



Living a Path of Mutual Respect: Technological Stone Ontologies in the Horn of Africa

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ABSTRACT

Boreda Indigenous knowledge prescribed that humans respect all entities with whom they co-inhabit, including stone. Humans, stone, and water's reciprocal relationships prompted their participation in each other becoming fetuses, infants, children, youth, married adults, mature adults, elders, and ancestors. Life was a co-production between humans and non-humans, such that stone and water could inflict harm or bring well-being to humans. Non-human beings, such as flaked stone tools, were evidence of engaging in correct interaction 'practice' (time, place, and actor) with other beings—a process of mutual respect and responsibility and one in which there was no end or final "product."

Résumé: Le savoir indigène Boreda stipulait que les humains respectent toutes les entités avec lesquelles ils cohabitent, y compris la pierre. Les relations réciproques entre humains, pierre et eau ont déclenché leur participation mutuelle pour devenir des foetus, des nourrissons, des enfants, des adolescents, des adultes mariés, des adultes d'âge mur, des anciens puis des ancêtres. La vie était une production conjointe entre humains et non humains, de telle sorte que la pierre et l'eau pouvaient infliger des dommages aux humains ou leur apporter un bien-être. Les êtres non-humains, tels que les outils de pierre éclatée, étaient la preuve de l'exercice d'une "pratique" correcte d'interaction (temps, lieu et acteur) avec d'autres créatures, à savoir un processus de respect mutuel et de responsabilité pour lequel il n'existait pas de « produit » fini ou final.

Resumen: El conocimiento indígena de Boreda prescribía que los humanos respetaran todas las entidades con las que cohabitan, incluida la piedra. Las relaciones recíprocas de los humanos, la piedra y el agua impulsaron su participación mutua convirtiéndose en fetos, bebés, niños, jóvenes, adultos casados, adultos maduros, ancianos y antepasados. La vida era una

coproducción entre humanos y no humanos, de modo que la piedra y el agua podían causar daño o traer bienestar a los humanos. Los seres no humanos, como las herramientas de piedra labrada, eran evidencia de participar en una “práctica” de interacción correcta (tiempo, lugar y actor) con otros seres: un proceso de respeto y responsabilidad mutuos y en el que no había fin ni “producto” final.

KEY WORDS

Technology, Processes, Ontology, Africa, Stone

Introduction

The Tree Caught the Stone with Its Roots (Elder 2023)

A chalcedony core, a parent of future stones, was nestled in a hollow ‘womb’ (*kantsa*) of a fig tree, *Ficus sur* (Figure 1). The tree’s massive trunk, 10 m in circumference, was anchored into the earth and was one of the most sacred trees in the Gamo-Boreda highlands of southern Ethiopia. Many elders recalled when all Boreda lived according to the Fig Tree Path (*Etta Woga*). As fig trees aged, their roots penetrated the grassy mountain plateaus and created deep surface channels, where elder men offered barley beer. Many Boreda still exalt the fig tree’s branches as “the gray hairs of the old men.” Boreda elders frequently comment that the fig trees appeared on the graves of the ancestors who first settled on the land. The descendants of the founding ancestors possessed most of the farmland and claimed elite status; they were *malla* (i.e., farmers). In the wombs-hollows of the same fig trees, *malla* men gifted the intestines of sacrificed sheep to their founding ancestors. The old fig trees propagated through a mutualistic relationship with wasps.¹ Boreda commonly respected fig trees for embodying maleness and femaleness and for broadcasting on the landscape the critical reproductive process outlined in their ontology, *Etta Woga*. Many elders perceived the chalcedony that was wedged in the trunk of this sacred fig tree as representing a disturbance. Chalcedony was usually transformed into hidescrapers with the aid of low-status Boreda *hillancha* (i.e., artisans). Together, the hidescrapers and artisans-*hillancha* converted domesticated animal hides into ritual musical instruments and clothing for farmer-*malla* ceremonies in the sacred forests. *Etta Woga* stipulated that the presence of artisans-*hillancha* and their chalcedony was

taboo (*gome*) and forbidden in sacred groves. A leatherworker's stone within the tree signaled a disruption of the proper creative process, reproduction. The chalcedony core embedded in the fig tree implied that both leatherworker and stone were on alternative life paths, one of impending chaos and infertility for the community—human and non-human. Why did artisans-*hillancha*, including knapping leatherworkers, hold a low-status in Boreda society? How did Boreda explain the presence of chalcedony in the fig tree? Why was a core an omen?

