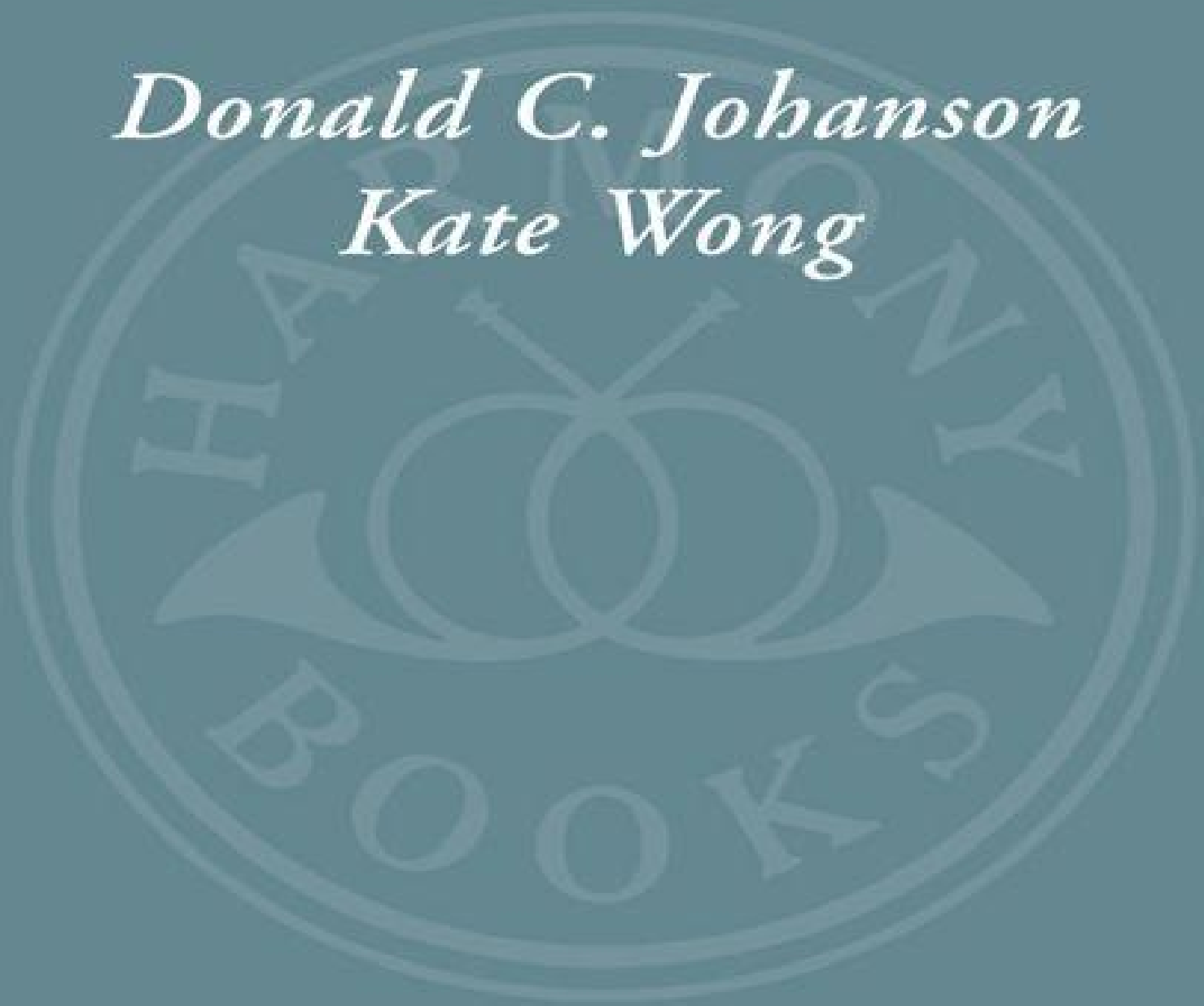


LUCY'S LEGACY

The Quest for Human Origins

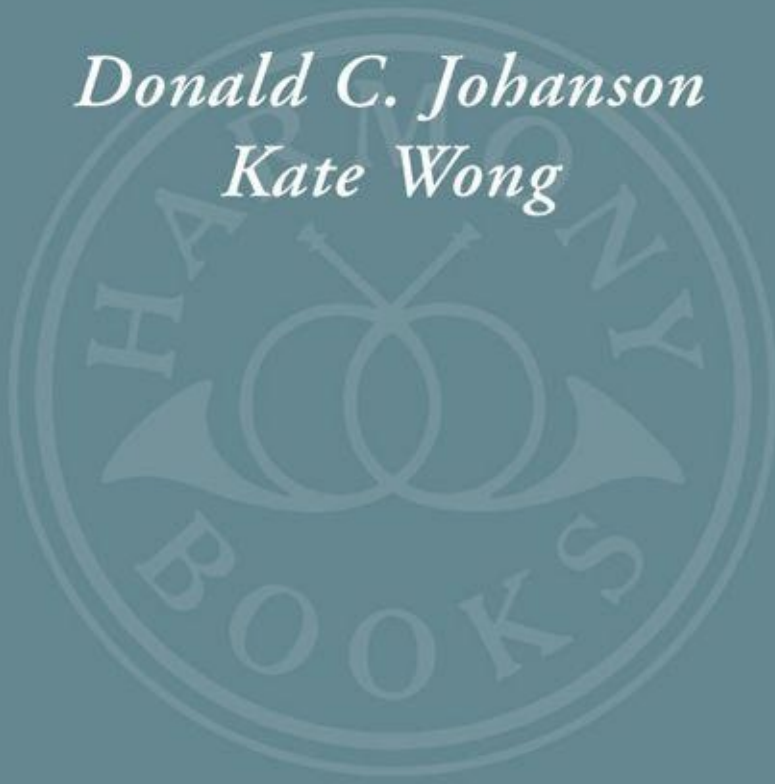
Donald C. Johanson
Kate Wong



LUCY'S LEGACY

The Quest for Human Origins

Donald C. Johanson
Kate Wong



Also by Donald C. Johanson

The Skull of Australopithecus afarensis
(with William Kimbel and Yoel Rak)

