the vast majority are also white.
was standing. Then, if everything works perfectly, the safari-client gets photographs and ivory, the local folks get a whole lot of meat, the professional hunter gets a pile of money, the government gets a hefty license fee, and at least occasionally a village council gets funds for schools or clinics or irrigation projects. We’ll think more about this rosy scenario after a couple of really depressing paragraphs.

Several pages ago I started writing about the reasons and means for and by which Twenty-first Century human beings kill elephants. Thus far I have mentioned safari hunting with approval and poaching with distaste. Now I must consider culling—which I view with simultaneous approval and distaste. As I have already suggested, in national parks and other protected areas, elephant populations often increase beyond their environment’s long-term carrying capacity. Left alone, the elephants would experience lower reproductive rates and higher death rates, so their populations would eventually decline. Meanwhile, however, since population-stressed elephants will eat almost anything, environments within the park would be enormously degraded, perhaps permanently. Therefore, African elephant-conservationists are sometimes forced to institute culling. In most culling operations elephants are shot by highly trained professionals. Techniques and tactics vary. I don’t even like to think about culling, but I did once interview a woman who culled professionally in southern Africa. I do not remember her exact words, but she said something like this. “Of course we cull family groups because they are the reproductive nucleus of a population. We don’t leave survivors because they would be emotionally deranged and would cause problems. After my shooters on the ground have closed on a group, we work from a helicopter, with automatic weapons. We sometimes anchor animals with wounding shots, but of course we kill as quickly and as humanely as possible. After the initial assault the babies will sometimes approach our shooters for comfort. Occasionally we have contracts from zoos for the babies, but usually we have to shoot them too. I hate it all. I absolutely, absolutely hate it all.”

Culling is the most draconian and most successful method used by wildlife managers to address problems of eco-demographic disaster among elephants confined within national parks and other patches of habitat left residual to Africa’s development. Culling, obviously, is very straightforward; like it or not, it is easily understood and analyzed. Other strategies to manage elephant populations are somewhat harder to analyze—and are much more difficult to implement. This is particularly true of programs with multiple objectives that are not smoothly congruent. As an intellectual exercise, just try to design a program that would maintain elephant populations below the level of ecological disaster while protecting the animals from rampant poaching and also encouraging elephant-conservation among local people. And do it all on a management-budget appropriate to a nation where the median income is less than two bucks a day.

I am not familiar with details of elephant-management regimes in most African countries, but I have tried to stay informed about Zimbabwe’s Communal Areas Management Programme for

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163 This assumes that boundaries of protected areas effectively preclude out-migration, which is pretty much the case in southern Africa today. I consider food in the scenario above, but many elephant biologists say that we need to think even more about water.
Indigenous Resources, or, CAMPFIRE. The program was launched with great fanfare. And, around the world, it was hailed by wildlife-academicians, field-managers, and hunting enthusiasts as the greatest conservation idea since Teddy Roosevelt invented sliced bread—or national parks or whatever. CAMPFIRE was indeed a fantastic idea because it recognized the inextricably mingled futures of people and wildlife in Africa and because it promised to return profits from sustainable wildlife exploitation to local people who shared land and resources with that wildlife. With regard to elephants, the CAMPFIRE intent was that $20,000-$50,000, generated through the death of one elephant by Yankee gunfire, would encourage villagers to view elephants in a positive light.

CAMPFIRE is not perfect. In many places, and fairly often, the program has been plagued by bad luck, bad administration, and the general economic decline afflicting Zimbabwe as a whole. But in some areas, CAMPFIRE has worked as planned. I have seen villages that benefitted substantially from the revenues it generated. And I’ve met Zimbabweans whose attitudes towards conservation were dramatically reversed by a policy of empowerment that guarantees local communities a stake in the natural resources that only they can protect.

I doubt that any single program could successfully address all the elephant-issues that challenge managers in southern Africa. And indeed CAMPFIRE has not been Zimbabwe’s only attempt to develop sustainable strategies for dealing with elephants. Non-consumptive tourism has been the most important, and it generates impressive revenues for the national economy. However, visitors on photo-safaris contribute minimally to local communities, and taking a few pictures does nothing to address the problem of elephant-overpopulation.

Some conservationists and economists envision an important role for a commercial ivory trade. In 1999 and again in 2008, CITES permitted large-volume sales of ivory confiscated from poachers and salvaged from elephants that had died of natural causes. Of course these sales were profitable; however, irregular “one-off” auctions do not provide a predictable revenue-stream that can be incorporated into resource-management budgets.

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164 If you searched diligently for a budget outfitter and were willing to settle for an animal of less than trophy-size, you could probably complete a Zimbabwean elephant hunt for $30,000 plus airfare. As of this writing, with a folder of paperwork, you might or might not be able to import tusks back into the USA, but of course they could not be legally sold. Alternatively you could select a tuskless-elephant hunt, which you could probably book for around $15,000. For megatuskers, $50,000 is not a top-end price; at the Harare airport, I talked with one hunter who planned to spend about $250,000 on his elephant hunt.

165 Some CITES conservationists hoped that occasionally dumping massive volumes of legal ivory into the international market would undercut the illegal economy of elephant-poaching. However, import-merchants never believed that legal sales would occur with sufficient predictability to sustain the lucrative commerce upon which their enormous profits depended. In 1999 and 2008 the import-merchants did indeed purchase the legal ivory, but they largely incorporated it into their product-reserves. Personally, I believe that the potential conservation-significance of commercial trade in ivory has not been sufficiently explored. But maybe that’s just because I was trained in crocodilian management, where sustainable commercial exploitation has been a tremendous conservation success. And elephants aren’t exactly crocs.
More recently Zimbabwe Parks and Wildlife has captured baby elephants and sold them in international commerce. One might assume that such a scheme would be applauded by international organizations opposed to killing elephants, but such has not been the case. Indeed, the baby-elephant sales have generated more vociferous protest than any other wildlife-management policy with which I am familiar. For example, on 3 January 2015 *National Geographic* published a feature by Christina Russo describing an interview with John Scanlon, Secretary-General of CITES (which organization did not oppose the baby-elephant sales). I shall summarize that interview below.

*Russo* says: “When it recently came to light that Zimbabwe is planning to export dozens of baby elephants, conservation organizations, elephant experts, and concerned citizens expressed horror and condemnation.”

*Scanlon* replies that CITES cannot formally object because Zimbabwe Parks and Wildlife has certified through proper procedures that the sales would not adversely affect wild populations and would be in accordance with a CITES-approved sustainable management plan.

*Russo* says: “But speaking of Zimbabwe, when you have a dictatorship like Robert Mugabe’s, those checks and balances could go out the window.”

*Scanlon* objects that the legitimate role of CITES does not encompass the criticism of overall national policy.

*Russo* says: “So Zimbabwe isn’t violating the CITES treaty—but is it ethically defensible to trade in baby elephants?”

*Scanlon* says: “My job is to honor the convention and do my best to make sure that parties do what they all agreed to do.”

In my experience most conservation-scientists are good people with strong senses of personal ethics. However, like General Secretary Scanlon, they are generally reluctant to pass professional judgment on policies by which sovereign nations attempt to address wildlife management problems. This is particularly true when those policies have no measurable negative impacts on wild populations—and when nobody has a clearly superior strategy to suggest. But oh, well, nowadays elephant-related politics often transcend all scientific judgments. Spend a quick half-hour on Google, and you should be convinced that the world of international elephant conservation is full of good ideas and bad, of modesty and hubris, of despair, unbounded enthusiasm, wisdom, stupidity, and self-righteous indignation.