Throughout 30 years, many Boreda patiently taught me the tenets of Etta Woga and how they perceived the relationships between humans and between humans and non-humans, including stone technology (Arthur 2018, 2019, 2021). Etta Woga prescribed that every being was in a constant state of transformation. A being's value and status were based on how, when, and where (e.g., the process) they became an apprentice, a respected skilled person, a working stone tool, a ritual vessel full of barley beer, or an ancestor. I became *their* cultural apprentice, someone who listened and learned with epistemic humility, embraced a long-term apprenticeship, was receptive to adopting the praxis of learning in a manner set out by community teachers, and was willing to shed my culture-bound way of perceiving the world (Arthur 2019; Brumbach and Jarvenpa 1990; Keller and Keller 1996; Wallaert 2012). My journey and willingness to become a cultural apprentice provided me with a deep and rich perception of the lives of humans, knappable stones, and their offspring. I assert that we must



Figure 1. Chalcedony core wedged in the trunk of a Boreda sacred tree (Photograph Kathryn Weedman Arthur)

privilege a wide range of cultural theories of reality or ontologies in interpretative writing about past and present worlds. By becoming a cultural apprentice, I became articulate in their way of perceiving the world, which ascribed knappers a low status in society and recognized stones as charged with potency to cause harm. In this paper, I will illustrate, according to the tenets of *Etta Woga*, how people, stone, water, and animals were immersed in mutualistic relationships in which they instigate one another's transformations. *Etta Woga* proscribed reproductive interactions (procreation, gestation, birth, maturation, circumcision, marriage, death) as initiating discernable states of being (fetus, infant, child, young adult, married adult, elder, and ancestor) on identifiable landscapes (forests, caves, and homes) and at distinct times of the year (season).

Learning Boreda Ontology

My first lesson toward substantially learning Boreda technological knowledge was to *listen with epistemic humility*. I began my journey studying Boreda stone tool practices by setting out to test the Western perceived divide between stone tool style and function (Weedman 2005, 2006). I desperately wanted to understand Boreda's way of perceiving their material culture, but I firmly held on to my academic perceptions of stone (Arthur and Weedman 2005). After finishing two years of PhD studies among Boreda knappers, I had many more questions and few satisfying answers. Five years of teaching, life changes, and reading the works of Indigenous scholars made me realize I needed to be humble, patient, and listen to Boreda (Arthur et al. 2017). Importantly, my identity as a woman did not prohibit me from learning Boreda stone tool technology, nor was I considered an 'honorary male.' Correct technological 're'production required male and female interaction, according to *Etta Woga*. My early attempts to become an apprentice were not thwarted because I was a woman but because I was a woman who had not yet demonstrated my reproductive potential. When I returned to Boreda with my three-year-old daughter, in the view of many Boreda, I had finally been 'caught,' which meant that I now understood responsibility for another being. I gestated into a new status, *mischer*, a woman with a child (Arthur 2020). As a mother, I experienced how swiftly change occurs, and I recognized that my previous two years in the highlands represented a short-term investment. In the view of many Boreda, as a mother, I also understood the responsibilities of shaping another person's identity and how much of that depended on my concept of identity—and how that, in turn, was entrenched in my culture and history. Through sharing my life changes and experiences as a mother, I became accepted as a mature adult woman in the view of many Boreda. In turn, they often

disclosed their personal, family, and community histories. For many Boreda, my life transformation was essential for instilling in me a sense of understanding change, responsibility, and the importance of the future and the past.

I was slowly introduced to spirit mediums and elders, saturated with knowledge about Boreda religion and culture. Boreda taught me through proverbs and stories, which did not seem to be about stone and whose meanings were not immediately disclosed (Arthur 2019). I needed to *embrace long-term apprenticeships and be amenable to learning in a manner established by my Boreda teachers*. My practice to attain a deep understanding of Boreda's way of perceiving the world required becoming more articulate in their language and culture (Walz 2013) to ascertain how they viewed stone. African scholars rightly insist that we must recognize African ontologies as legitimate theories for understanding past cultures (Asante 2007; Chirikure 2016; Diop 1974; Ichumbaki et al. 2023; Pikirayi et al. 2022; Ogundiran 2014, 2022; overviews in Schmidt 2018, 2023). Following the work of Spain's philosopher Wenceslao Gonzalez (2012), I argued that Western academics often are caught in a scientific tautology by testing and retesting Western theories concerning human-matter-spirit interaction in non-Western contexts. We are not learning. We decontextualize knowledge, which renders science unreliable and engages us in epistemological imperialism (Arthur 2019). A Boreda spirit medium reminded me that science is practiced universally, "We have a science of religion—all this I do is science; for all answers we try and try again, little by little, it is a process based on observation and experience" (personal communication 2012; Arthur 2018:66). Boreda process of acquiring knowledge throughout a person's life was referred to as learning "bit by bit," combining experiences with wisdom shared by elders. In their phrase "bit by bit," they were referencing Zara Yacob, a 17th-century Ethiopian philosopher who wrote a treatise titled *Hatata*, literally meaning *piece by piece* (Kiros 2005). Zara emphasized that wisdom comes not from God but through observation, reasoning, and life experiences. Boreda's process of acquiring knowledge was founded in their historical philosophies that rival those of Descartes and the West. Understanding the world around us is based on observation, experience, and experimentation, which is science and not the purview of only Western society.

