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# 1

## The Sengele Mystery

SENGELE IS A camp that lies near Lake Eyasi in northern Tanzania. The habitat is nestled within a vast savanna-woodland, dotted with rocky outcrops, that is lined with strips of marshland, scrubs of brush, and intermittently placed baobab trees. The Hadza live here. They are one of the last remaining hunter-gatherer tribes on earth. Their camp is organized around two clusters of huts, each differing in size and shape according to the number of people dwelling within. Some house families with half a dozen or so children and can be as large as the canvas tents commonly used by families in North American campgrounds. Some house only single individuals and resemble a one-person tent that a backpacker might quickly assemble at the end of a long day's hike. The huts are made primarily of acacia, a wood native to subtropical regions around the world. Conjure any image of an African safari and these are the trees that dot the savanna and provide shade to a pride of lions. Often, the thatch that fills in the flesh of the hut's acacia skeleton is savanna grass, and with some luck, a zebra hide might drape its pinnacle and provide insulation from the wet season's rains. This camp is not a permanent thing. It is a place for people to come together for a time and share companionship as well as the burden of day-to-day tasks crucial to survival. It is ephemeral by nature, with no camp lasting longer than a few seasons. When dry and wet season trade places, so too do some people swap camps, reconfiguring its constituents seasonally.

What makes this camp unlike most others on the planet are the people who give it life. The Hadza live off the land. Many of their daily

calories come from foraged berries and tubers and hunting animals for meat. These roughly one thousand indigenous people have thrived in these parts for a very long time. Their oral history (they have no written language) depicts stories linked with this region and no other, and the earliest descriptions of the Hadza have them living where they do today.

The camp's narrow foot-worn paths coil snakelike through the clusters of huts. Fires strategically dot these paths, and like urbanites having an impromptu kaffeeklatsch, the Hadza continuously surround their hearths, which function day and night as places for cooking, smoking, and spending time together. As they have no currency to exchange for time spent doing some task, their work is literally their life. Typically, this work is divided by gender, with men's roles focusing on hunting game and women's roles focusing on digging up tubers and picking berries. Their survival hinges on a simple\* but perfectly adapted tool kit of poison-tipped arrows and wooden bows and digging sticks that meets the demands of their environment.

I am in Sengele, living and working alongside the Hadza. This scientific mission, sponsored by the National Geographic Society, has taken me from my home in the United States on a 7,800-mile journey to the heart of East Africa. The efforts expended to seize this opportunity were daunting. It required three international flights, weeks of immersive Swahili lessons, and securing supplies—not to mention the massive, multiton Land Rover truck I shared with my sole advisor and research assistant, Ibrahim Muballa, who would soon become a cherished friend. I journeyed here to study Hadza sleep behavior, driven by a passion to unravel a scientific enigma. The results of this fieldwork would change the trajectory of my life and also lead to a series of discoveries that would uncover one of the long-standing puzzles of our species' natural history: What was sleep's role in human evolution?

\* To be clear, when I say "simple" I mean it in the technical sense. The Hadza have one of the least complex tool kits of any society ever measured. To me personally, the simplicity of their tool kit is incredible. Form and function are perfectly adapted to their environment. I consider the term *simple* an honorific. I am humbled by the knowledge that I would likely die in the African savanna with such technology at my disposal, dwelling in conditions that the Hadza have mastered.

## The Mysterious Sleepers of Tanzania

It is a Tuesday in September, and she is quickly marching down the hall, tailed by a clutch of undergraduates. She is a tall woman and wears an easy, bright smile. Despite the quick, almost frenetic pace, she moves gracefully, slipping the key into the lock and popping open the lone obstruction between her and her desktop computer. I'd been hired at the University of Nevada, Las Vegas, for the 2014 academic year, and this was my first academic employment after defending my dissertation. I had long desired a meeting with her since the moment I knew I would be part of the faculty here. She was a personal hero of mine (a feeling that only grew in proportion as I got to know her better), and I was desperate to pitch her an idea I'd been obsessing over for months. It was a problem—rather, a puzzle—that needed solving. And the troubling and astounding fact was that only a few people in the world could help me solve it. Alyssa was one such person. And her office was practically next to mine. Now, I was about to shake her hand.