Ecce Homo: Scritti in onore dell'uomo del terzo millennio
(with Giancarlo Ligabue)

From Lucy to Language (with Blake Edgar)

Ancestors: In Search of Human Origins
(with Lenora Johanson and Blake Edgar)

Journey from the Dawn: Life with the World's First Family
(with Kevin O'Farrell)

Blueprints: Solving the Mystery of Evolution
(with Maitland Edey)

Lucy's Child: The Discovery of a Human Ancestor
(with James Shreeve)

Lucy: The Beginnings of Humankind (with Maitland Edey)

LUCY'S LEGACY

The Quest for Human Origins



Donald C. Johanson

Kate Wong



HARMONY BOOKS / NEW YORK

To my late mentor Paul Leser,
for precious understanding and
enduring inspiration.
—*D.C.J.*

To my parents, Ann and C.C.,
for their unflagging support.
—*K.W.*

Contents

[KEY HOMINID SITES](#)

PART 1 / [Lucy](#)

CHAPTER 1 / [The Woman Who Shook Up Man's Family Tree](#)

CHAPTER 2 / [Unfinished Business](#)

CHAPTER 3 / [Rocky Beginnings](#)

CHAPTER 4 / [Pay Dirt](#)

CHAPTER 5 / [Several Successful Field Seasons](#)

CHAPTER 6 / [Getting to Know Lucy Better](#)

CHAPTER 7 / [Lucy's World](#)

CHAPTER 8 / [Growing Up Australopithecine](#)

PART 2 / [Lucy's Ancestors](#)

CHAPTER 9 / [The Dawn of Humankind](#)

CHAPTER 10 / [The First Australopithecines](#)

PART 3 / [Lucy's Descendants](#)

CHAPTER 11 / [Ecce Homo](#)

CHAPTER 12 / [Leaving the Motherland](#)

CHAPTER 13 / [The Hobbits of Flores](#)

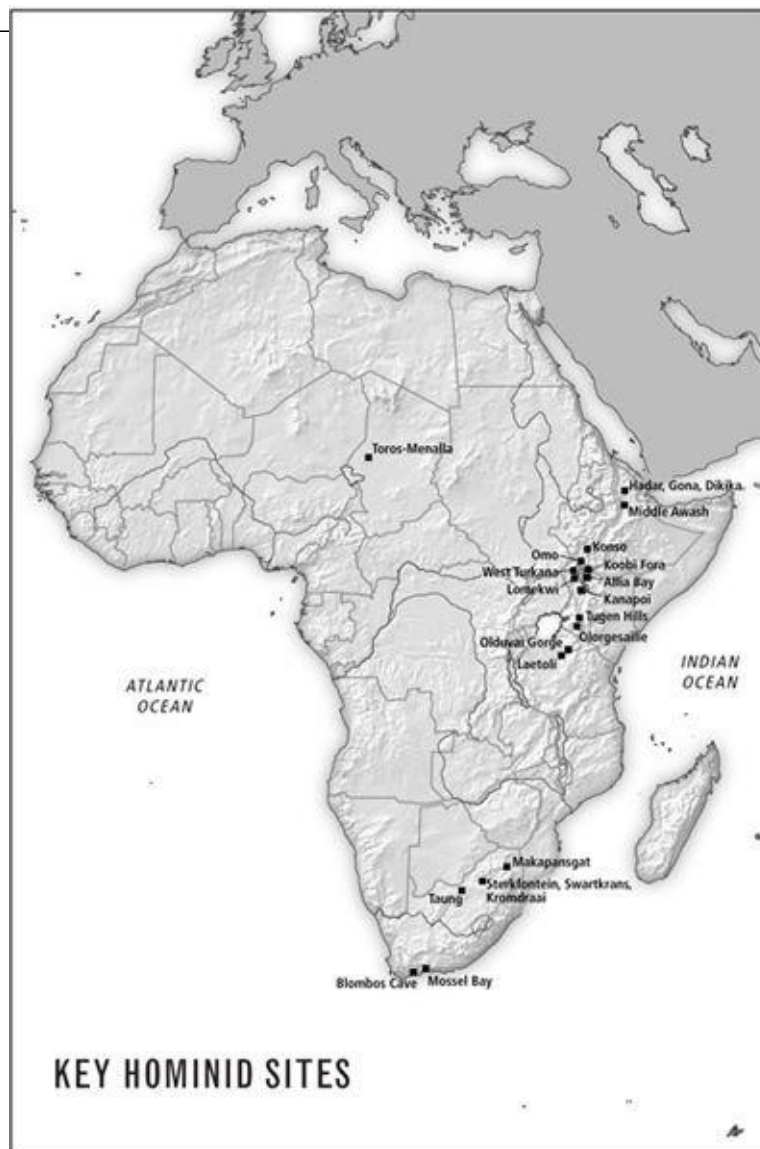
CHAPTER 14 / [The Neandertals](#)

CHAPTER 15 / [The Rise of *Homo sapiens*](#)

EPILOGUE / Unsolved Mysteries

[SELECTED REFERENCES](#)

[ACKNOWLEDGMENTS](#)



The Woman Who Shook Up Man's Family Tree

Never in my wildest fantasies did I imagine that I would discover a fossil as earthshaking as Lucy. When I was a teenager, I dreamed of traveling to Africa and finding a “missing link.” Lucy and more: a 3.2-million-year-old skeleton who has become the spokeswoman for human evolution. She is perhaps the best known and most studied fossil hominid of the twentieth century, the benchmark by which other discoveries of human ancestors are judged.