Many Boreda taught me the necessity of *shedding my culture-bound way of perceiving the world and allowing myself to be taught their ontology and its emphasis on process* (Arthur 2019). I chose to frame Boreda ontology within the context of other African epistemologies and philosophies that tend to be obscured even though they pre-date Western knowledge (see Acholonu 1995; Akena 2012; Asante 2007; Diop 1974; Kiros 2005). I learned bit by bit, through the course of my life, how Boreda ontology,

Etta Woga (Fig Tree Culture/Path) emphasized that all beings (human and non-human) exist and perpetually exist because of their mutualistic relationships entangled and dependent on reproductive processes. A person, whether a farmer-*malla* or an artisan-*hillancha*, learned proper behavior and technological practices, little by little. Knowledge was transmitted according to a person's status marked by rites of passage during a person's life course (Arthur 2019, 2020). Similarly, Ethiopian Gamo (Bombe 2013) and Oromo scholars (Megerssa and Kassam 2020) emphasized the importance of life cycles and fertility in relation to defining being and the co-creation of existence (also see Freeman 2002). Boreda's perception of the world was based on their generational knowledge, observations, experiences, and experimentation with other beings (plants, animals, sun, moon, earth, etc.). According to Etta Woga, human and stone bodies were active agents who interacted and transformed; they were pliable and moved as they were immersed in being. Western perspectives and science, which tout objectiveness, have been criticized for breaking down bodies into parts "attributes" and ignoring the processes of multiple interacting bodies (Kimmerer 2013). An emphasis on a reproductive process and the concept that a being cannot exist independently resonates with many African ontologies (Amadiume 1997; Diop 1974; Dutta et al. 2021; Karenga 2004; Murove 2018; Nnaemeka 2004; Oyěwùmí 2016). There is no separation between matter-body and spirit-soul. All beings have power that manifests in their ability to move and change, instigating interaction between beings in the form of reproduction. The existence of all life is founded on reproductive tension between order and disorder (Karenga 2004:175–217). Annihilation of all life only occurs with sustained infertility and lack of reproduction, a state of nothingness. All matter and spirit are in continual existence, so the death of a body is not an actual death but a transformation of a being's essence to a new form. For the Boreda, this essence of being in all earthly materials was *Xaallahetti*, which transformed through the lifecycle, *deetha*, and was recognized as a light, sheen, fire, or *xoomppe*. A being could not exist alone or transform alone. Existence was defined as being in a continual transformative state of interaction (reproduction) with other beings. To ensure wellness, balance, order, and the continuation of existence, humans, stones, trees, water, and all other beings transformed at specific points in their lifecycle, *deetha*. At each of these transitions in life, other beings must have been present to instigate change by catching, penetrating, and holding one another.

As a cultural apprentice, I had to listen and learn with epistemic humility, embrace a long-term apprenticeship, be receptive to adopting the praxis of learning in a manner set out by community teachers, and shed my culture-bound way of perceiving the world. Formerly colonized peoples and their knowledge do not endure as a result of being hidden, forgotten,

or existing on the fringes of imperialism and capitalism. They exist because ontologies are invisible to those who perceive the material world as the only real and relevant world. For many Boreda, there were no end-products as material bodies continually change. Informed by Boreda understanding of being in the world—it was the process of interacting with other beings in a proper way, place, and time or path that was significant and ensured future well-being. Below, I offer what I have learned from my Boreda teachers concerning the lives of stone tools between 1996 and 2012 that provide a key to understanding the omen in the fig tree. Therefore, in the discussion below, I use the past tense, even though some Boreda continue to follow Etta Woga. Upon returning to Boreda communities in 2022–2023, I found several elder knappers had died; their sons frequently converted to Pentecostalism and did not follow the path of *Etta Woga*, even if they pursued leatherworking and knapping.

Etta Woga and the Mutualistic Lives of Male Knappers and Stones

The Fig Tree Path was Boreda theory of being and informed not only what constituted being but how, where, and when Boreda should appropriately interact with other earthly beings. Reproduction was the proper process of interaction between beings that elicited change. Humans and other beings needed to continue to change and move as these activities were recognized as signs of life. A Boreda proverb spoken to youth was *Sorsha Mela Pota*, keeping changing and shedding your skin like a snake. The snake was perceived to change repeatedly, and even the body's death was a transformational shedding into a different state of being—ancestor. The correct path for humans and all beings was to exist in a continued state of latent change, like a snake.