5. A RAY OF AFRICAN LIGHT: CREATIVITY AND SOME CRAZY AU STUDENTS

Now y’all have read your way through twenty-two pages of my thoughts about elephants. If you think it all sounds a bit too academic—too many subtopics and footnotes, etc.—then you are quite perceptive, because I’ve given you a condensed version of Lectures Six through Nine in AU’s Course AAS 203, Wildlife Management. I do talk a whole lot about elephants, and I do focus largely on Zimbabwe. This is not ideal for my International students, and occasionally a young woman or man from Congo will tell me, “My country has a thousand problems more
serious than anything involving elephants.” I do not apologize publically for my narrow geographic focus; rather, I just keep ranting about Zimbabwe’s elephant-problems and the failure of the nation to solve them. And finally, if I’m lucky (in this regard I often am), some Zimbabwean student will eventually explode:

“Elephant overpopulation is ruining our national parks. Elephants destroy villagers’ maize-fields; sometimes they raid wells and knock down villagers’ homes. So what are we supposed to do? We invent CAMPFIRE, and the U.S. blocks import of hunter trophies.\(^{166}\) We confiscate poacher’s ivory, and we can’t sell it to pay enforcement Rangers. We decide to export baby elephants, and American animal lovers talk like we are selling human infants. We salvage tusks from dead elephants—millions of dollars’ worth while half our people live on two dollars a day—and we can’t sell even that. International elephant-policy is exactly the sort of racist Neocolonialism we expect from whites, who obviously care more about animals than people!“\(^{167}\)

After the outburst, my classroom is silent. Some students worry that my feelings are hurt; some students are afraid that I’ll penalize everybody in my gradebook. Actually, I simply warn my class that 50% of our final exam will be to invent a strategy for elephant management. In the Faculty of Agriculture, this is a serious issue because a final examination must count 60% of a course’s grade. Therefore, over the next ten weeks, Wildlife students worry and plan and Google and catch me after class and email their aunts in National Parks or their uncles who work for a safari company. And eventually I read bunch of very long answers. Of course no student solves the problem. But they do come up with a whole lot of ideas: injectable contraceptives, conservation-taxes on tourist visas, OIEC,\(^{168}\) buffers of hot peppers planted around maize-fields, genetic fingerprinting of ivory, deployment of the Army to the national parks, pan-African boycotts of Chinese manufactured goods, partnerships with American zoos, a resolution at Methodist General Conference, essay contests for primary-school children, electric fences, lecture tours in the USA, wider buffer zones around national parks, destroying waterholes,

\(^{166}\) In February 2014, citing irregularities in wildlife enforcement, the U.S. Fish and Wildlife Service ruled against the import of ivory from elephants legally killed by sport-hunters in Zimbabwe. I think the ban actually began in April. At least one government website suggests that some trophy-ivory actually can be imported. To be honest, I don’t know, but don’t y’all try to bring in your trophy-ivory unless you can afford a good lawyer. Some safari companies will cast replica-tusks and will also store hunters’ ivory in hopes that restrictions will eventually be eased/clarified. In any case, after the USFS import ban, Zimbabwe’s revenues from safari hunting fell by about 30%.

\(^{167}\) Nowadays China justifiably occupies a prominent place in student diatribes against Neocolonialism. And China is big-time complicit in elephant-conservation problems; that’s where the illegal ivory goes. But I couldn’t work China smoothly into the above paragraph, and besides, this long essay is not the place to consider China’s pervasive geopolitical penetration of African affairs.

\(^{168}\) With no apology to OPEC, “OIEC” is the student-invented Organization of Ivory-Exporting Countries, which would operate without regard to CITES and USFWS prohibitions.
creating waterholes, reorganizing CAMPFIRE, and selling sponsorship-adoptions of individual wild elephants to rich white people.  

I am never satisfied with the answers; neither are the students, and none of us are surprised by our joint failure to solve a particularly difficult conservation problem. When there are multiple elephants in an increasingly crowded room, you got to expect a mess of, uh, elephantine proportions. Still, I am not discouraged. After all, people and elephants have managed to share the bright continent of Africa throughout the two species’ existence. And every semester, some Wildlife student who fully understands the complexities of elephant conservation—some crazy-ass student glowing with the spectrum of endurance, courage, humor, creativity, and love—will say to me, “I just can’t wait to graduate and take on this problem!”

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In my experience, AU students who seriously contemplate wild elephants recognize without despair the enormity of problems associated with them. Meanwhile a few Americans claim they already have all the answers, and a few other Americans moan that no answers will ever exist. Many Zimbabweans believe that these two extreme positions typify whitefolks’ more general attitudes towards the African continent.

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My current favorite idea goes something like this: Charge foreign tourists enormous amounts of money to dart cow-elephants with etorphine. The tourist is photographed with the apparently dead elephant, “like your President Roosevelt.” Meanwhile, since a tubal ligation in the field would be a logistic nightmare, the elephant is fit with an IUD, and her ears are notched so that she won’t be darted again. Of course there are problems with this scheme. (The third-most serious is the exhaustion of the supply of rich American fools.) Nevertheless, I hope you agree that it deserves an “A” for creativity.
Africa University is the window through which I have observed a continent. I know that the window is small and the continent is big. However, as I have tried to show throughout this book, my view from AU is broader than you might initially expect. And I can tell you this: certainly I missed some important sights, but I sure enough saw the Rainbow, as magical as the Gaboon viper’s impossible song. Our bright and colorful University, as you have learned, is a place where life is celebrated in in the complexities of daily events. I have written about some occasional highlights from my ten semesters on campus, but the actual parade of events is unbroken. At AU, day after day, we do a bunch of things rather badly and a bunch of things rather well. At this place, on Monday morning a researcher expands the frontiers of science, and on Tuesday afternoon a teacher stumbles through an important lecture. At this place, in sunshine and in rain, students learn and students refuse to learn; students sacrifice for their nations and students waste their scholarships. At this place, across the phases of the moon, we invent strategies to avoid homework and strategies to mitigate climate-change. At this place, throughout the year, we protect habitat, pollute waters, squander natural resources, and conserve the life-sustaining richness of our soils. At this place, according to season, our maize grows and our hens fail to produce and our pythons bask in the golden sun. At this place, whatever happens in Harare or Nashville, our scholars explicate God’s ways to Man and irrigation pumps are repaired and missionaries measure rainfall and governments are analyzed and collard greens are eaten and students from two dozen nations talk on their cell phones. In other words, AU is a great and imperfect place; she is a living university, sustained by hope and dollars and rainfall and sunlight and the song-blessed air of Mother Africa.

For over a thousand years living universities—the very first one was in Africa—have been great, and good, and imperfect things. In her tradition of grace and struggle, the Methodist Church has mustered the courage to affirm both the goodness and, yes, the imperfection. How else could she bring colleges to life on every inhabited continent, while many of her congregations still worshiped in barns, tents, and brush-arbors? Within my twenty-five years of connections to Africa, I have attended church under open skies, and I have taught classes, quite imperfectly, in high-dollar science labs. Thus I can testify that our vibrant little AU, created by people who could not afford her, stands within the living university tradition of imperfect goodness. Logically then, because AU is my window on Africa, my views of the continent are framed by goodness and by imperfection. For Americans, Africa may be more fun if you see her this way. And maybe you’ll be less tempted to despair of Africa’s future—or to decide that Only You can save the continent.

Throughout this chapter I’ll use the pronoun we in a radically inclusive sense. It goes beyond Chrissy and me and the other folks who work within the 625.24 hectares that comprise our University campus. I intend the term to include alums, visitors, and AU’s Manicaland neighbors, as well as fervent supporters and concerned critics. That is to say, we is a small word for a vast host of people: it’s like seeing a big continent through a tiny window.
OK folks, in case y’all haven’t guessed from the tone of those intro paragraphs, this is my preaching chapter. And as I write it, Lord help me avoid the two sins that I’m going to condemn. One sin is hubris; the other is despair. They are related because both arise when we embrace as Ultimate Truth mere interpretations of reality that largely reflect our own vanities and fears. One or both of these sins will tempt every thoughtful American who visits Africa. And if you don’t fight ‘em early, these sins can be deadly, like a rabies virus, incubated along our nerves until they take over our brain.