Whenever I tell the story, I am instantly transported back to the thrilling moment when I first saw her thirty-four years ago on the sandy slopes of Hadar in Ethiopia's Afar region. I can feel the searing noonday sun beating down on my shoulders, the beads of sweat on my forehead, the dryness of my mouth—and then the shock of seeing a small fragment of bone lying inconspicuously on the ground. Most dedicated fossil hunters spend the majority of their lives in the field without finding anything remarkable, and there I was, a thirty-one-year-old newly minted Ph.D., staring at my childhood dream at my feet.

Sunday, November 24, 1974, began, as it usually does for me in the field, at dawn. I had slept well in my tent, with the glittering stars visible through the small screen that kept out the mosquitoes, and as sunrise announced a brilliant new day, I got up and went to the dining tent for a cup of thick, black Ethiopian coffee. Listening to the morning sounds of camp life, I planned with some disinclination the day's activities: catching up on correspondence, fossil cataloging, and a million other tasks that had been set aside to accommodate a visit from anthropologists Richard and Mary Leakey. I looked up and Tom Gray, my grad student, appeared.

“I'm plotting the fossil localities on the Hadar map,” he said. “Can you show me Afar Locality 162 where the pig skull was found last year?”

“I have a ton of paperwork and am not sure I want to leave camp today.”

“Can you do the paperwork later?”

“Even if I start it now I'll be doing it later,” I grumbled. But something inside—a gut sense that I had learned to heed—said I should put the paperwork aside and head to the outcrops with Tom.

A couple of geologists joined us in one of our old, dilapidated Land Rovers, and in a cloud of dust we headed out to the field. I sat in the passenger seat enjoying the passing landscape peppered with animal fossils. Flocks of quacking guinea fowl ran for cover, and a giant warthog, annoyed by our intrusion, hurried off, its tail straight up in the air. Unlike many mammals that had been hunted to extinction in the area, the Hadar warthogs were left alone by the Afar locals, whose Islamic faith forbade eating pork. Tom put the Land Rover through its paces, and as we picked up speed in the sandy washes, my mind switched gears into fossil-finding mode. After we dropped off the geologists who needed to inspect a troublesome geological fault that had disturbed the sedimentary layers near Locality 162, Tom and I threaded our way along smaller and smaller gullies.

“Somewhere around here,” I said. “Pull over.” Then I laughed as it occurred to me that in the remote desert you don't have to pull over, you just stop driving. We got out and spent a few minutes locating the cairn that had been left to mark the pig skull's locality, a little plateau of clay and silt sediments bordered by harder layers of sandstone. A year earlier, a geologist had been out on a mapping mission and the plateau was obvious on the aerial photographs we had toted along; otherwise we might have overlooked it. After carefully piercing a pinhole into the aerial photo to mark the spot and labeling it “162” on the reverse side, we lingered. I was reluctant to return to camp and n

paperwork. Even though the area was known to be fossil poor, we decided to look around while we were there. But after two hours of hunting all we had to show were some unremarkable fossil antelope and horse teeth, a bit of a pig skull, and a fragment of monkey jaw.

"I've had it. When do we head back?" Tom said.

"Right now." With my gaze still glued to the ground, I cut across the midportion of the plateau toward the Land Rover. Then a glint caught my eye, and when I turned my head I saw a two-inch-long light brownish gray fossil fragment shaped like a wrench, which my knowledge of osteology told me instantly was part of an elbow. I knelt and picked it up for closer inspection. As I examined it, an image clicked into my brain and a subconscious template announced hominid. (The term *hominid* is used throughout this book to refer to the group of creatures in the human lineage since they diverged from a common ancestor to the African apes. Some other scholars employ the word *hominin* in its place.) The only other thing it could have been was monkey, but it lacked the telltale flare on the back that characterizes monkey elbows. Without a doubt, this was the elbow end of a hominid ulna, the larger of the two bones in the forearm. Raising my eyes, I scanned the immediate surroundings and spotted other bone fragments of similar color—a piece of thighbone, rib fragments, segments of the backbone, and, most important, a shard of skull vault.

"Tom, look!" I showed him the ulna, then pointed at the fragments. Like me, he dropped to a crouch. With his jaw hanging open, he picked up a chunk of mandible that he wordlessly held out for me to see. "Hominid!" I gushed. "All hominid!" Our excitement mounted as we examined every splinter of bone. "I don't believe this! Do you believe this?" we shouted over and over. Drenched in sweat, we hugged each other and whooped like madmen.

"I'm going to bring the ulna to camp," I said. "We'll come back for the others." I wanted to mark the exact location of each bone fragment scattered on the landscape, but there were too many pieces and time was short.