“Hi, Dr. Crittenden!”

I'm in between classes, so my fleet pace matches hers. I've got a glow from having power walked through the preheated oven temperature of the arid Nevada campus that overlooks the Vegas Strip. I reach out to shake her hand. “I'm David Samson, your new neighbor,” I say, nodding toward the door of my office only feet away. We exchange introductions, and I let her know that I've followed her work for years. Since the mid-1990s, Alyssa has worked and collaborated with the Hadza hunter-gatherers. I can't help myself. Despite only knowing her for the short half of a minute, my enthusiasm takes over: “I've got this research idea I can't wait to discuss with you . . . it's about Hadza sleep.” She glances at her watch, smiles, and says, “I've got a second now, if you do.”

At that time, what evolutionary anthropologists knew about human sleep was close to nothing. As summed up by the eminent anthropologist Carol Worthman, when contemplating what anthropologists knew about sleep: “The bald, if somewhat overstated, answer was: zero. Sleep, in its ubiquity, seeming nonsociality, apparent universality, and presumed biologically driven uniformity, has been overlooked and

delegated to a background variable. Amazingly, it had not yet engaged any discipline dedicated to the study of human behavior, human diversity or cultural biological bases.” I paraphrased as much to Alyssa in my opening foray. I asked her questions. Lots of questions.

Alyssa is a dynamic woman. She flows seamlessly from one activity to the next as though tapping into an endless source of energy. At times, her head tilts slightly, as if contemplating something deep, and her eyes open wide, as if in exclamation, when you say something that piques her interest. She treats her graduate students like family, and she’s that rare kind of advisor that anybody who’s slogged through a PhD program yearns for but few ever receive. Lined with overstuffed bookshelves, her office mainly features a desk and a tall window shielding us from the intense desert heat, allowing in only the rays illuminating the campus quad. Numerous African statuettes and knickknacks, seemingly ancient, are placed atop piles of books and nestled within cupboards and nooks.

“Why Hadza sleep, though?” Alyssa wonders. “What specifically about them is crucial to the research question?” I explain that of the hundreds of living primates, we only have a small fraction of their sleep architecture quantified. To understand sleep architecture, imagine you’re building a house out of blocks. Each type of block represents a different stage of sleep, and the way you stack and arrange these blocks is like the pattern or “architecture” of the house. Sleep architecture is the pattern of our sleep, showing how we cycle through different stages of sleep during the night. There are three stages: deep sleep, light sleep, and dream sleep. Just like how a house has different rooms for different purposes, our sleep has different stages that help our body and brain rest and recover in various ways. In 2014, only nineteen primates (under 5 percent!) had had their sleep architecture measured. I further explained that of all the human cultures that exist, the vast majority of people who’ve had their sleep measured are WEIRD.

Joseph Henrich, a professor of human evolutionary biology at Harvard University, challenged scientists to start collecting more data outside of the economically developed world. To do this, he coined a concept: WEIRD, an acronym for Western, educated, industrialized, rich, and democratic.<sup>1</sup> WEIRD societies are hardly the global norm—they

are outliers. A fundamental challenge to the scientific understanding of the human condition is that most psychological studies source their data from these WEIRD corners of the world, inadvertently biasing our perceptions of universal human behavior. The broader implication is that we scientists have been painting with a limited palette, and it's time we expand our canvas. This is especially the case with sleep studies—because the methods that have been employed are so costly, invasive, and require specialized labs and equipment. The consequence is that nobody could ever conduct a proper study outside a sterile, controlled laboratory . . . until now.