According to Boreda elders I learned from, the tenets of their Etta Woga ontology outlined that people, and all other beings stone, earth, etc., had the *potential* to experience transformation through structured life stages (*deetha*): fetus, infant, childhood, puberty, married adult, titled adult, elder, and ancestor. Marking the transition into a new stage in a being's life, the individual initiate (fetus-*gaccicino*) participated in a 9-month ritual reenacting the events before and after their birth. The path of their successful physical birth into the world recreated during social rebirth ensured and increased the success of their social transformation. The perceived correct path for a being to enter the physical world was birth-entrance (*yella*), severing (*katsara*) of the umbilical cord, seclusion (*dume*) with mother, joining the family celebration (*bullacha*), and incorporation (*sofe*) into the

community. Boreda titles for human life stages and life processes were applied equally to all beings, including stone, clay, stone, animals, etc.

For many Boreda elders, according to Etta Woga (Fig Tree Culture/Path), humans and non-humans were caught in each other's existence. The catcher and captured were responsible for co-creating, and there was tension between them because they both had agency. For example, the proverb, *Michishin hatay mees*, meant if you did not respect the water and other non-human beings, they could kill you. Stone, rainbows, soil, and water were alive innately with a vital force (vitalism, e.g., Bennett 2010), while the potency of trees and snakes was enriched through the transference of human souls (animism, e.g., Harvey 2005 and see Bonsu 2016 for a critique of terminology in the African context). The *Xaallahetti* could change through time and could conspire with one another. For instance, water in the form of rain (*Dydanta Xallahetti*) could wash down a mountainside, dislodging boulders (*Chicho Xallahetti*) and trees (*Etta Xallahetti*), either harming or bypassing humans. At any point in a being's life, they could encounter other beings that altered their life and set them on a different path. There was recognition that human beings could not and did not exist alone, which was incorporated into all transformative rituals. During birth, severing, seclusion, joining of families, and incorporation into a community, an individual depended on the presence of water, stone, and sacred trees to ensure successful transformations.

Birthing Stones—Becoming *Uka* (Infants) and *Na7ay*² (boys)

Etta Woga established that all beings gestated for 9–10 months (proper time) in a womb (proper location), after which midwives (proper actors) assisted with their birth. In a well-known Boreda myth, the first people were born through one of the earth's wombs—*caves*. Like a woman, the earth possessed wombs that patiently caught rain and created, nurtured, and cared for the first humans. Like a man, the rain eagerly penetrated the earth's wombs 'caves' through openings made by fig trees and instigated new human beings. When the first humans exited the womb, the waterfall cleansed them. In parallel to the first act of human creation, the birth of human beings occurred in the *womb* (*kantsa*) of a home's hearth room, which was enclosed by a figwood roof penetrated by a wood 'spear/penis' (*tora*) central house post (*tusa*, an heirloom of patrimony). The midwife laid the human fetus (*gaccicino*) on an enset leaf, removed the placenta (*doha*) and cut the umbilical cord (*gula*) with a stone knife (*mas'sha*). The infant's father buried the placenta and umbilical cord, which was considered infertile waste (*chacha*). He then cleansed the infant in a sacred river and announced the birth from the household threshold. For rites of pas-

sage conferred later in life, such as puberty, marriage, titles, and death, a male elder announced the beginning of the initiate's transformation, i.e., birth, at the household threshold. Announcements usually occurred during Maskaram (September 11–October 10) at the end of the long, intense rains (July to September).

Knappers preferred nodular stone bodies (fetuses-*gaccicinotti*) acquired through reaching into the earth's womb (quarry-*kantsa*) after the heavy rainy season. Quarries were ecosystems that exhibited continuous change, where the earth, water, and trees interacted. Knappable stone bodies formed when the male rains penetrated earthly crevices and blended with earthly elements in wombs (Arthur 2018, 2021). Boreda highlands experienced a bimodal rainy season. After the rains stopped, September–March and May–June, knappers traversed one to three hours (2–15 km) down steep scree slopes to quarries. The Boreda quarries were located east along the Southern Main Ethiopian Rift escarpment in the Hageza, Bobe, Kandalo, and Etala river valleys, north along the Saware River, and west in the Abeye, Kulano, and Shembo rivers. Nodular cherts existed at 2300 m enclosed in continental flood basalt (Eocene–Oligocene) (Coltorti et al. 2019).