"Good idea. Don't lose it," Tom joked, as I carefully wrapped the ulna in my bandanna. I decided to take a fragment of lower jaw, too, for good measure. I marked the exact spots where the bones had lain, scribbled a few words in my field notebook, and then got back into the Land Rover.

The two geologists relaxing in the shade of a small acacia tree looked relieved when we drove up to rescue them from the stultifying heat. As they stood and greeted us, they could tell from our grins that we'd found something.

"Feast your eyes!" I said, and opened the bandanna. I held the ulna next to my elbow. Being geologists, they didn't know a lot about bones, but they understood the importance of the find. Back into the bandanna the bones went, and then into my khaki hat for the trip to camp in the safety of my lap. Thirty minutes later Tom announced our arrival by honking the horn, and as we pulled to a stop our inquisitive teammates surrounded the car.

I jumped out of the Land Rover and everyone followed me to the work area, where a large tent flaps protected our plywood worktables. Still in a state of semidisbelief, I sat and unpacked the precious remains. Reassured that they were in fact real, I sighed with relief. Everyone leaned over to see the tiny fragments of arm and jaw. The questions came fast and furious. Is there more? Where'd you find it? How did you find it? And then there was a stunned silence as the import of what we'd found sunk in. It hit me that if I had walked just a few more paces and looked to my left rather than my right, the bones would still be there on the slope. And in the ever-changing landscape of the Afar, a single desert thunderstorm could have washed them off the plateau, over a cliff and into oblivion, forever.

Suddenly someone slapped me on the back and exhilaration replaced awe. We all started talking at once, and we had to keep raising our voices to be heard so that eventually no one could hear what anyone else was saying. A hurried lunch followed and then everyone wanted to see the spot where I had found the ulna. At the locality my colleagues stood back as I carefully pointed to the bones.

fragments on the slope. Immediately my team understood that what they were looking at was a partial hominid skeleton. It was a special moment for all of us, though I don't think any of us truly realized how special at the time.

We celebrated the discovery with a delicious dinner of roasted goat and panfried potatoes washed down with a case of Bati beer my students had somehow managed to smuggle into camp. Conversation became less animated and more technical, focusing on morphology and size. I felt from the beginning that the fossils belonged to a single individual because there was no duplication of parts in the remains we collected; the pieces all had the same proportions and exhibited the same fossilization color. I further argued that the skeleton was a female specimen of *Australopithecus*— a primitive human forebear— because of the small size of the bones relative to those of other australopithecines. Australopithecines were sexually dimorphic, which is to say males and females exhibited physical differences beyond those pertaining to the sex organs. So if the lightly built ulna we discovered were from a male, then a female would have to be unbelievably tiny.

While we were all talking, *Sgt. Pepper's Lonely Hearts Club Band* was playing on a small Sony tape deck. When “Lucy in the Sky with Diamonds” came on, my girlfriend Pamela Alderman, who had come to spend some time in the field with me, said, “Why don't you call her Lucy?” I smiled politely at the suggestion, but I didn't like it because I thought it was frivolous to refer to such an important find simply as Lucy. Nicknaming hominid fossils was not unheard of, however. Mary and Louis Leakey, giants in the field of paleoanthropology, dubbed a flattened hominid skull found in Tanzania's Olduvai Gorge “Twiggy,” and a specimen their son Jonathan found received the moniker “Jonny Child.” But most of the scientists I knew wouldn't give their fossils a cute name based on a song by the Beatles. The next morning, however, everyone wanted to know if we were going to the Lucy site. Someone asked how tall Lucy was. Another inquired how old I thought Lucy was when she died. As I sat there eating my breakfast of peanut butter and jelly on toast, I conceded that the name Lucy had a better ring to it than A.L. 288, the locality number that had been assigned to the site.

At my request, the government representative from the Antiquities Administration who had escorted our expedition sent word to the director general of the Ministry of Culture, Bekele Negussie. He arrived a few days later with some of his colleagues. While I answered their questions, I resisted referring to our australopithecine as Lucy because I was uncomfortable about an Ethiopian fossil bearing an English name. When the team returned that afternoon from the site bursting with news of more Lucy fragments, additional information about Lucy, endless speculations about Lucy, my discomfort grew. After dinner Bekele and I sat outside the dining tent looking up at a brilliant starry sky. I talked about the implications of the discovery, how it might impact prevailing theories about hominid evolution. And we discussed arrangements for a press announcement in Addis Ababa in December.

He listened in silence, then regarded me very seriously and said, “You know, she is an Ethiopian. She needs an Ethiopian name.”

“Yes!” I agreed, relieved. “What do you suggest?”

“Dinkinesh is the perfect name for her.”

I mentally inventoried my Amharic vocabulary, which was just enough to shop for basics, greet people, ask directions, and, most important, order a cup of the best coffee in the world. The word *Dinkinesh* wasn't there. “What does it mean?”

With a broad smile, as if he were naming his own child, he answered, “Dinkinesh means ‘you are marvelous.’”