“Kristen Knutson, at Northwestern, just published a study with people in a village without electricity in Haiti! She did it with super-science Fitbit-like devices. They're called actigraphs, and they are pretty much like wristwatches.” Alyssa's head tilts. A torrent of questions follow: “Are they waterproof? How tough are they? How long can they be worn?” Answers follow questions. Waterproof, check. Robust, check. Three-month battery life. Check. “Alyssa, what I'm proposing here is that we take the sleep lab into the field!” Her eyes widen. The point lands.

I seize the moment, and we continue to converse, exchanging ideas back and forth about the mysterious sleepers of Tanzania. The unknowns of hunter-gatherer sleep are vast and profound. When we examine the Hadza, what will their sleep reveal? Could it offer a deep, restorative “paleo sleep”—similar to the health benefits touted by the paleo diet—or might it be as minimalistic as their huts? Certainly, there would be intriguing data on communal sleep.

For nearly 1.8 million years, communal sleep was not just a cultural norm but an essential aspect of human life. The Hadza remind us that solitary sleep, as we know it today, is an aberration. Until the mid-nineteenth century, it was entirely normal for people to share beds with friends, family, and even strangers. This tradition wasn't merely a matter of necessity due to a shortage of beds; it was a profound social practice that reinforced bonds of trust, warmth, and security. The intimacy of sharing a bed was so integral to human experience that it transcended social classes and even geographical boundaries. Yet, in the nineteenth century, bed-sharing began to fall out of fashion. Social commentaries

argued that sharing a bed polluted the air and undermined social respect, making it not only unhygienic but also immoral. As we ponder the sleeping habits of the Hadza, we must recognize that our ancestors likely slept in close quarters for most of human history, finding comfort and safety in numbers. The communal sleep of the Hadza today might offer clues to the restorative, deeply connected sleep patterns that were once universal.

More controversially, what about mother-infant co-sleeping? Hadza mothers take a markedly different approach compared to many sleep-deprived mothers in the Western world, who often place their infants in separate beds and even separate rooms. In 2016, Notre Dame anthropologists James McKenna and Lee Gettler introduced a concept that landed like a riddle in both academic and clinical sleep circles: “There isn’t just infant sleep or breastfeeding, there’s only breastsleeping.” Beneath this catchy terminology lies a profound idea. It’s the act of mothers sharing their bed with their babies while breastfeeding, sidestepping all the hazards that have been, like cautionary sermons, so widely preached against co-sleeping. McKenna and Gettler are heralds of a profound cultural shift. Their work shines a light on the intricate interplay of mothers and infants, an ensemble of instinctual responses that nature has perfected over millennia. In a world where “Safe to Sleep” campaigns cast shadows over bed-sharing, these researchers were challenging the status quo and scientifically illuminating the merits of “breastsleeping.” Even more intriguing—what would Hadza mothers think of this idea?

Just as cultural practices like co-sleeping shape the modern experience of sleep, so too have ancient technologies transformed the evolutionary foundation of how—and where—humans rest. If breastsleeping reflects an intimate social adaptation, then fire reflects a transformative environmental one. Before we could safely share sleep in beds, we had to share it around flames. To understand how humans became the only primate to sleep on the ground—exposed, vulnerable, and unarmored—we must consider one of the most consequential adaptations in our species’ history: the control of fire.

Fire forged our species. The prehistoric moment when some proto-human first harnessed the complex chemical process known as

combustion—the rapid combination of oxygen in the air with a fuel source, which produces heat, light, and various chemical byproducts—has been lauded as one of the most important innovations in human evolution. At Harvard, Richard Wrangham had been producing a torrent of compelling studies suggesting a provocative idea: fire was instrumental in shaping the evolution of humans. Central to his argument was the thought that the mastery of fire was pivotal in reducing the energy expense of digesting food, thus providing the requisite fuel for our calorie-intensive brains. This claim ruffled the feathers of many a paleoanthropologist. Wrangham audaciously posited this theory, which suggested that fire had been discovered more than a million years before the current understanding, even before any concrete archaeological evidence supported it. As a primatologist rather than an archaeologist, I found myself nodding along because I'd been scaling African trees and studying chimpanzee sleeping habits. Their treetop beds were more than mere resting places; they provided warmth, dryness, comfort, and even defense against mosquitos. It left me thinking, if our ancient ancestors descended from those trees, how did they find or create these benefits on the ground? Perhaps, if Wrangham was correct and fire was mastered by our forebearers much earlier than suspected, it could have been instrumental in survival and also have allowed them to thrive in the night. Beyond merely fueling our brains, could fire have been the linchpin in achieving quality sleep amid the perils of the Paleolithic?