Quarries-wombs were considered alive and dangerous places protected by specific lineages of men. Knappers considered that their knowledge about birthing practices and the location of stone constituted restricted information transmitted through a man's patrilineage, creating a stable alliance between lineages of men and stone (Arthur 2021). Men of one lineage lived together in a hamlet, and with the expansion of lineage members, different branches of the lineage claimed access to other quarries along the same river. In addition to lineage membership, a man's life stage determined his activities at a quarry. In the past, a boy began his relationship with stone by entrusting a stone knife to perform his circumcision during his puberty rites of passage that would socially transform him into a man. The boy (*na7a*) became a young man (*pansa*) permitted to accompany elders to birth stone. While in seclusion for healing, men also learned technological knowledge from older men in their lineages, usually fathers, but sometimes other male relatives. For many Boreda, knappers were an example that the path through the lifecycle structure (*deetha*) was not linear with a set ending. Elde knappers escorted initiates to stone quarries and encouraged the young leatherworkers to birth stone for the first time.

Knappers who improperly birthed stones received retribution from farmers-*malla* and other earthly beings (*Xaallahetti*). *Malla*-farmers punished knappers for birthing stone without women—an action that violated the proper reproductive path outlined in *Etta Woga*. Boreda oral traditions suggest the low status of *hillancha* and male control over resources, likely dates to the late nineteenth century when the Ethiopian-Christian state

insisted on male conscription of resources (Arthur 2018). *Malla* forbade knappers from completing their puberty rites of passage, which required public incorporation at the marketplace. Landowning farmers-*malla* perceived that knapping leatherworkers and other artisans-*hillancha* did not follow the correct path during their puberty circumcision rites of passage. Consequently, they took another path and failed to become full-mature adults. The social recognition of artisans-*hillancha* as living in a stagnant state of non-adulthood reaffirmed and prohibited artisans-*hillancha* from interacting and sharing food, land, homes, spouses, and sacred forests with farmers-*malla*. As living beings, stone, earth, and water could also punish knappers for neglecting to provide offerings. Knappers believed that landslides and drownings at quarries were penance for improper veneration. Elder knappers placed barley-powder and roasted-sorghum in tree hollows or along the riverbank at quarries to ensure protection while they birthed stone.

Experienced knappers guided their youth to select specific colors and shiny chalcedony nodular “eggs-*uka*” buried in the womb-earth near trees (Arthur 2018, 2021). Viable stone beings ready for birth expressed a particular color and a light or shine, *xoomppe*, in archaeological terms—luster. Each community of knappers also recognized specific chalcedony colors as emanating life (light), and other shades of chert were impure and worthless (*t’unna*). Color and light were more than independent qualities, traits, or variables. The sparks of a bonfire, the glow of a household hearth, the twinkle of the stars, the sun’s radiance, the gleam in a person’s eye, and the sheen-luster of stone were all indicators of life. Humans had light, so they were connected to all other beings. The light was diffuse rather than directional; a being’s light represented its potential to change and proceed along a correct life path. Like newborn human infants, knappers removed the cortex (*chacha*—infertile waste, e.g., umbilical cord and placenta) to fully expose a core (*uka*-egg). If the exposed parent material exhibited the correct color and shine, the knapper proceeded to form the parent material into a core (*uka*, egg). A core was a fresh egg from which life could potentially emerge. Boy stone blanks (*na7a*) emerged from an egg at the quarry through *tekata* (knapping), which means “to protect.” Like the umbilical cord of humans, knappers buried the *chacha* (infertile waste, debitage) at the base of a tree. The stone blanks were usually carried back to the leatherworker’s home in a leather bag.

Chalcedony nodules were living beings who required care, and elder knappers were responsible for ensuring that chert beings had a long life. Inexperienced knappers could significantly alter the life course of stone during birth. Youth could reject guidance from elders and choose poor-quality cherts, resulting in more debitage, fewer scrapers, and the inability to produce durable scrapers that would not break or need frequent

resharpening (Arthur 2018). Though because experienced knappers often intervened, the frequency with which stone lives ended abruptly tended to be low.

Circumcising Stone—Becoming *Pansa* (Circumcised Youth)

Etta Woga stipulated that artisans-*hillancha* (actors) must excise impurities by *katsara*, meaning circumcising and knapping (action). Human and non-human beings were circumcised at one of the wombs of the earth (location) during June (time, Arthur 2018). When parents decided that their child was becoming mature, they called a specialist to perform the circumcision (*katsara*). In the past, humans were circumcised (*katsara*) with a stone blade in its most potent fertile stage (married-hafted tool). More recently, a metal implement was used to circumcise humans and stone. Historically, men and women experienced circumcision on an enset leaf in a sacred forest and later in their household garden (men) or the hearth room (women). The foreskin (*shurita*) and clitoris-spear (*tora*) were perceived to be infertile waste material (*chacha*). All materials were wrapped in an enset leaf buried in the household animal pen or at the base of a tree. After men and women completed their entire puberty rites of passage ritual, ideally nine months, they washed in the boundary river at the next *Xoomppe* ceremony in June. They were fertile adults ready for procreation.