He was right, it was the perfect name. Of course, today most of the world, including nearly every Ethiopian I have spoken to, calls her Lucy. And Lucy is the name that has appeared in crossword puzzles, on *Jeopardy!*, in cartoons, and on African Red Bush Tazo tea bags. In Ethiopia she has led

her name to numerous coffee shops, a rock band, a typing school, a fruit juice bar, and a political magazine. There is even an annual Lucy Cup soccer competition in Addis Ababa. Once, while driving through the town of Kombolcha on the way back to Addis after a field season, years after the discovery, I spotted a small sign that said LUSSY BAR. I brought the car to a screeching halt and my colleagues and I went in to have a beer. When we asked the proprietress how the place got its name, she explained in a solemn voice that many years ago a young American found a skeleton named Lucy in the Afar region, and that she took great pride in naming her bar after the fossil that proved Ethiopia's status as the original homeland to all people. With a grin, I told her I was the American who had found Lucy. She shrieked in delight and insisted that we have our picture taken together to mount on the wall. I sent the photo to her, and for all I know, it hangs there still. But sometimes I still think of Lucy as Dinkinesh, because she truly is marvelous.

At the end of the 1974 field season, Lucy, painstakingly wrapped and packed in a cardboard box, made the day-and-a-half journey from Hadar to the National Museum of Ethiopia in Addis Ababa. Lucy was expected, and when my colleagues and I pulled up to the museum in my Land Rover, the director, Mamo Tessema, and his curatorial staff greeted us warmly. The cardboard box, a temporary home for Lucy, was whisked off and locked in a carefully guarded room.

Over the next few days I worked with Woldesenbet, the no-nonsense collections manager, to officially tally every fragment and formally catalog Lucy as part of the National Museum of Ethiopia's collections. The entire Ministry of Culture was abuzz with the news that she was now in Addis Ababa, and Bekele and the minister made preparations for her official coming-out party, a public announcement at the ministry. A throng of scientists, antiquities people, ministry officials, university faculty, and journalists jammed the room that had been specially prepared by the minister. Resplendent on a black cloth, Lucy was an instant hit. Everyone in the room jostled to catch a glimpse of her bones.

The press conference was intense, and Bekele had to finally call a stop to the questions. Thirty million two hundred thousand years after her death her image would grace the front page of newspapers all over the world. Not exactly an overnight success, I thought. In a way, we had both arrived, Lucy and I. Her path to that press conference was quite different from mine, to be sure. But the reason we were there together was because we had met in the right place at the right time.

My own path could be characterized as a combination of hard work, perseverance, and more than a few lucky breaks. My first opportunity to travel to Africa had come four years earlier, in 1970, when one of my professors at the University of Chicago, F. Clark Howell, invited me to work as an assistant on his expedition to the Omo area in extreme southwestern Ethiopia, where he was looking for hominids. This was the chance I had been dreaming of ever since I had read as a kid the *National Geographic* articles describing the Leakeys' finds at Olduvai Gorge. I was utterly mesmerized by the fascinating fieldwork and the photos of Africa. But when I stepped out of the light plane at the Omo airstrip I was astounded by the brutal heat as I staggered to the waiting Land Rover. Soon I suffered an attack of malaria that could have quickly terminated my career as a field scientist, but eventually became acclimated to the rigors of working in Africa. During my first expedition, the weeks passed swiftly as I grew more and more comfortable in the field and learned many of the skills necessary to conduct fieldwork. After three months I was hooked, and I knew that Africa would forever be a part of my life.

In the summer of 1971 I returned to the Omo and was given greater responsibility in running the

camp alongside Gerry Eck, our camp manager extraordinaire. More than anything in the world I wanted an expedition of my own someday, and I knew that all the work I was doing on the Omo Research Expedition was the best preparation I could ever have.

In the fall of 1971 I spent several weeks in Europe gathering data for my doctoral dissertation. I was studying variation in chimpanzee teeth, which could inform assessments of similar variation in early hominids. My time working in Paris proved to be the most memorable and rewarding of my young career, for many reasons. From my experience in the Omo I knew several members of the French contingent, who looked after me in Paris. One evening I attended a dinner party where I met a young Tunisian-born French geologist named Maurice Taieb, a gregarious, handsome, and heavily tanned man with a highly animated personality. As he sipped a glass of red wine and took deep drags off one Gauloise after another, he regaled me with stories of his fieldwork in the Afar Triangle. The Afar Triangle, Africa's most northern reach of the Great Rift Valley, is a geologist's dream because it is where three tectonic rifting systems intersect and buckle the landscape. It is the ideal place to study the process of continental drift. Maurice wanted to survey the area in hopes of piecing together its geological history. He called it "a geological and paleoanthropological paradise" and explained that it contained great expanses of sediments eroded by wind and water that were literally oozing fossils. Full of enthusiasm, he invited me to visit his lab the next day to see his photographs and maps of the place.

I stood in Maurice's lab electrified by his pictures of entire elephant skulls, pig jaws, antelope bones, crocodile skulls— complete specimens, not fragments like the Omo fossils. What impressed me even more was that the Afar pig and elephant fossils closely resembled the Omo samples that were in excess of 3 million years old. Maurice paced back and forth as he recounted stories of the Afar region, with its exotic people, its treasures, and its dangers. The Afar didn't like strangers, he explained. But once one got to know them they were wonderful. "You should go out there with me," he said, exhaling thick, blue smoke and adjusting his heavy-rimmed glasses. I was floored; usually scientists weren't inclined to share information about a fossil-rich area, particularly if it was as promising as the Afar. It didn't appear to matter to him that I wasn't French: He just wanted to launch a full-fledged expedition to the region and, wonder of wonders, he wanted me to come along! A once-in-a-lifetime opportunity, for sure. I felt torn. I had to finish my dissertation, I had committed to another season in the Omo, and I had no money and no job lined up. But there was no way I could say no to Maurice; this was my chance to get in on the ground floor in a fossil paradise and perhaps find the hominid fossils of my dreams. "Okay," I said, "when do we leave?"