And then there are dreams. In the modern world, dreams are often dismissed as random mental noise. But for the Hadza, they carry deep spiritual significance—sacred visions that connect them to their ancestors, to the land, and to each other. Sleep, for them, is not just rest; it's a portal to meaning.

This reverence for the night extends beyond human minds. The presence of dogs in Hadza camps invites a fascinating question: Could our bond with canines have roots not only in hunting or protection, but in sleep itself? Dogs perceive the world through heightened senses—smell, sound, and subtle movement. Perhaps early humans benefited from these nighttime guardians, whose sensory vigilance allowed their

human companions to sleep more soundly, less encumbered by threats in the dark.

Finally, there's the moon—a timeless celestial companion. While most in the industrialized world give little thought to its phases, the Hadza still live under its illuminating influence. Their rituals, movement, and even sleep may rise and fall with the lunar cycle, echoing a rhythm that shaped the nights of our ancestors for millennia.

There is a pregnant pause for the first time in our conversation. She locks eyes with me and responds: “I’ve actually been interested in this topic for so long . . . look, I get a lot of requests from a lot of people to collaborate with me because of my having contacts with the Hadza. Literally hundreds a year. Ninety-nine percent of them I flat out turn down.” Her head remains tilted, as though she’s running unseen calculations. Government permits, plane tickets, ethics review boards, loads of equipment being transported to the most remote places of the world—in her mind, a series of ongoing equations and challenges being crunched and overcome. And doing all this with a guy she’d met only thirty minutes before. She looks at me for a second and then immediately launches a challenge: “If you win the grant, we’ll get you to Hadzaland.”

## The Epeme Dance

I lie in the dark of my tent, situated on the outskirts of the Hadza camp. It is late, perhaps a bit after midnight, but I am not asleep. My eyes are wide open. I am listening intently, as I have been for the past few hours, to the sound of the cadence of a sacred ritual that I can hear but cannot see. It is a wonderful entrancing exercise to focus all my creative energy on the dance that is being performed not far outside my tent. I can hear rhythmic jostling of bells and the rising tide of pounding feet. At the crest of the dancers’ movements, I hear a chorus of ululations. Silence follows for a few tense moments. After several rounds I can predicatively time the pattern down to the second. It is the *Epeme* dance, one of the most important group rituals of the Hadza hunter-gatherers.

Each sex has different conditions for being able to attend the ceremonial dancing and singing. Men must have become *Epeme*—meaning they

have either killed a special type of large animal (the list includes warthog, impala, greater kudu, eland, giraffe, buffalo, zebra, wildebeest, lion, rhino, hippopotamus, and elephant) or they are senior men (usually above the age of thirty-five). Women must have undergone the *mai-to-ko* ritual upon reaching menarche. This three-day ritual coincides with the ripening of the *undushipi*, the most important berry species. The girls, wearing little more than beads and a sheen of animal fat so that their bodies shine, sing, dance, and chase the boys, trying to hit them with their fertility sticks (*nalichanda*). It was a great honor to eventually be asked to participate in the Epeme dance, but when questioned further I was considered ineligible because I was not (at the time) married. Therefore, every night when there was no moon and the savanna woodland was shrouded in pitch darkness, I sat in my tent and listened intently to the ritual, imagining its play in my mind's eye. The function of the ceremony is to act as a social adhesive, reify gender roles and status of adult individuals, and bring fortune to future hunting expeditions. The Hadza would forgo hours of sleep to perform the dance, and the next day they would have a pronounced "Epeme hangover" during which their activity was greatly reduced.