Prior to the *Xoomppe* ceremony, knappers prepared the hidescraper *na7a* (boys) for their work on hides. Farmer-*malla* slaughtered sheep and cattle for immolation feasts during the fourth day of the *Xoomppe* ceremony. *Malla* offered the animal's blood and entrails to the ancestors, consumed the roasted fatty hump and meat, and gifted the artisans-*hillancha* the legs, tail, head, and hide. Leatherworkers transformed hides into leather wedding gifts (bed mats and hammocks), bags (for carrying children and agricultural goods), musical instruments (for rituals), and, in the past, clothing. All items were utilized during and after the *Xoomppe* rituals. Leatherworkers began to knap-circumcise (*katsara*) stone bodies before *Xoomppe* so that they were ready to enter the scraping haft to process the numerous hides that would become available. Knappers used an iron billet (stone in the deeper past) to circumcise stones next to the home's hearth over an enset leaf or an old hide. The debitage (*chacha*) was removed and placed in the household garden. The hidescrapers were washed in river water. Knapping, like circumcision, removed the impurities and readied the stone to become an active procreative tool.

The lives of stones were protected, and knapping was a serious responsibility. If not carried out properly, then the life of the stone being may be cut short. Young leatherworkers began to knap after they completed their

circumcision rite of passage, but they could spend 8–10 years in apprenticeship before they were permitted to knap alone (Arthur 2018). They considered knapping the most challenging aspect of leatherworking, which required years of listening, observing, learning, and practicing with expert and master knappers. Boreda learned little by little, as appropriate to one's status in life (Arthur 2019). Stone was protected, and youth practiced in the presence of experts, who directly interceded on behalf of the stone and could take over production. Just as they would not leave a human youth to mature on his own or alone in the presence of other youths, expert knappers did not leave knapping to the whim of youths. Experts worked closely with novices, so there was less waste (*chacha*), though experts produced a fifth of debitage (100 vs 500 ccm) compared to novice knappers. Furthermore, a hidescraper's breadth, thickness, length, edge angle, and amount of cortex did not vary based on the experience level of the knapper because elders worked closely with young knappers to ensure the production of fertile young male scrapers (Arthur 2018:157–160; Weedman 2002, 2006). Stones, as living beings, had to be protected throughout their life and engendered long-term human apprenticeships that began during puberty rites. However, an overeager youth who believed that a forceful strike on the stone could compensate for his lack of skill could produce a larger surface-area-scatter and hidescraper bodies with prominent bulbs of percussion.

During knapping, stone also had the potential to harm a knapper. Inexperienced knappers could position their bodies incorrectly or impact the stone in a way that shatter flew into their eyes or skin. Holding the billet and/or chalcedony-being in the wrong position also led to cuts or bruises on the hands.

Secluding Stone—In Between

Seclusion or *dume* was a period of isolated gestation during which the initiate (fetus-*gaccicino*) transformed from one social identity to another. After birth and every ritual rebirth, Etta Woga specified that humans and non-humans experienced seclusion in the household womb-hearth room (prescribed location), ideally for nine months from October to June (prescribed time) for a period of maturation and education (activities, Arthur 2018). Seclusion occurred after male elders “birthed” announcements in October (Timkat-Hedar) that a household member, initiate, was about to begin a socially recognized life change (adulthood, marriage, titled leader).

During seclusion, a person like a fetus engaged with a limited number of other humans and material beings (Arthur 2018). Initiates experienced *dume* in their womb-home (after birth, circumcision, marriage, and con-

ferred title) or in the womb-earth (death). During *dume*, household members and neighbors fed and educated an infant/initiate. Initiates ate foods on enset leaves rather than ceramics, did not use water to wash, did not use stone or iron to cut their hair, shave, or make offerings, and wore little clothing. They sat on a leather mat in the hearth room, typically in the house's western half. Although men and women shared household space, the west side of the house was women's domain because it was associated with the sun's setting, the capturing or holding of the sun by the earth. In contrast, the rising-erect sun in the east was associated with men and the release of the sun. A permeable wall made of highland bamboo (*Arundinaria alpina*) stood between the women's hearth room (*kola*) and men's cultural room (*woga*) and was symbolic of fertility. The hearth was adjacent to a central house post (*tus'a*) that pierced through the fig tree wood roof. Seclusion in the house was a physical sensual reminder of the proper reproductive process. Ideally, *dume* ended with the Bonfire festival (*Xoomppe*), a summer solstice festival. The Bonfire festival (*Xoomppe*) was celebrated over 4 days in June, between the short and long rains. *Xoomppe* was a rite of intensification in which Boreda came together to venerate their ancestors who first settled in the highlands. Initiates ended their *dume* period by entering a public ceremony (*sofe*) during the Bonfire festival, where the community recognized them as new persons (infant and mother), full adults (puberty circumcision), and titled adults.