I use the metaphor of a virus, but the Old Testament writers did a whole lot better than that. In their Books, we commit the most deadly sin when we reify our pride or terror—and confuse this, our own creation, with the Ground of our Being. Oh heck, y’all. I read too much theology when I was too young, and I remember it too imperfectly. What I’m trying to say is this: Old Testament writers tell us about Golden Calves and Sixty-Cubit Towers. They called ‘em idols. And they were against ‘em. Furthermore, the Old Testament writers tell us exactly how to fight against idolatry. First, if you maintain your faith in God and his grace, then you won’t be tempted to fall down and worship anything less worthy, less read. And second, if you lose your faith (temporarily or otherwise), well, that’s no excuse, so screw your courage to your own sticking-place—and just say your own No! to the goddam idol.

Throughout the Bible, this theme appears again and again, particularly in the Prophets. My personal favorite story is from the first three chapters in the book of Daniel.

In the third year of the reign of Jehoiakim king of Judah came Nebuchadnezzar king of Babylon unto Jerusalem, and besieged it. And the Lord gave Jehoiakim king of Judah into his hand....

In addition to the usual species of loot, the conquering Babylonians also carried off a number of high-born young men, who were thought to have “knowledge and understanding” of potential value to King Nebuchadnezzar II. Four captives whose names are recorded were Daniel, Hananiah, Mishael, and Azariah, whom Nebuchadnezzar’s Chief Eunuch renamed as Belteshazzar, Shadrach, Meshach, and Abednego respectively.

Initially these four young Jews prospered mightily in the service of their new royal master, especially after Daniel grew strong on a vegetarian diet and proved himself more adept at dream-interpretation than any other courtier. Eventually, however, driven by some moral pathogen afflicting his royal blood, King Nebuchadnezzar erected on the Plain of Dura an image of gold. With a height of three score cubits (almost like a 10-story building), it must have been quite the sight. And Nebuchadnezzar must have been right proud of the image, because he assembled all Babylon’s civil servants and, on pain of death, required them to fall down and worship it. As I have reminded you, Old Testament Jews were very touchy about graven images, so Daniel’s three friends found themselves otherwise engaged during the big worship ceremony. Their absence, however, did not go unnoticed, and “certain Chaldeans” ratted them out to the king. Hananiah, Mishael, and Azariah—Shadrach, Meshach, and Abednego—were promptly brought before Nebuchadnezzar, who told them how things would henceforth be in his kingdom:

Now if ye be ready that at what time ye hear the sound of the cornet, flute, harp, sackbut, psaltery, and dulcimer, and all kinds of musick, ye fall down and worship the image which I have
made, well: but if ye worship not, ye shall be cast the same hour into the midst of a burning fiery furnace; and who is that God that shall deliver you out of my hands?

The first part of the young men’s answer evidences the enviable theological confidence that has characterized the words of religious heroes throughout the millennia:

Our God whom we serve is able to deliver us from the burning fiery furnace, and he will deliver us out of thine hand, O king.

But Hananiah, Mishael, and Azaiah were something more wonderful, something more transcendent, than religious heroes. They were idol-hating, stubborn-ass Jew-boys. As such they first testified to the king concerning their confidence in God’s miraculous abilities. And then they made known to Nebuchadnezzar the invincible power of God’s grace that abides when mere miracles forsake us:

...and he will deliver us out of thine hand, O king. But if not, be it known unto thee, O king that we [still] will not serve thy gods, nor worship the golden image which thou hast set up.

I am confident that no reader of this book will ever have to declare her or his faith under threat of a fiery furnace, and I am super-thankful that I’ll be spared the occasion to fail such a test. However, as I have warned, modern-day Americans who find ourselves drawn towards Africa are often presented opportunity to fall down and worship one or both of two gold images, both of which can appear three-score cubits tall upon the wide Acacia savannas.

**The first great idol.** The more seductive idol—the cute one, the one that promises noble accomplishments, moral satisfaction, and honorary degrees—is the sin of pride. We look at Africa, that Dark Continent, and we decide that We Ourselves can be the Bringers of light hitherto unseen. Such hubris has a long history on the continent. Today, of course, we easily ridicule its early practitioners: the Victorians who covered the breasts of native dancers in Zululand, the missionaries who “brought Christianity” to an Ethiopia that had been Christian for fifteen hundred years. But the Twenty-first Century has not endowed everybody with perfect wisdom, and I’ll now testify that some America-knows-best gifts can still be embarrassing. Shipping in bulk to Zimbabwe is difficult, but generous U.S. churches will occasionally combine forces and deploy a Container.\(^{171}\) The journey is long. From eastern North America the Container typically moves by rail to New York or Charleston or New Orleans or maybe Miami. Then the Container goes across the Atlantic and around the Cape of Good Hope. Arriving at the Mozambican port of Beira, the Container is offloaded onto a 22-wheeler mega-truck and bounces through 290km to the border-post at Mutare. Then the receiving party’s agent makes a journey or two between Manicaland Customs in Mutare and National Customs in Harare. Manifests are

\(^{171}\) More specifically, that would be a “40-foot high-cube Container,” which is a metal box, not cubical, that can be off-loaded from a ship to a railroad car. A forty-footer is typically loaded to almost 3,000kg. I describe one possible shipping route to Beira, Mozambique, which is the port of landing for Zimbabwe-bound Containers. Many other routings to Beira are possible.
checked and compared with contents. If donation certificates are in good order, some of the contents may enter Zimbabwe without duties; otherwise, import taxes can exceed market values. Anyhow, after some months of travel and administrative rigmarole, after substantial input of time and money (usually on both sides of the Atlantic), the Container arrives at AU—or, more likely, across the highway, near Fairfield Children’s Home. Recipients gather around for the Grand Opening, and a ritual prayer is offered. Usually the prayer is unspoken because everybody knows its words, but sometimes the prayer is expressed aloud: “Thank you, O Lord, and your church, for this Container. And this time please don’t let there be too much Junk for Jesus.” I have seen the junk arrive in many forms: a teddy-bear with one eye, clothing too tattered to wear, a coloring book with only four uncolored pages, a broken coffee machine that won’t run off of 220 volts anyhow, genetics texts from before the time of DNA-sequencing.… When I see crap like that, I am not wise enough to laugh, so I tend to become judgmental. And then I remember the stupid stuff I’ve done “for Africa.” In other words, please, please don’t ask me about three temperamental PC desktops I donated in 1995 or about a plethora of my lectures whose irrelevance was accurately diagnosed by 99% of my students. But it’s my lecture; I’m a Yale PhD, so of course it’s relevant; if these darn Africans would just…. You see, it’s so easy to incubate that virus of hubris in our superior American blood. I mean, uh, like of course Africans are intelligent. But just between us Americans, you know, sometimes they don’t have the, uh, academic background to decide what’s worth learning. And like in politics, sometimes they can’t understand what their countries really need, at least not at this stage of national development. And, you know, with networks of tribal and family obligations, well, it’s not that Africans are corrupt, of course, but they can still learn from our righteous examples of how to spend our donation-money wisely—you know, like we kinda need to keep a finger on the purse-strings when really big amounts of money are involved. And when it comes to getting things done, well, uh, you know there’s nothing quite like good old American efficiency.172

So let’s consider “good old American efficiency” in the context of a non-metaphorical virus, Ebola, 2014-15. The United States gave a lot of money to fight the epidemic. Exact figures are difficult to sort out, but $1.4 billion is the amount most frequently quoted. Much of the money was channeled by USAID through various NGOs in West Africa, and, predictably, national media like Fox News raised questions about African waste and corruption.173 However, before we criticize Africans about disappointing results-per-dollar, perhaps we could examine the Ebola-efforts over which America exercised very substantial control. Like many other folks, I was elated when the U.S. military was sent to Liberia, and I do not think that the $400 million deployment price-tag was excessive. But ponder the following facts. Of course our soldiers did

172 Of course situations do exist in which the U.S. and other “western” nations can supply valuable expertise and even leadership to Africa. Nevertheless, I have learned that these situations are less common than I formerly believed. And I remain convinced that any such assistance should be accompanied by humility and should be offered in a spirit of partnership.