In March 1972 Maurice picked me up at Bole Airport in Addis Ababa. After quickly assembling food and equipment, we set off for a monthlong reconnaissance of the Afar. It was an endless expanse of badlands littered with tons of animal fossils exposed by erosion. "Terra incognita" Maurice called it, as each day we penetrated deeper and deeper into the uncharted territory. Escorting us was a spindly, gentle Afar man named Ali Axinum, who knew the region like the back of his hand and had served as Maurice's guide for several years. Without Ali we would have been lost, literally. The geology of the Afar was overwhelming. Texan geologist Jon Kalb provided additional expertise. The Afar region held such an allure for Jon that he moved his family to Ethiopia, where he had initially worked for the Ministry of Mines. And rounding out our small expeditionary force was Yves Coppens, an ambitious French paleontologist I had met when he was directing the French team in the Omo. Yves, like me, was especially motivated to find fossil hominids, and his background in mammalian paleontology would be invaluable on this first foray into the Afar region.

We arrived at Hadar in the afternoon. Maurice, who had acquired his driving skills on treacherous French roads and packed Paris streets, managed to brake just before he pitched our Land Rover over

cliff. Hot, dusty, but mostly relieved when he stopped, I climbed out and beheld a veritable El Dorado of paleoanthropology. I stood on the edge of the vast expanse of eroded sediments confident that this was ideal: no vegetation, clear stratigraphy, and, most important, fossils everywhere.

After our six-week reconnaissance we limped back to Addis Ababa exhausted and suntanned but immensely satisfied with the potential we had seen in the Afar for finding fossils. We formalized our collaboration as the International Afar Research Expedition (IARE) and decided that of all the places we had visited, Hadar was the most promising. So in the fall of 1973, with a modest grant from the National Science Foundation (NSF) and funds from the Centre National de la Recherche Scientifique (CNRS), we set up camp at Hadar. Day after day, bent over with my hands behind my back and my eyes to the ground, I scoured the hillsides in search of that illusive first hominid fossil. For weeks there was nothing. The heat, effort, and constant backache began to sap my enthusiasm. But I knew in my gut that it was just a matter of time and persistence. The fossil hominids were there; they had to be.

Late in the afternoon of October 30, I saw what looked like a hippo rib protruding from the ground. I gently tapped it with my shoe, and the proximal end of a tibia (the top end of the shinbone) emerged from the loose soil. Crouching, I also spotted parts of a distal femur (the bottom end of the thighbone). When I placed them together, they formed a knee joint, missing only the kneecap. From the angle at which the shaft of the femur ascended I knew it was from an upright walking animal—the first hominid fossil ever discovered in the Afar region. I also knew that I now had important leverage to justify expanded funding for Hadar research.

While yielding valuable information about locomotion, the knee joint by itself held few clues about the species of its owner. When anatomist Raymond Dart discovered the Taung baby in 1924, he named his hominid *Australopithecus africanus*, the “southern ape of Africa.” I surmised that the knee was from *Australopithecus* but could not be certain whether it was the same species as Dart's or perhaps a new species. Despite the claims of some critics during my subsequent presentations that its small size indicated that it was nothing more than a monkey knee, I never veered from my original assertion that the knee belonged to a biped. The way the femur and tibia articulated with each other, making maximum contact, was a distinctly hominid trait.

With the fossil securely bundled in a small cardboard box labeled Afar Locality (A.L.) 128/129, I returned victorious to Case Western Reserve University in Cleveland where I had begun teaching, a big-game hunter bringing home his trophy from an African safari. I spent many humid summer nights completing my thesis, and late in August 1974 I successfully defended my daunting 444-page doctoral dissertation on chimp teeth. I had a little NSF money remaining and with some additional private funds I was able to enlist a few more students and colleagues who would accompany us back into the field. In early September we set off for Ethiopia and the next great adventure.

The IARE departed in a convoy of heavily laden Land Rovers, trailers, and a lorry from Addis Ababa. Even before camp had been fully set up, a few team members began eagerly searching the geological deposits within walking distance of Camp Hadar in hope of finding a hominid. One of the most motivated and keen-eyed was a young Ethiopian colleague from the Ministry of Culture, Alemayehu Asfaw, who was possessed by what I call “hominid fever.” The outline of his figure could be seen roaming the hills until sunset, when it was too dark to survey. His perseverance eventually paid off when he found two jaws containing beautifully preserved teeth in the very deposits that others had searched near camp. Were they the same species as the owner of the knee joint? And was the species *A. africanus*, like Dart's Taung baby, or something new?

Friendly rivalry is at times a good thing because it motivates us all to work a little harder, a little longer, and take chances we otherwise might not take. Chief among my rivals was Richard Leakey, son of Louis and Mary, who had made some spectacular finds at Lake Turkana in Kenya, including

specimen known as 1470, then considered the earliest evidence of *Homo*. Tall and lanky with sun-bleached hair and boyish good looks, Richard exuded authority and confidence. We'd met several times, and the previous year I'd brought the fossil knee to Nairobi so that his team at the National Museums of Kenya could make a cast of it. He graciously allowed me to see their hominid fossil collection, including specimens that hadn't been published yet or even announced. Honored to be a member of the "inner circle" of scholars who were granted such access, I felt it was now my turn to return that favor, so I invited Richard; his wife, Meave; and his mother, Mary, to Hadar. A licensed pilot, he flew to Ethiopia in his own plane and landed at our hastily cleared airstrip, dubbed Hadar International Airport. In addition to Meave and Mary, Richard brought his brother-in-law, a paleontologist named John Harris. As they walked Hadar's astonishingly fossil-rich hillsides, I enjoyed watching their dumbstruck expressions, thinking that was how I must have looked to Maurice when I first came here.