Whether it be the Epeme dance—rallying nearly every adult in the camp—or a fireside smoke with kin, or the near constant suckling of infants, the Hadza camp bustles with activity—all of which was mostly within earshot. I could generally hear people talking in the center of the camp, and if I were to call out to them, members on the other side of the camp would respond. Camps are noisy, dynamic, alive things—both day and night. I was losing sleep for other reasons though. Few of the predictions and preconceptions I had about hunter-gatherer sleep were bearing out. The empirical data I was downloading from the actigraphy watches was profoundly shocking and paradoxical. As exemplified by the Epeme dance, the Hadza would forgo sleep for lots of reasons. This flew in the face of the paleo sleep hypothesis.

The paleo sleep hypothesis is the idea that "naturally" sleeping humans would experience much longer, less fragmented, and highly restorative sleep. For those who haven't dwelled in a hunter-gatherer camp before, it's somewhat intuitive if you think about it. It's easy to

imagine a place like the Sengele camp as a peaceful, bucolic, sleep-enhancing haven. Think back to a time when you went camping and, after a hard day's hike and making your own campfire-heated meal, had a calm, beautifully restorative night's sleep. I've experienced this many times. But real-life experience shows this simply isn't the case with Sengele. Unlike many of the local and state-regulated campsites of North America, Hadzaland remains a wild, unregulated environment.

The Hadza coexist in an environment with other animal predators and human competitors. Thus, outside the borders of the protective shell that the camp offers, there are many reasons to stay vigilant. Perhaps, though, within the camp it is calm, quiet, and without too many impediments to a good night's sleep? Not so. Camp life is a far cry from a perfectly calm, still, and quiet night's sleep. When the sun sets, in many ways the camp comes truly alive! While the day's physical work is over, the social work has only just begun. I know this experientially, having slept in camp, and empirically, by physically measuring the sound waves in the environment. I am using microphones no bigger than a six-sided die, placed strategically throughout the camp. They capture sound waves, amplify weak signals, and translate them into numbers called decibels (dB) to tell us how loud or quiet a sound is. This helps us keep track of camp-wide noise levels. The camp was empirically loud, with peaks and valleys depending on the time of day or night. Until midnight, the camp is socially dynamic, stories are traded, food is shared, rituals are performed, and bonds are strengthened. The Epeme ritual is just one example of such a night.

Counter to the paleo sleep hypothesis—the idea that hunter-gatherer sleep would be long and high quality—the data I was generating every night was showing sleep that was highly fragmented and low in efficiency and duration. Sleep efficiency is a crucial measure of someone's overall sleep quality. Here's how it works: imagine you go to bed at 10 p.m. and wake up at 6 a.m., so you spend eight hours in bed. Now, if you actually sleep for seven of those eight hours, your sleep efficiency would be 87.5 percent because you're using most of that time for sleeping. But if you spend a lot of time in bed tossing, turning, or just lying awake, your sleep efficiency would be lower because you're not using your time

in bed very effectively for sleeping. Sleep efficiency is a way to see how good your sleep is by checking how much of the time you spend in bed is actually spent sleeping. Differentiating itself from sleep duration, the higher the sleep efficiency percentage, the better the *sleep quality*. The values I was generating from the Hadza were in the high sixties\*—well below the National Sleep Foundation’s recommendation of 85 percent for healthy sleep. Surprising, yes, but even more shocking was the juxtaposition between their short, poor-quality sleep and how *they subjectively feel* about their relationships with sleep.