173 I suspect (though without evidence) that some of the complaints might actually be valid, but if we look at the big picture, we can say that Africa whipped Ebola, and America was privileged to help. I consider that to be very good news, irrespective of any attendant waste, inefficiency, etc.
a great job, constructing eleven state-of-the-art treatment centers. Unfortunately, however, ten of those centers were unable to open before 22 December, by which time the back of the epidemic had been broken. Two of our centers treated a total of 28 Ebola patients. The other nine centers treated no Ebola victims at all.\textsuperscript{174}

I do not want anybody to read this as a criticism of the American expeditionary force in Liberia. Our personnel did their job, and they did it well. I would also be slow to condemn the international decision-makers who delayed the start of the mission. Back in the States, we could not launch a massive military deployment without Liberian assurances about who would be allowed to do what, and when, and where. Conversely, on the African side, no responsible Liberian leader could agree to the air-landing of three thousand foreign troops until their mission had been explicitly delineated. None of these concerns could be resolved instantaneously. No, I really don’t want to criticize the response. But I do want y’all to consider the mentality that propelled it. Good people in America truly hunger to respond to crises that arise in Africa. However, difficulties are inherent in responses driven by a crisis-mentality. Almost by definition, crisis-action must be immediate. But if problems are important and complex, and if no groundwork has been previously established, then immediate and effective action may be impossible. Furthermore, the surging enthusiasm generated by crises is difficult to sustain. Perhaps you recall that on the night of 14 April, 2014, Boko Haram fighters kidnapped approximately 300 girls\textsuperscript{175} from a government secondary school in Borno State in northeastern Nigeria. Of course the world was outraged; “Bring Back Our Girls” signs flowered everywhere, even at the White House. Soon, however, the headlines disappeared from the front page. And, one year after the abduction, the Boko Haram kidnapping no longer made the evening news. Meanwhile, about fifty girls managed to escape on their own, and in October, 2016, the Nigerian military cut a deal to free about twenty more.\textsuperscript{176} As far as the world knows, no Western powers have been involved.

My point is, no important African problem can be solved by any foreign miracle dropping out of the sky just in the nick of time—and if we think otherwise, then we’ve got the hubris-virus pretty bad. Africa must solve Africa’s problems, and America helps most effectively when she assists in developing Africans’ indigenous capacity to address their continent’s challenges. Ex-pat ag teachers like me lack the wisdom to invent specific blueprints on how this should be done. Nevertheless, I do have three general suggestions. First, let’s avoid actions that make Africa’s problems worse. For decades, responsible U.S. lawmakers have agreed that our international trade should not undercut the sustainable development of poorer nations. Congress should formalize that restriction, which should also be applied to issues other than trade. I believe, for example, that details of American aid to Central Africa should be reexamined.

Chrissy and I have heard rumors that U.S. assistance-money sent to Rwanda is diverted in part to

\textsuperscript{174} These data are taken from an article in \textit{Stars and Stripes} for 13 April 2015.

\textsuperscript{175} The round number of 300 is most often given. Two other totals, 276 and 329, have also been reported. Supposedly, 53 girls (329 minus 276) eventually escaped. Around the beginning of May, 2015, Nigerian military forces (apparently without foreign assistance) did manage to liberate several hundred civilians held by Bolo Haram; reportedly, none of “the girls” were among them.

\textsuperscript{176} Toward the end of 2016, rumors circulated around Nigeria that eighty more “girls” would eventually be freed.
finance cross-border violence in the Democratic Republic of Congo. I am in no position to fact-check such accusations, but they worry me and underline the importance of a scrupulous do-no-harm policy for American aid to Africa. We should also consider Africa as we formulate strategies to address environmental problems. Before 2050, climate change, if not mitigated, will harm Africa more than any other inhabited continent. Intensifying droughts, particularly in regions currently receiving 800-1000mm of rain, would catastrophically reduce food production in areas where hunger is already a constant worry. Therefore, Americans who care about Africa should apply the do-no-harm criterion to political choices about carbon emissions. Perhaps I should list other issues, but this chapter threatens to be too long. So I’ll hope that the point is sufficiently clear; although “don’t make things worse” is hardly an exciting slogan, its application as policy is an important challenge.

Second, those of us who want to assist Africa must move beyond our crisis-mentality. Of course we should try to help when lives are broken by sudden disaster. Sadly, however, intelligent responses cannot always be scaled up fast enough to meet the demands of catastrophe. Some disasters are at least partially preventable, and therefore prevention becomes a linchpin of rational aid-policy. Other disasters, however, will come when they will come. To confront these inevitable crises, relief operations will be necessary, and they can be greatly facilitated by establishing multi-national agreements and by pre-positioning materiel during better times. Furthermore, in disaster-prone regions, development programs should maximize resilience—social, medical, industrial, economic, and especially agricultural (told you I’d be preaching). In other words, when we cannot prevent disasters, we need to foster enterprises that can bounce back from them.

Certainly these principles are well known by modern NGOs and national relief agencies; perhaps, however, they should be more widely understood by the constituencies who might support these organizations by prayers, donations, and tax-dollars. Finally, as we move beyond crisis-mentality, we will understand that our knee-jerk reactions to Africa’s sporadic troubles are less effective than programs accentuating the sustainable use of the continent’s resources. As everybody knows, these resources include enormous hydroelectric potential, vast croplands and rangelands, parks and preserves that span a dozen biomes, astounding biodiversity, and mineral wealth that is almost inconceivable. And, as we should always remember, Africa’s greatest resource is its boundless supply of human capital: endurance, courage, humor, creativity, and love.

Third, and most important, I believe that if we Americans are called to help Africa, then we are called to be servants, not masters. Therefore let us push aside our pride and affirm that Africa’s problems will be solved by the hands, hearts, and brains of Africa’s people. If we are privileged to fight in the campaigns that will achieve these triumphs, then we are very fortunate, and we need to remember our places. I think that many NGOs and national development agencies have different ways of expressing this important truth. I think they use words like

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177 These claims have been asserted to us only by citizens of the DRC. Rwandan students have neither confirmed nor denied them.
indigenization, capacity-building, and empowering of stakeholders. I think that those are great words, I wish I had invented them, and I believe that we should write them upon our hearts.

The second great idol. Towards the beginning of this chapter I wrote that Americans seeking to serve Africa would be confronted by temptations to worship two false gods. Thus far I have described the god that I consider to be the more seductive: the golden image born of our own pride. The other idol is not so sparkly and flirtatious. It does not seek to lure us into its congregation—but rather to bludgeon us with its naked strength into idolatrous worship. I cannot say that Chrissy and I have ever confronted this false god in its full power, but we have seen its evil shadow many times.