After their birth from the quarries in October, knappers placed the boy stones (blanks, *na7ay*) in a leather bag for *dume* above the household door, where fathers announced the births of their children. During seclusion in a leatherworker's home, a stone body was rarely disturbed by humans or interacted with others. The seclusion of stone blanks ended after 9 months in preparation for the *Xoomppe* (Bonfire) festival in June. Knappers engaged stone to process hides into items that participated in the various ceremonies performed during *Xoomppe*. Parents gifted hide clothing and bedding to newlyweds. Elders wore hide capes when they achieved new ritual-political titles. Artisans-*hillancha* played leather musical instruments throughout different *Xoomppe* rituals.

Like their human counterparts, stone experienced several *dume* periods throughout their lives. Sometimes, stone bodies were not married immediately to the haft. As young men (*pansa*, unused hiderscraper), they would be placed in a leather bag hanging on the male side of the (fertile) bamboo wall, where unmarried circumcised boys might sleep. After hafting, the married hiderscraper (*wodala*, newly hafted) and respected adult hiderscraper (*wozanota*, hafted partially used) might rest near the household hearth, like a human married couple. When their bodies aged and they could no longer work well, the stone bodies separated from the haft. A stone elder (*cima*, discardable scraper) rested near the hearth in *dume* like

a human elder. Indeed, an elder hiderscraper might lay by the hearth on the floor long after it parted from a female haft. There also was the potential for the leather bag to have a hole through which a stone child or young adult could fall to the floor. Lying vulnerable on the earthen house floor, women might accidentally sweep the stones up and usher them out, landing near the house threshold or in the open area in front of the house. Someone may or may not pick them up and move them to their proper burial place—the base of a tree.

Marrying Stone—Becoming *Wodala* (Men) & *Cima* (Elders)

After circumcision and 9 months of seclusion (*dume*), men and women cut their hair and nails, washed in river water, and were presented to society under sacred trees at marketplaces. *Etta Woga* prescribed that men and women were (participants) fertile adults eligible to marry. They would consummate their marriage (action) at the groom's home (location) during June (time) to create a productive household (*gad'do*) (Arthur 2018). Boreda celebrated marriages with two feasts, one at the bride's house, *Emo Bullacho* (giving feast), which the groom did not attend, and another with the bride and groom at the groom's father's house, *Eko Bullacho* (taking feast). The ceremony was associated with happiness and incorporating the bride and groom as adults into the family social group. At the end of the *bullacha*, the initiate's father usually presented him with his first hide scraping handle and a hide. After the feasting, the bride and groom commenced to the groom's house to consummate their marriage in the hearth room on a hide. Hafting was one of the first acts that novice leatherworkers were permitted after they were circumcised, but they did not begin to haft tools by themselves at their hearth until after they were married.

Like a human groom, the male circumcised hiderscraper (*pansa*) did not attend the *Emo Bullacho* (giving feast) for his female partner, the haft (*zucano*). Hafts were birthed (*yella*) of hardwoods, such as African olivewood, Sudan teak, and cedar; after birth the hardwood was carved (*katsara*) in a haft that could live through 2–3 human generations and could experience many periods of resting in the hearth room (*dume*). The haft required the presence of mastic to secure the hiderscraper. During the dry season (October to March), leatherworkers traveled to the lowlands and collected tree gum from acacia trees. The gum exuded from the stem, forming small sacks of “tears.” Leatherworkers scraped the gum off a branch without wounding the tree and placed the gum on a broken sherd. While away from his home, the leatherworker built a small fire and set the sherd with the gum over the fire. He added charcoal to the gum as it heated to create mastic (*shell'ee*). When the gum became malleable, the knapper placed

some of it into the socket of the haft. This was the *Emo Bullacho* (giving feast) preparing the female haft for ‘consummation’ with the male hide-scraper.