## Wild Nights, Wild Data, and Wildly in Love with Their Sleep

As I can speak only basic survival “field Swahili” and have only a few words of Hadzane (the click-based language of the Hadza), Ibrahim translates my survey questions,† attempting to get a better picture of the kinds of things that bother the Hadza when they sleep. We are finishing up the survey, and I am tallying up some rough percentages. I am astonished. The Hadza, it appears, rarely identify their sleep as insufficient or unsatisfactory. The data were incredibly uniform. That is, when asked if they sleep “not enough,” “just enough,” or “too much,” thirty-five of thirty-seven respondents said “just enough.” Meaning, 95 percent of the Hadza surveyed thought they had a Goldilocks-approved, just right amount of nightly sleep.

Fascinating.

What about sleep latency? Sleep latency is the term we sleep scientists use to measure how quickly an individual falls asleep. For example, if it usually takes you a long time to fall asleep after you go to bed, you

\* A future publication of ours would show Hadza had a sleep efficiency of 68.7 percent, a whopping 16.3 percent less than what the National Sleep Foundation recommends for optimal sleep.

† Although, after a few weeks’ practice I was giving the survey daily in Swahili, which earned me my name among the Hadza, “Lalanje.” This could translate into a couple things: “Sleep Man” (*kulala* is the verb for “sleep”) or “Orange.” I always wore my lucky field cap, which was bright orange, so the translation could go either way.

have a long sleep latency. But if you close your eyes and quickly drift off into slumber, your sleep latency is short. Thirty-four respondents said they fall asleep quickly. I have enough familiarity with the US sleep statistics to know that 92 percent of the US population do not believe they fall asleep quickly. What about their perception of their sleep environments? And what about the comfort of their beds?

It's worth, at this point, describing a Hadza bedroom by imagining you are *making one* to sleep in this night. Close your eyes and picture yourself nestled on a bed made from the hide of an impala—a souvenir from a successful hunt. (If you don't opt for a skin, your other option would be to trade with nearby pastoralists for bedding like a textile blanket or a woven grass mat.) You'll average a little over two layers to your "firm" bed, which measures around 70 inches in length and 50 inches in width—both Spartan and practical (figure 1.1). No fancy memory foam pillows here; instead, you might find your head resting on rolled-up clothing or a modest mound of dirt. In fact, the term *pillow* doesn't exist in your native tongue (when I inquire about its use, the word doesn't translate, and over 40 percent of Hadza don't use one, instead propping their head up with their forearms). You likely opt to bundle something up under your head or shuffle some earth under your sleeping hide to align your spine during sleep.

Now, let's build the room around you. I mean this literally—you will *physically build* your bedroom. Typically, this is the task of Hadza women, masters of construction that they are. They will spend an afternoon working together by bending flexible branches into an inverted U shape (as seen in figure 1.2). Picture it: you take these acacia branches, end over end, pushing them into the soft ground. As the branches criss-cross, they form an upside-down bowl. Finally, you grab local savanna grasses and stuff bundles of them into this skeletal structure, crafting a protective cocoon. Voilà, you have your grass hut bedroom. You can fit about three of these huts into a studio apartment in New York City. If you are part of one of the larger families, wanting a bit more living space, you might intertwine two such huts, making a double-domed abode. Two of these may fit in that same studio apartment. I bet at this point you're ready to call an electrician and air conditioner installer to ensure



FIGURE 1.1. *Interior of a Hadza hunter-gatherer sleeping hut.* The sparse sleeping area consists of 1–2 cm of bedding made from textiles or animal hides, sometimes placed near a small fire for warmth and protection. Huts accommodate a range of occupants, from a single individual to entire families, including up to two pair-bonded adults and as many as a dozen children.

you keep that temperature regulated down to your favorite sleeping temp. Maybe it's also time to install some light-blocking curtains on your windows? You will be denied such luxuries.