Dark shadows can be small or large. For people who care about Africa, it is impossible—and would be unconscionable—to overlook the larger shadows that have been cast across the continent. In Rwanda, 1994, one hundred days witnessed the deaths of 800,000 Tutsi citizens. During the decade following 2003, hell on the plateau of Darfur ended almost 480,000 lives and displaced about 2.8 million people.178 Since 1981, roughly 28 million people have died of AIDS in Sub-Saharan Africa. Between 1995 and 2005, about 3.8 million people were killed by war and domestic terrorism in the Democratic Republic of Congo.179 In 2013, over half of the world’s one million malaria deaths occurred among African children. Today, infant mortality in Somalia still exceeds 10%. Worldwide, the ten countries with the lowest median incomes are African, and the thirty-three countries with the shortest life expectancies are also in Africa. With access to a computer search-engine, you can discover a roll-call of horrors that goes on and on, until the raw numbers anesthetize the mind and heart. Clearly, big shadows are important shadows. Nevertheless, when Chrissy and I contemplate the sorrows of Africa, we think first about intense, close-up tragedies that inscribed their histories in small letters on our hearts. We think about a dear friend’s daughter, burned alive by her desperate husband, just a few clicks from AU. We remember a farmworker, her face scarred by disease, who died in Africa University’s fields. We remember a beautiful young Humanities student, laid in her coffin, propped across pine sawhorses in our parking lot. We recall Tsvingwe’s wasted children of the drought-years, eating ashes to slow the shrinking of their stomachs. Every great tragedy of Africa is constructed of individual stories like these. Each story breaks many hearts, because life on the Continent is so exceedingly cherished. And no calculus of combination can diminish the pain of an intimate loss that bears the name of someone you love. So Chrissy Hope and I have cried many tears.

178 Those are the UN estimates, predictably disputed by the Sudanese government.
179 By contrast, officially, all military combat deaths among U.S. forces (including Colonial and Confederate casualties) from 1775-2014 total 848,163.
OK, True Confession Number 1. The first time I tried to raise money for Africa University, that’s exactly the way I ended my begging-talk, in a small Methodist church in Spartanburg County, South Carolina. **But that’s not the real end of any true Africa-story!**

And True Confession Number 2. Although GR and I are quite familiar with the story of Hananiah, Mishael, and Azaiah, we have too often ignored its Africa-lessons. That is to say, we ourselves have strutted around the veldt as white-American bearers of light, and we ourselves have moaned in helpless despair about Africa-tragedies small and large. Furthermore, we’ll probably commit both of those sins again and again. **But that is not the way we are going to end this book!** This is because, when we wipe the vanity and the tears out of our scientist-eyes, we actually see overwhelming evidence that Africa, raised by African hands, is emerging victorious in this young century. And to convince y’all that we are seeing right, I’m going to let some light shine on the subject. This Light, of course, has been sorted into the Rainbow-spectrum of endurance, courage, humor, creativity, and love.

**Endurance.** Nobody exemplifies endurance better than Nelson Mandela, the liberator, reconciler, statesman, and hero who kept the faith throughout twenty-seven prison-years before he stepped into freedom to become the first post-Apartheid president of South Africa. Furthermore, because y’all endured the ponderously long pachyderm-chapter immediately preceding this one, I should tell you that Mandiba also launched an enduring project that may be the best hope for elephants in southern Africa.

In the dry heat of 5 October, 2001, retired President Mandela opened an unforgettable borderlands ceremony by reflecting on the horror that had struck the United States 24 days earlier. “We have expressed our abhorrence of these acts,” he said, “and would urge the world to take hands in finding lasting peace.” Then, to symbolize such unity, Mandela unlocked a gate in the high fence separating South Africa from Mozambique. Through this gate passed a dusty convoy of enormous trucks. They were carrying elephants, about 50 of them, down-payment on the thousand elephants that South Africa had promised for the repopulation of Parque Nacional Gaza (now renamed P.N. Limpopo). As the photographers snapped their pictures of the convoy, Mandela grinned and added that the elephants were *lobola* for his recent marriage to Graca Machel, widow of Mozambique’s late President Samora Machel.

My A.U. students tell me that, by the mores of southern Africa, very few brides should cost more than thirty cows. But if you read Dr. Machel’s biography, you will agree that Graca is

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180 And oh, I didn’t get much money either: three nights times me and a colleague, six prayers, five hymns → $50.

181 …and Methodist, incidentally.

182 “Mandiba” is Nelson Mandela’s traditional Xhosa clan-name. Stephan Colbert explained for The Washington Post that just about zero percent of Americans can use the name without committing the sin of cultural appropriation, and I admit that I am generally unworthy. But in the particular matter of elephants, I do feel kinship with the great man. And besides, I did once tell a recruiter for the Apartheid South African Defense Force to go f… him.

183 Here’s what Mandela said when he turned over these elephants to the people of Mozambique: “Just like normal *lobola*, we are paying this off in batches and the rest will come later.”
definitely a 1000-elephant gal, sort of like Chrissy Hope or any of her four sisters. Furthermore, Mandela’s elephant transfer obviously represented more than a spectacular lobola: it affirmed a regional commitment to a fantastic conservation dream.

So OK, when I teach Wildlife Management at Africa University, most of my students typically plan to seek their long-term employment in more prosaic and prosperous enterprises—mining, commercial forestry, government service, whatever. But every year one or two brave souls declare their commitment to lifelong vocations as wildlife managers, as conservation biologists. If you did endure my elephant essay, or if you have studied Modernity’s assault on Africa’s natural resources, then you will understand that I fear for these students. Indeed, I sometimes feel almost as I did during the worst days of 1969, when I taught “The Rifle Platoon in the Attack” to young soldiers at Fort Benning, Georgia.

But in southern Africa, alongside the devastation, an enduring game is also afoot. On 9 December, 2002, the Presidents of Mozambique, South Africa, and Zimbabwe signed a treaty to establish the Great Limpopo Transfrontier Peace Park. Today this protected area, 35,000 square kilometers, is more than three times the size of Yellowstone. Heck, the Limpopo Park is bigger than the nation of Burundi, bigger than Equatorial Guinea, bigger than Rwanda! It includes Kruger National Park, P.N. Limpopo, and Zimbabwe’s Gonarezhou. Yeah, I know that, as of this writing, Kruger and P.N. Limpopo are still largely separated by game fences, but 50km of fence are already down. I know that the Sengwe Corridor does not yet fully link Gonarezhou and Kruger, but Zimbabwe’s government is absolutely committed to completing this passageway. I know that the Limpopo Crossing still presents technical problems, but engineers are already modeling solutions. I know that P.N. Limpopo is still underpopulated by large mammals, but all the landmines have been removed, and, even after Mandela’s death, payments of his lobola continue. In other words, the Park really does exist!

Furthermore, as the dream endures, it continues to grow. Increasingly, Zimbabwe encourages cross-border tourist-safaris out of Gonarezhou. Mozambique is integrating P.N.s Banhine and Zinave into the Park project. South Africa continues to remove fences. And, most important, landholders and villagers throughout the general region of the Peace Park are joining with politicians and conservationists to establish the Great Limpopo Transfrontier Conservation Area. This piece of real estate will be really big, elephant-big, 100,000 square kilometers big. And although it cannot (indeed should not) be hands-off protected, considerations of biodiversity will be incorporated in every decision about land-use or development in the area. Indeed, the mission-theme of Great Limpopo Transfrontier Conservation Area will be “the creation of a Biodiversity Economy.”

As y’all surely realize, the nature of such an economy remains poorly defined. Reportedly it will involve enterprises such as wildlife protection, tourism, ecological research, safari hunting, and wildlife commercialization (all sub-topics in my Wildlife Management course) as well as sustainable, low-density pastoralism and agriculture. And y’all, I am praying for a miracle: that “a Biodiversity Economy” will also be constructed upon numerous wild & crazy ideas, as yet un-invented, that will actually work.