Over dinner we debated the fossil identification of the new hominid jaws that Alemayehu had found. Richard favored classifying the larger one as part of a member of our own genus, *Homo*, whereas I thought it belonged to a male australopithecine. We weren't just arguing about the jaw, though. Richard believed that the 1470 skull was 3 million years old. But like many other experts in the field, I suspected that the geological dating was wrong because the animal fossils found along with it, particularly the pigs, were identical to those from the Omo that were dated at about 2 million years old. Although we disagreed, I was thrilled to be exchanging ideas with some of the giants in the field. The stimulating conversation, which included students and other Hadar team members, left everyone excited but exhausted.

On Saturday we drove Richard and his group out to the airstrip, helped them load up, and waved good-bye as they took off for the flight back to Kenya. The following day I found Lucy.

During the 1974 field season at Hadar, Ethiopia's emperor, Haile Selassie, was overthrown by the Derg, a violent military junta who capitalized on Selassie's decreasing popularity following a poorly managed famine in the very region where we were working. I was deeply concerned about how the turn of events would impact our future plans to work at Hadar. Sure enough, when we returned in 1975, the political atmosphere had changed from calm to violence and fear. With increased funding from both the United States and France, the IARE team had grown to include more students and more specialists in paleontology and geology. I had always been concerned about medical issues in the field—dysentery, malaria, snake bites, appendicitis—so I was pleased when Mike Bush, a young, soft-spoken medical doctor with a passion for archaeology, expressed interest in joining my expedition. Not only was Mike a great guy to have in camp, as well as a competent physician, he also turned out to be a keen-eyed and avid surveyor. Late in the morning on November 2, Mike's dedication paid off. I was in the middle of a conversation with David Brill, a *National Geographic* photographer, when Mike interrupted us to say that he had found what he thought might be some hominid teeth. David, a tall, skinny guy from Wisconsin, was excited because after hounding me for days, this might just be the photo op he had been pushing for—a hominid find. We followed Mike back to the spot.

"Right there," Mike said, pointing. I crouched, squinted, and was amazed to see two gray teeth embedded almost invisibly in gray stone. How had he managed to spot them? "Upper premolars," Mike added.

I grinned, looking up at David. "Here's the hominid I promised you."

David looked at the teeth, then at the sky. "You couldn't have discovered them when the lighting was better?"

I thought he was kidding, but he just shook his head and refused to take any photographs until the next day, when the sun would be lower on the horizon. We headed out to Mike's find first thing next morning, when the light was warmer and shadows gave the landscape a more three-dimensional feel.

David began snapping away. I could tell he wasn't very impressed with the amorphous block of stone containing two little blobs of gray, but he was doing his best.

Hoping for a noteworthy discovery, Maurice had persuaded a French film crew to spend most of the field season with us. One of them had positioned herself upslope from us near a little bush, and suddenly she called down to me, "*Queb sont ceux-ci?*" She was holding up a couple of fossils, and as I approached her, much to my astonishment, I could see that one was a heel bone and the other a femur, both unmistakably hominid.

"Could this be another skeleton?" I yelled, and everyone scrambled up the steep hillside. It turned out to be a mother lode of hominid fossils: During the rest of that season and the next, location A.L. 333 furnished more than two hundred fossils, including a partial baby skull, portions of an articulated foot, some articulated hand bones, most of an adult male brain case, parts of faces, and numerous mandible fragments. Together these represented, in our best estimate, at least thirteen individuals—nine adults and four children or infants. From the title of my 1976 *National Geographic* article, the 333 collection was dubbed "the First Family."

Maurice speculated after careful inspection of the geological strata that the fossil-bearing layer was the result of a single geological event such as a flash flood; a snapshot of a group of hominids who lived, died, and were buried together. Unlike the usual discoveries of single specimens, the 333 assemblage offered unprecedented insight into the anatomy not only of a single species but of individuals who had actually known one another millions of years ago. Again, I marveled at the circumstances that had led to the discovery. Had I turned down Mike's request to join our expedition, the well-concealed teeth might not have been found, and A.L. 333 could have gone unnoticed.

By 1977 Ethiopia was under the ruthless leadership of Mengistu Haile Mariam, and it was too dangerous to conduct fieldwork. I was now the curator of physical anthropology at the Cleveland Museum of Natural History, and the major part of my job was to oversee the study of the unmatched hominid harvest from Hadar. The process involved cleaning the stone matrix from each piece of bone in order to obtain a clear picture of its surface anatomy, taking color and black-and-white recording photos, molding and casting each specimen, as well as describing each fragment in meticulous detail for publication. All of this had to be accomplished by 1980, when the fossils would be returned to the National Museum of Ethiopia for safekeeping.