As twilight approaches, you're armed with three age-old tools to counteract the night's unpredictability. When the sun is gone, this signals not just the end to the workday but also the start of a battle against



FIGURE 1.2. *Exterior of a Hadza sleeping hut.* Constructed entirely by women in approximately four hours, these huts are built from scratch using flexible acacia branches for the frame and thatched with savanna grass. The design provides basic shelter from wind and rain while remaining highly mobile and well suited to the Hadza's foraging lifestyle.

a bone-chilling cold. Your first tool, a canopy of thick savanna grassland thatching, a 20-inch barrier between you and capricious natural elements. Next, the fire—not outside, but within your dwelling. An ember of warmth in the cold savanna night, and as 89 percent of Hadza affirm, a sleep-enhancing tool. But the final tool? It's the oldest form of warmth: the human touch. The Hadza aren't solitary sleepers—they huddle

together. Specifically, the average Hadza sleeps with 2.1 other human beings on the same bed, with an impressively large range of up to six other humans (which was the Sengele record at that time). On any average evening, your slumber might be warmed by a single neighbor or perhaps a quintet, whether on a modest straw-and-hide mat ensconced in your hut or under the majestic expanse of the stars.

Knowing all of this, I am astounded by these numbers. Thirty-six respondents—97 percent of the Hadza surveyed—perceive their beds as comfortable. I compare this to camping with my friends, when despite using technologically advanced portable mattresses thicker than most Hadza beds, we often attributed a rough night's sleep to poor bedding.

I was especially eager to address the next questions. Of everyone we surveyed in the camp, when asked “Do you have trouble sleeping?” the answer was that nobody had trouble with their sleep. I had to verify this answer by asking them again, only in a slightly different manner: “Are you happy with your sleep?” One hundred percent respond in the affirmative.

Surely Hadza moms with infants would have some complaints about their sleep? What did Hadza mothers, cradling their infants, think about their sleep? Their unanimous response was enlightening. Every mother I spoke to wasn't just a regular sleeper; she was a breast-sleeper. Night after night, these mothers nestled close to their infants, the gap between them nonexistent. When I quizzed them on their choice, their expressions were a blend of bemusement and incredulity. The idea of not sleeping intertwined with their baby was, in their view, unthinkable. The response was almost instinctual, their voices harmonizing in a powerful chorus: “It's how you keep your baby safe, warm, and fed.” It was a poignant moment, one where the unwavering convictions of the Hadza women sharply contrasted with the clinical dictates of the industrialized world. For them, the act of breastsleeping wasn't just natural—it was essential. Their message was clear: In their eyes, separating from a child at night was the real danger. The moms' answers were said in such a way that I felt a fit of shame at asking them.

In very clear terms—the Hadza genuinely *like* their sleep. The results were astonishingly paradoxical. This was in direct conflict with the raw data I was downloading from the actigraphy watches. The Hadza *subjectively* love their sleep yet *objectively* experience short, fragmented sleep. The Sengele mystery revealed itself: How is it that the Hadza, in their dynamic, bustling, exposed, and Spartan sleep sites love their sleep so much, and sleepers from Tokyo to New York approach their temperature-regulated, secure, comfort-laden bedchambers with trepidation and anxiety?

### The Mystery Deepens

In a truly astounding reversal of what we would predict under the paleo sleep hypothesis, Hadza sleep was anything but “optimal.” Amazingly, their sleep quality was significantly below WEIRD values. As a result, in the scientific articles that my team published from these data we described Hadza sleep to be short and highly fragmented and surmised it to be substantially less than sleep in postindustrial populations.<sup>2</sup> What could explain the Hadza’s near universal appreciation of their sleep? Let’s delve into this puzzle by testing other ideas. While many might believe that the essence of science is to “prove” theories, Karl Popper, often hailed as the godfather of the scientific method, saw it differently. In his eyes, the heart of true science beats not in the victories of proof, but in the deliberate acts of disproof. In other words, it’s not about how many theories you can validate, but about how many alternatives you can confidently cast aside. Science, in Popper’s world, isn’t a journey of confirmation but rather a process of elimination, edging us closer to the truth.