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184 That’s bigger than Massachusetts, Vermont, New Hampshire, Connecticut, and Rhode Island put together.
Now folks, I admit that it’s almost un-Methodist to pray for any specific miracle except for world peace and the feeding of hungry children. And yet—as Mandiba tried to tell us, his ignorant white relatives—those two OK-to-Pray Miracles are exactly what a Peace Park / Conservation Area is all about. Furthermore, I can testify to this: one miracle has already occurred. Dreams like the GLTFA have already changed irrevocably the conservation-discourse in southern Africa. Twenty-five years ago, people I interviewed defined National Parks as threatened fortresses whose fenced borders would be eternally patrolled by bas-ass, militarized anti-poaching units. In 2017, by contrast, no sane conservationist in southern African envisions Protected Areas as mere islands within a hostile sea. Today, the new orthodoxy not only recognizes but also affirms the inextricably linked futures of people and wildlife on this Mother Continent. This attitude is not imported; it is fundamentally African. And for this reason I have faith that the dream of the Peace Park can spread across the continent and will endure, like the spirit of Nelson Mandela. For that enduring miracle of Light, TE DEUM LAUDAMUS.

Courage. During 2013 Chrissy and I had a room in the AU Guest House, down at the northwest end of Faculty Row. In these quarters we shared a kitchen/living room with Professor Gilbert Wimbodinga, whom I have mentioned in this book’s “Missionary…” chapter: he’s the hero who defied a bishop, stared down a dozen AK rifles, and attacked the AIDS virus bare-handed. Prof Wimbodinga is a medical doctor, an ob/gyn specialist who completed post-doctoral studies at Johns Hopkins and Tulane Universities. To the AU Faculty of Health Sciences, he was Dean and chief academic officer. To Chrissy and me, he was mostly a friend and a super-fun housemate. Every morning Professor Wimbodinga sang old-time Methodist hymns; he sang in English when things were going smoothly, in French when he was confronting difficult intellectual challenges, in Lingala when times were particularly hard. And in the evenings, night after night, he regaled us with tales—alternatively inspiring, scary, and hilarious—about his early life as a preacher’s kid and then a young physician in central Africa. Professor Wimbodinga took seriously Saint Paul’s admonition to be all things to all people. And sometimes his most important role was to be counsellor, advisor, financier, and surrogate father to needy students from his homeland, the Democratic Republic of Congo. One day this role would require a dimension of stubborn courage that I tried to match—and failed.

On Wednesday, 6 November, 2013, Chrissy and I woke at oh-dark-thirty to a house that was strangely silent. I wandered down the narrow hall to the kitchen, thinking that Professor Wimbodinga had left home super-early, presumably to confront some minor administrative crisis at AU’s Faculty of Health Sciences. But the man was sitting at our shared table, his head in his hands. At a glance I could see that he was almost broken by fatigue and sadness. I think he was in prayer; apparently it was an occasion beyond the healing power of Methodist hymns, even in Lingala. I guess he heard my footsteps; he looked up. “I have been awake all night,” he said; “I have been with a student who suffered an impossible loss.” The details emerged slowly. The student’s father, who survived, was a United Methodist minister in central Congo, and like most Methodist preachers in the DRC, he was dirt-poor. Nevertheless, against odds, the family had managed to send two sons to University. One was our AU student, named Pascal, with whom Prof Wimbodinga had spent the night. The other son was Pascal’s older brother, in his final year
of medical school in Kinshasa. The brother was home for a brief holiday, just months before graduation. Like the other houses in the Congolese village, the Methodist parsonage had no running water. So, on 5 November, the young medical student was helping his mother fill plastic containers at the village water-point. Out of the Tropics’ convective uplift, an afternoon thunderstorm broke suddenly across the sky. Pascal’s mother and brother were killed by a single bolt of lightning.

At 0530 on that November morning in 2013, when Gilbert Wimbodinga did not sing his Methodist hymns, when he told me the story of death in central Congo, my reaction to his horrific news was quintessentially American: I cussed everything I could see from the kitchen window of Africa University Guest House One. Senseless freaking tragedy! Essence of goddam Africa! A mother killed! A doctor lost to a nation racked by disease and pain! The way I saw it, Death had once again staked his irrevocable claim to a continent Joseph Conrad had rightly called “the Heart of Darkness.” Yeah, that’s right. I flat fell down on my knees to worship the second great idol, the ugly one, the one that does not flirt, the one that hammers us into despair and demands our worship of Death, three-score cubits tall.

But Professor Wimbodinga? He’s a mild-mannered Congolese gentleman, but he is as stubborn as any hero from the Sixth Century BCE, as stubborn even as the mighty Jew-boys originally named Hananiah, Mishael, and Azaiah. In other words, that preacher’s kid with the MD does not bow down. Instead, he withstood my tirade, and then he quietly asked whether I might contribute a few dollars towards Pascal’s passage home to the funeral. Still fuming, I peeled off a twenty and slammed it onto the kitchen table. Wimbodinga shut his eyes for a moment. Then he tightened his lips. Thanking me graciously, he picked up the money, and then he was out the door, towards his Faculty, where he trained bright young health workers for the “dark continent.”

And for that courageous miracle of Light, TE DEUM LAUDAMUS.

Humor. Fairfield Children’s Home, across the Nyanga Highway from Africa University, is a worthy institution. It has served eastern Zimbabwe for many years, and although it receives some international support, Fairfield is very, very African. Not surprisingly, American visitors to AU usually make a short pilgrimage across the highway to Fairfield, where they and resident orphans have a fine old time, singing and playing together. Like most African charitable institutions, Fairfield has many needs, and back around 2012, a team of U.S. visitors decided, without local advice, that they had precisely identified the most serious need of all. Fairfield just absolutely had to have milk-goats. Yes, friends, milk goats! And can’t you just see the PowerPoint slides at your church’s Wednesday Night Supper? A little boy is chugging a big glass of super-nutritious goat’s milk; a little girl is smiling as she hugs the neck of a floppy-eared milk-goat! Well, the American visitors generously made arrangements for delivery of such noble animals, one immediately and others at intervals over the next several months. (Donors need to think about sustainability, right? You can’t just buy one goat and go home, right?) Indubitably, milk-goats are marvelous animals under proper husbandry regimes. However, any goat in eastern Zimbabwe is a worm-magnet, and without regular veterinary care its system will
be feeding a great squirming community of entirely selfish endoparasites. Furthermore, high-dollar milk-goats are not adept at foraging on their own; rather, centuries of selective breeding have engineered the animals to produce oceans of milk when sustained by a giga-ton diet of Purina Noble Goat Dairy Parlor 16©. Unfortunately, Fairfield operates on a tight budget; every penny of income goes to specific, vital needs; heck, sometimes Fairfield employees work for months without pay so that the orphaned children can be properly cared for. In other words, there were no extra dollars for goat-husbandry, and the well-intentioned gift was a waste.

Now listen, folks, when I heard the milk-goat story, I reacted just like every other American who considers himself/herself sophisticated beyond the junk-for-Jesus ignorance of would-be missionaries who walk around the Continent with their brains stored where the African sun never shines. “What reprehensible stupidity,” I thought. But that was NOT the attitude of Fairfield’s African personnel. As far as I have been able to ascertain, every African heart overflowed with gratitude for those darn goats. And, years later, in repeated tellings of the story, every African voice inevitably explodes with laughter. Thus the gift was wonderful, beyond anything that O. Henry could invent, and the humor has sustained Fairfield Children’s Home in sacred ways that no purely secular donation could ever approximate. And for that humorous miracle of Light, TE DEUM LAUDAMUS.