I assembled a team—consulting experts, researchers, students, and colleagues—to systematically undertake a comprehensive study of the Hadar collection. Mike Bush used his expertise in anatomy and his interest in hands to catalog the hand bones; Owen Lovejoy, a leading expert on hominid bipedalism and postcranial anatomy at Kent State University, was assigned to the limbs and the pelvis; William Kimbel, Lovejoy's graduate student, worked on the cranial remains. I recruited Tim White of Berkeley to document the mandibles. Tim, a promising young paleoanthropologist with a curmudgeonly streak, had worked with Mary Leakey at Laetoli, in Tanzania, where similar fossils had been found. We had met in 1975 when I brought the First Family to the National Museums of Kenya where he was working for the Leakeys, and we struck up a friendship. Having parted ways with Richard's expedition and then Mary's, he joined mine. Meanwhile, ever the dental expert, I worked on the teeth. The final analysis was eventually published in a 352-page single issue of the *American Journal of Physical Anthropology*.

While we were working on detailed descriptions of the bones in early June 1977, I was unexpectedly invited to present an evaluation of the Hadar hominids at a Nobel Symposium in Sweden. Convened by the Royal Swedish Academy of Sciences to address the "Current Argument on Early Man," the symposium commemorated the two hundredth anniversary of the death of the

Swedish botanist Carolus Linnaeus, whose taxonomy (the practice of describing, classifying, and assigning Latinized binomial names to all biological organisms, living or extinct, for placement in a hierarchical system) is still the basis of modern classification. I could think of no occasion more fitting than a Nobel Symposium to present our results. My parents had emigrated from Sweden in the early 1900s, and I felt honored to deliver a paper in the country of my ancestors. I knew that some paleoanthropology's most accomplished scholars would be in the audience listening carefully for speculative claims or factual errors. My presentation had to be meticulously researched, and I was grateful for colleagues like Tim and Owen and others who agreed to review draft after draft, sometimes offering brutal criticism.

On May 21, 1978, a clear, cool Sunday evening in Stockholm, I attended a gala reception and dinner hosted by the Royal Swedish Academy of Sciences. Early the next morning we set off by bus for the town of Karlskoga, some 240 kilometers west of Stockholm, home of Bofors, the major sponsor of the symposium. Alfred Nobel had owned the company in the late nineteenth century when it became important in the chemical industry and the manufacture of cannons. Unfortunately I was too preoccupied with my upcoming presentation to appreciate the passing countryside.

Richard Leakey opened the conference with a relatively short talk on his work at Lake Turkana in Kenya, describing the many hominid discoveries found there. Then it was my turn to walk to the podium. With my stomach in knots, I presented my paper, "Early African Hominid Phylogenesis: A Re-evaluation," describing the Hadar hominid collection and delivering evidence that they represented the same species as fossils found at Laetoli, in Tanzania, by Richard's mother, Mary. I made my case that all of the fossils bore more primitive anatomical features than any other known hominid species. And then I announced that these hominids belonged to a new species: *Australopithecus afarensis*. As I listened to my words reverberating through the small auditorium, I thought about the sixteen-year-old who dreamed of finding the missing link: He was now standing, dressed in a three-piece suit, before the most distinguished audience on the planet, publicly pronouncing Lucy's scientific name for the first time. It was a provocative thing to do. Many researchers thought that the fossils were simply early African versions of *A. africanus*.

From the sound of people shuffling in their seats and a few audible aspirations I could sense the immediate skepticism. My mouth went dry and I took a sip of water. In my next slide I showed a redrawing of the human family tree and elaborated on the major implications of the new species for understanding the shape of that tree. I was fully aware that most of the assembled favored placing Dart's Taung baby, *A. africanus*, at the base of the tree, the common ancestor to all later hominids, including modern humans. But I boldly maintained that it was now time to relegate *A. africanus* to an extinct side branch of human evolution, and to position *A. afarensis* as the trunk of the tree, the last common ancestor to all post-3-million-year-old hominids. Dead silence. I took another sip of water. The lights came on, and Carl Gustaf Bernhard, the moderator, called for questions. Not a single hand went up. The silence was broken when the moderator suggested that we break for high tea.

During the remaining days of the symposium I continued to argue the main points of my paper, but most of the guests were unconvinced. How could I be sure that all the Hadar hominids were of a single species, they wondered. Based upon what evidence did I put Hadar and Laetoli fossils in the same species? I knew that my colleagues and I faced months of work, possibly years, before our conclusions were accepted and Lucy could assume her proper position on the human family tree.

- [The Lady Anatomist: The Life and Work of Anna Morandi Manzolini pdf, azw \(kindle\), epub](#)
- [Introduction to Automata Theory, Languages, and Computation \(2nd Edition\) online](#)
- [download Correspondance](#)
- [read online The United Nations: A Very Short Introduction \(2nd Edition\) pdf, azw \(kindle\), epub](#)
- [download online Ciclos del tiempo: Una extraordinaria nueva visi3n del universo](#)
- [read online Anatomy of Stretching](#)

- <http://bestarthritiscare.com/library/Real-Happiness-at-Work--Meditations-for-Accomplishment--Achievement--and-Peace.pdf>
- <http://paulczajak.com/?library/To-Our-Friends.pdf>
- <http://junkrobots.com/ebooks/Vinegar--A-Guide-to-the-Many-Types-and-Their-Uses-Around-the-Home.pdf>
- <http://www.netc-bd.com/ebooks/Modern-Japanese-Writers-and-the-Nature-of-Literature.pdf>
- <http://aseasonedman.com/ebooks/The-Metareferential-Turn-in-Contemporary-Arts-and-Media--Forms--Functions--Attempts-at-Explanation--Studies-in-l>
- <http://test.markblaustein.com/library/The-Ever-Blooming-Flower-Garden--A-Blueprint-for-Continuous-Color.pdf>