This is an opportune moment to emphasize why the Hadza, despite being a contemporary human population influenced by geopolitics and interactions with large-scale economies, still offer crucial insights into the evolution of human sleep. Their way of life, while not untouched by modern forces, reflects patterns that have likely persisted throughout much of our evolutionary history. Of course, no contemporary community can be seen as a direct analogue of ancient societies. These communities have been significantly influenced by centuries of colonialism, integration into

local and global economies, and various modern institutions, fundamentally altering their way of life. The Hadza people, while not direct ancestors of modern humans, live in ways that echo the rhythms of our Pleistocene forebears—those who lived during the epoch spanning roughly 2.6 million to 11,700 years ago, when early humans evolved and adapted to life as foragers in dynamic, often harsh environments.

The Hadzas' days are not dictated by clockwork precision. They are foragers, thriving without the noise-blunting insulation of environmentally controlled buildings or the constant glow of artificial light—factors that heavily influence the circadian timing in our contemporary world. Again, while no modern population perfectly mirrors our ancestral past, the Hadza's way of life and environment provide a unique window into the lifestyle of our forebears. Their connection to the land, their dependence on its bounty, and their adaptation to ecological pressures mirror the challenges and solutions our ancestors once faced.

The Hadza are not isolated from the tide of change. The encroaching market economy, the pressing need to secure land rights, and various sociopolitical shifts are testing their resilience and adaptability. Yet, even as they navigate these transformations, their familial structures and sleeping patterns have remained remarkably consistent, a testament to the enduring nature of their lifestyle. Studying the Hadza offers us not just a glimpse into our past but also a richer understanding of human sleep and activity patterns.

And knowing how the Hadza sleep isn't just academic, given the "sleep restriction epidemic" that has been pumped up by public health officials for decades—a nightmarish narrative stalking the proclaimed sleepless nights of Westerners. We are inundated with the anxiety-raising stats everywhere. In the United States, fifty to seventy million people suffer from chronic sleep disorders and 20 percent of serious automobile accidents are caused by sleep deprivation.<sup>3</sup> Moreover, clinicians and public health specialists have implicated diseases such as immune system dysfunction, metabolic disorder, infection, heart disease, and some types of cancer to poor sleep. The stakes are high, and insights from Hadza sleep can inform and perhaps even ameliorate what has been termed by public health officials as a global epidemic of poor sleep.

Then what of the Sengele mystery? If calm, peaceful, Zen-like environments and long-duration, high-quality sleep didn't explain the sleep mystery at Sengele, then what about the Hadza just being "unusual" outliers among hunter-gatherers? Could it be that other groups, living with similar lifestyles, also suffer from the same apparent sleep maledictions as those living in developed economies? This does not appear to be a Hadza anomaly. Around the same time I was performing my research, my dear friend, colleague Gandhi Yetish, revealed similar patterns in other small-scale societies, including South African San hunter-gatherers.<sup>4</sup> In their reports, only 1.5–2.5 percent of the studies' participants responded that these were problems they regularly faced while sleeping. Compared to the 10–30 percent chronic insomnia rate reported in industrial societies, these numbers are drastically lower. Yet, just as our raw data were revealing with the Hadza, they slept well below the average WEIRD total sleep time.

Here was the first breakthrough clue to the Sengele mystery. There was some property embedded in the way that people in small-scale societies, especially hunter-gatherer societies, lived that led them to experience sleep in similar ways, despite dwelling on other sides of the globe, with different cultural identities, population genetics, and languages, and all this despite not (relatively) sleeping much at all. What, then, was the element of their lives that they all had in common?

The world in which the Hadza sleep is quite different from the slumber chambers we'll slink into tonight. They are satiated by their short, exposed sleep. They bask in the warmth of fireside dreams. They dance in the dark when the moon hides, while many of us remain oblivious to its celestial rhythms. After living with the Hadza, I had many more questions than when I started. Over the next half-decade, all of them would be answered and would reveal the strange and unexpected story of sleep's role in human evolution. I invite you in the following chapters to join me on a scientific journey to decipher these enigmas. Because while we might set our alarms, it's the Hadza and other sleepers across the world that have the power to truly wake us up to the riddles of sleep.

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