Creativity. I would argue that creativity is the central wavelength within the spectrum of African Light. I recognize this, even though I am definitely not a creative person. (If I were, Hollywood might be producing African Light: the Major Motion Picture.) Furthermore, I strongly believe that I also know where we should look for creativity. Talmudic tradition tells us that wholeness is to be found among the lepers, and everybody knows that the darkest shadows can indicate the brightest light. Therefore, I intend to point out Africa’s creativity in the darkness where this book began: Ebola Virus Disease. Creativity, of course, does not appear on command, like a genie out of a magic bottle. And the African creativity that will whip Ebola will not spring at some future time from the mind of a single genius. Rather, it is already appearing, in a hundred places as different as genetics labs, field latrines, village churches, city hospitals, funeral homes, mathematics classrooms, and even halls of government. The creativity that will triumph over Ebola is not one idea but a thousand—tiny ideas, simple ideas, why-didn’t-I-think-of-that ideas—ideas conceived under

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185 I’m a Purina fan, but I presume that other commercial dairy-goat feeds would serve equally well. Also, milk goats can prosper on a graze/browse diet if their pasture is sufficiently rich, but the Fairfield area is not. The point is that, contrary to popular belief, goats actually require a more nutritious diet than other ruminant artiodactyls. And every day you need to feed every lactating doe at least 3%-5% of her body weight in high quality food (measured dry). Nobody among Fairfield’s American goat-donors bothered to ascertain these simple facts.

186 Characteristically, Fairfield’s staff also profited in a tangible, secular way from the American Magi’s gift. Eventually, an itinerant Nigerian butcher was lured to the Children’s Home, where he acquired the small herd of emaciated, non-productive milk-goats at a scrupulously negotiated price. The money, of course, was well spent, so everybody ended up happy—except, alas, for the milk-goats themselves.

187 See the Babylonian Talmud, Tractate Sanhedrin, Folio 98a.
African stars, incubated in African sunshine, combined by African intellects, and transformed around African cook-fires or during African PowerPoint presentations. Here I shall list some creative syntheses of ideas that are currently crystallizing among Africans.188

First, we’ll beat the next Ebola epidemic because we beat the last one. And we’ll beat the next one with far fewer casualties because we learned a lot! Here is the most important lesson. Mobilized villages are the key to early diagnosis, and early diagnosis is the key to victory. If well-informed villagers will tell us who is sick, modern diagnostic techniques can determine who actually has Ebola, and we can shortstop contagion. But willing cooperation is crucial—and we didn’t get enough of it in 2014-15 because we screwed up. We entered villages in full emergency mode, dressed like StarWars storm troopers. Our explanations about diagnosis, contagion, and treatment were impatient and perfunctory. We snatched the bodies; then we hauled away the sick, and half of them were never seen again. So, it is hardly surprising that village-cooperation was not enthusiastic. Of course the protection suits really are necessary, but this can be explained in mosques, churches, and schools again and again, year after year, starting today, before the next epidemic begins. And however we dress, we must be careful not to act like storm troopers. Of course the haste was vital, but in Africa, when you outrun the norms of courtesy, you generally slow yourself down. In this regard, medically safe funeral procedures must also be respectful; fortunately, epidemiologists, teachers, and theologians are already working on this challenge. Finally, here’s a villagers’ idea that we must put into effect. Treatment centers need safe residences where a village’s trusted representatives189 can live and verify information about the treatment and prognosis of Ebola patients. These leaders should be paid, if necessary, and they must be members of cell-phone networks connected to key personnel in their home villages. As I explained in Chapter 1, these networks don’t need to be established because they already exist, and public-health services in every African country are currently inventing ways to interface with them.

Second, we’ll beat the next Ebola epidemic before it arrives. The pre-emptive war has already begun. Dozens of international and intra-African programs are rebuilding and extending the capacities of public health services. African social scientists are evaluating the success of anti-HIV programs, determining which strategies can be adapted for outbreak-catastrophes. During 2014-15, we learned that African health-care workers operated much more effectively at the village level than Euro-American types. However, visa-restrictions impeded cross-border movement of indigenous workers for training or for medical treatment.190 Legal protocols are

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188 I am using the term “African” in two senses. First, I mean residents of Africa, who are in fact synthesizing the most important ideas. Second, I mean “African” in the sense that the creative-intellectual capacity of *Homo sapiens* evolved in Africa. In that sense, all creativity is essentially African. That’s why, when I write about Africa’s assault on Ebola, I am using the pronoun we the way I promised at this chapter’s beginning: to include my friends on the African continent, plus another billion Africa-residents whom I don’t know, plus myself, plus every one of you all.

189 These representatives might be elected, traditional, or both.

190 During the 2014-15 epidemic, several NGOs relied heavily on European workers because they could move more freely in some African countries than Africans and because, if necessary, they could be quickly evacuated across national borders to US or European hospitals. Humanitarian
being established right now to preclude these problems; heck, political activists are even learning whom to bribe if worse comes to worst.

Also, medical creativity is hard at work. Ebola 2014-15 hammered home two lessons about how to fight a virus. 1. We must emphasize early detection. Therefore, when we source money to support African grad students and post-doc scientists, we’ll privilege research on networks, communication, community organization, and distance-diagnosis. 2. We know there will be no medical magic-bullet solution. Therefore, on the drug-front, we’ll emphasize multiple approaches to both treatment and prevention.

We will definitely be able to treat Ebola patients more effectively. Several antiviral drugs have already undergone preliminary tests. Also, administered early, serum from recovered Ebola patients—thousands are eager to donate blood—might jumpstart immune systems. These various chemotherapeutic treatments will be refined throughout the medical crisis. And they will be augmented by better supportive care, based on the lessons we learned in 2014-15. In the mobilized, well-informed villages that we envision, people will be more likely to seek early medical treatment if medical treatment is effective. And clearly, treatment begun early is more likely to work. In other words, treatment-success and detection-efficiency will be linked in a positive-feedback circle.

Some of the most creative Ebola-work is associated with the development of preventative vaccines. A search of the Internet will update you on the latest ideas, or if you are prejudiced towards peer-reviewed scientific journals, you could begin by reading articles in Nature, Numbers 7522, 7541, 7543, 7559, and 7563. Anyhow here is what Africa’s vaccine experts are saying. For decades we’ve waged war against HIV; we’ve sharpened our techniques, and slow-mutating Ebola should be a pushover by comparison. We already have an arsenal of mammalian promoters that could drive genetic expression of both cellular and humoral immune-responses, given appropriate Ebola antigens. We have already identified protein-fragments that should serve as relevant antigens. We are currently exploring multiple possible antigen-plus-promoter delivery vehicles as well as adjuvants to accelerate vaccine effectiveness. We have already conducted preliminary safety-studies on several of these platforms, and we are investigating considerations aside, during an epidemic you can’t afford to lose your health-care workers to the disease they are attempting to control. When they become sick, they must be treated as well as possible, as fast as possible, wherever necessary, to get them back into the fight!

191 These studies are way beyond my realm of expertise, but I do know that Favipiravir, Ribavirin, and Brincidofovir have been investigated with initially encouraging results. 192 Researchers disagree about the effectiveness of this therapy. Some virologists say that serum from recovered patients will have no positive treatment-effects. Other scientists are convinced that “plasmapheresis” merits further investigation, and in one mini-study (in D. R. Congo, 1995) 8 Ebola patients received serum collected during the 1976 outbreak: 7 of these people recovered. 193 Ebola virus is definitely variable, but it is not hypervariable, like HIV or the flu. So, at least in principle, an effective vaccine can be developed. I think that at least 13 candidate-vaccines have been under exploration. Of these the most promising may involve the attachment of a segment of an Ebola glycoprotein to a weakened but replication-competent vesicular stomatitis virus. (Vesicular stomatitis virus, VSV, infects a wide variety of animals. It is a member of the family Rhabdoviiridae, which also includes Rabies, to which VSV is closely related.)
production-techniques that would allow us to build and package millions of doses in a minimal amount of time, post-outbreak. We have sourced research funding from agencies within Africa as well as in Europe, the USA, Australia, and China. Finally, if the R&D money for Ebola begins to run short, we’ll still have a Post-9/11 card to play. Although Lassa Fever Virus (LFV) is a member of the family Arenaviridae, extensive research suggests that immunogen delivery systems suitable for LFV will also work for Ebola. Lassa hemorrhagic fever is not uncommon in Africa. Furthermore, the American military has speculated that LFV is a scary candidate for weaponization. This gives us an excuse to raise the ugly specter of bioterrorism, which could generate a pile of money for vaccine-research. And I bet that African creativity might find a way to repurpose some Lassa-dollars into the fight against Ebola.

I have chosen to illustrate African creativity in the medical world, but I could have done the same with agriculture or conservation. Chrissy could have done it with rural development. Friends and AU colleagues could have illustrated creativity with theology or finance or engineering or transportation or business administration or any of a hundred other enterprises on the African continent. You see, Homo sapiens, Africa’s best gift to the world, has evolved to be so smart. So damned creative-smart! And for all our species’ creative miracles of Light, TE DEUM LAUDAMUS.

Love. As y’all readers have surely detected, this whole book has been, for GR and me, a campfire-tale about the invincible action of love in Africa. And, in our best white-boy-African style, we are going to leave the love-story unfinished because we believe that the story can continue around the campfires where you—where we—listen for rainbows and warm our hearts. For that miracle of Light, and of Love, TE DEUM LAUDAMUS.

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Since 1992, to support our through-a-glass-darkly vision of African Light, Chrissy Hope and I have funneled spare time and disposable incomes into AU’s Ag Faculty. For our small

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194 Ebola virus, you may recall, is a member of the Filoviridae.
195 I’m mostly teasing about scaring the Department of Defense with LFV, but I do not mean to trivialize the issue of bioterrorism. And I certainly do not intend to trivialize the threat of Lassa Fever Virus! The disease probably attacks about 300,000 Africans every year. Most cases are non-symptomatic, but about 3,000-5,000 victims die. So a vaccine for LFV is in itself an entirely worthy goal.
contributions we have been richly repaid—in friendship, lodging, pythons, and unceasing amusement. Maybe someday we’ll have the funds and the permits and the health we need to do it all again. Or maybe we won’t; such mysteries are never revealed too far in advance. Because our returns are always uncertain, every time Chrissy and I leave Old Mutare, we look at the hills and the dust roads and the farm kids to cement in our minds pictures of our second home, in case we cannot come back. Then we cram field equipment into our check-bag—never pack your snake-stick until the very last minute!—and hope AU’s Transport Department will give us a free ride cross-country to the airport in Harare. In leaving I also think about my daddy (1915-2004), who loved Africa as much as I do, though he was never able to set foot on the continent.
EPILOGUE: THINGS CARRIED

Memory, from six decades ago: My father was an airline pilot. In describing this employment he always said that flying an airplane was merely his job-skill—and that his real vocation was to make the world smaller for people separated by excessive distance. Because he did not like to be preachy, he typically expressed this message indirectly, through conversations ostensibly about weather and airspeeds and compass directions. I have forgotten most of those mini-sermons, but I shall always carry the memory of what my daddy told me on one August afternoon, in, I believe, 1954.

We are standing in the surf off Isle of Palms, South Carolina. My father is holding an old Army air mattress that we have used as a float. Daddy’s bathing suit is tan; mine is green. A column of brown pelicans is flying southwest, parallel to the shore. They glide within centimeters of the wavetops. My father has explained to me about wing-length and ground-effect, so I understand the instinctive wisdom of pelicans. Behind us, on the shore, my mother stands with her parents. I do not look to the shore; I am afraid that my mother will indicate that it is time to leave. Big Ab smiles. I know that people cannot read thoughts, but I am his only child, so perhaps he almost can. He points across the Atlantic; I think he is happy and sad at the same time. “If you go that way,” he says, “due east, what will be the first land you hit?”

Little Ab: “I don’t know. Ireland or Spain or something; I think they say that in school.”

Big Ab: “No. If you go straight east from Charleston, you will come to Africa. And I want you to remember that because someday Africa and South Carolina will not be far apart.”

Memory, from the end of a recent AU semester. I am standing at an Ag School whiteboard in Old Mutare, Zimbabwe. It is my last Wildlife Management class, and I am rushing through the natural history of large African carnivores, brushing aside all student questions and trying to finish up before an impatient Ag-Econ teacher comes to toss me out of Classroom F21. But when I mention the unpopularity of spotted hyenas in Zimbabwe, two hands shoot up, and two students refuse to be ignored. I call first on a young woman from the Lowveldt, who has grown up in a world where baobabs paint moon-shadows across hard sands. “Sir,” she says, “hyenas are unloved because people associate them with witchcraft.” This is instantly disputed by the son of a high-ranking Army officer. “No way, sir; hyenas are disliked because they are the villains in that Lion King movie.”

My father would have loved those two student comments because, taken together, they comprise a testimony to the creation of a smaller world, a closer world, which was his life’s vocation. And therefore, for Daddy’s sake and mine, I have held onto both explanations and have toted their memory across the Atlantic.
The entire trip, from Africa University to Chris’ and my house in North Charleston, takes only about forty hours. For most folks who crossed from the African continent to America, the journey was unimaginably longer. But my father was certainly right, and nowadays Africa is not far away, so Chrissy and I have been able to make the crossing again and again.

My good friend, the most excellent Dr. GR Davis, has demanded that in our book’s final chapter I should summarize all this to-ing and fro-ing, all Chris’ and my ten semesters in Neighbor-Africa. But I do not know how to do this, except by saying that every time we cross the Atlantic, we are leaving home and going home. The hills around Old Mutare, the creatures that inhabit them, the laughter and songs that echo through them: all are precious to us. But the Spanish moss and palmettos of South Carolina, the life-sustaining wheat fields of Chrissy’s ancestral West Kansas: nowadays they whisper of sadness and joy that, at our life-stage, will not wait forever. So as every Africa-semester ends, we absolutely believe that we should go, and as departure-time approaches I typically ask myself, what will I leave behind in Zimbabwe? The list is usually extensive: Friends. Painted reed-frogs. Worn-out boots. Students whom I helped, students whom I failed. Some laboratory equipment. Radio transmitters, implanted in pythons. An Ag Dean who needs more teachers than the University can afford to pay. Some years a broken tooth; some years an annotated statistics text. Always some tears and some curses. Usually a half-eaten box of Willards Cornflakes.

The list of things that I’ll carry across the Wide River will also be on my mind. A “Stump Ripper” snake-stick. A blue passport. The last knife my parents gave me. A battered camera and an SD card of photographs. A soapstone nativity set I didn’t want to buy: some unfortunate preacher will get it for Christmas. Field notes. Left-handed needle-holders for implant surgery. Frog books, bird books. A laptop. Reverberations of Fanny J. Crosby hymns—too damn many for a leftwing Methodist like me. Presents from colleagues and students. Memories.

My two most important blessings that will accompany me from my home to my home—well, they belong to a different Order of Creation. Foremost is my best friend Chrissy, who can make any land my home (uh, though New Haven Connecticut was a stretch). Second, just like y’all readers, I carry a shared genetic heritage. Of course I realize that some people talk a lot about race, and I admit that there may be some utility in that kind of language. But to an evolutionary biologist, we are all essentially African. Our species was born on the Bright Continent. On African landscapes the eyes, brains, fingers, and upright posture of our ancestors established the evolutionary trajectory that led to all of us. Every human emotion—fear, courage, bitterness, humor, envy, hate, love—was first experienced under African skies. Under African stars, people first dreamed of visiting other worlds, and 100,000 years ago, driven by that quintessentially African dream, some of ‘em crossed desert, sea, and icecap to claim an entire planet for Mother-Africa—and eventually to plant African footprints on the moon.

And so, when Dr. Chris Hope and I leave Africa, we shall also be going home to Africa. By grace this is easy to remember in Charleston, South Carolina, where, as every educated person knows, the Ashley and Cooper Rivers add their strength to the Congo and the Kwanza to form the narrow Atlantic Ocean. *TE DEUM LAUDAMUS.*