A circumcised stone hide-scraper (*pansa*) traveled to the hearth in preparation to join with a female haft with tree gum in *Eko Bullacho* (taking feast). A hide-scraper might be trimmed again to ensure he would fit properly into the haft. The haft waited, and her *mastic* (*shell’ee*) warmed at the fire’s edge until she was soft enough for the male hide-scraper to enter. While the mastic was warm, the leatherworker inserted the hide-scraper and set it at an appropriate angle and position in the haft. When the stone joined the haft, he was a full fertile being ready for use—a married man—*wodala*. The male hide-scraper’s insertion into the female haft was reproduction, creating a fully fertile and powerful tool. The male hide-scraper consummated his marriage with the female haft near the hearth, just like his human counterpart. Many leatherworkers expressed that a hide-scraper was happy when combined with the haft.

A human married couple established their home and began their (re)productive lives. A married man focused intensely on all aspects of leatherworking to support his family. He quarried, knapped, scraped, and sewed to make leather products for his neighbors.

Hides were given to the leatherworker with a request regarding the desired product. The leatherworker assisted the hide in commencing through its life course. A leatherworker removed (*yella*) the hide from the animal, washed the hide in the river, and made incisions (*katsara*) along the edge of the wet hide, where he inserted wooden stakes to secure the hide on the ground. The hide dried in the sun, rolled up, and rested ‘stored’ in the home’s rafters (*dume*). The hides were bathed in river water before they were scraped (*katsara*) with the hide-scraper. Together the human, hide, and hide-scraper began an intensive 1 to 1 ½ hours of transformative interaction.

The hide-scraper’s working-edge moved across the inner hide, removed pieces of dried fat, and began to age quickly. I directly observed the lives of 65 scrapers from birth to death; on average, their life span was about one year (Arthur 2018:166–170). The life of a hide-scraper passed more quickly at the end of their lives. Once he had joined with the female haft, they were actively engaged, scraping a hide about 280 strokes for about 1 h, and followed on average by four other hide-scrapers to complete the processing of the hide. As the edge of the hide-scraper dulled, the leatherworker struck the stone’s edge an average of 19 times, removing an average of 1.7 g of material. The hide-scraper became slightly smaller (1 mm in length and 1 mm in thickness) and more wrinkled (increased number of retouch scars), and their bodies began to stoop at an increased angle (edge angle increased average from 50 to 67). In this process, the hide-scraper became

an elder (*cima*). He had changed predictably in relation to his entire body, i.e., allometrically (Shott and Weedman 2007). From the perspective of many archaeologists, the hidscraper would not appear to be exhausted. A Boreda leatherworker would decide that a hidscraper was ready to retire, by observing how close the scraper's edge was to the haft and by running the tip of his index finger over the stone's working edge to determine its sharpness. If the hidscraper was determined to be ready to retire, then, like a very old man, the hidscraper remained near the hearth in *dume* until his death.

During attempts to rejuvenate a hidscraper, the hidscraper could cause injury to an inexperienced knapper by cutting his finger. During resharp-ening, a knapper held his finger on the edge of the dorsal face of the tool and lightly struck the edge (eye) of the hidscraper with a small iron billet. If the knapper struck too hard, he could break the tool, and the stone's edge could cut him. Despite long apprenticeships to ensure the longevity of a hidscraper, once he was hafted, competent knappers were allowed more leeway than novices. Novices more often broke stone bodies than their elders because novices selected thinner flakes that broke more easily and struck the stone too forcefully. They were also more likely to create spurs that ripped the hide. The impact of a novice knapper's engagement with stone and hide could redirect the life paths for all three beings, resulting in various scenarios: a knapper with a deceased broken scraper or a spurred retired scraper and delayed hide production and income; a knapper with a ripped deceased hide and no income; a knapper with a hide that would be made into a smaller product for less income; and perhaps a knapper who would be admonished by elders and injured by a stone.

Death of the Stone Body—Becoming *Moyittilletti* (Ancestors)

Sofe was public incorporation into a new status, and in some instances, this meant the death of the physical body and transformation into a new ancestral being (Arthur 2018). When a leatherworker died, he was kept in his house, separated from others in *yella* 'birth'. His nails and hair were trimmed, his body was straightened, washed with roots and water, and wrapped in locally made cotton cloth. A procession of male relatives carried the artisans-*hillancha* on an enset leaf to his grave in the household garden. Farmer-*malla* were buried in sacred forests. The body was covered with soil and juniper branches. No items were placed in the grave with the person. In the past, the person gestated for nine months (*dume* seclusion) in the earth. Then, his oldest son brought barley porridge on an enset leaf and placed it on his grave (*bullacha*-feasting). He would say, "Old soul, take this," and the soul joined the old ancestors. Non-artisans were buried

in formal forested cemeteries, and it was thought that *etta* (fig) trees established themselves (they self-propagate) over the heads of exceptionally important persons. The souls of all beings became ancestors (*moyittilletti*). Ancestors were not souls who silently watched the living from the fig trees. Ancestors in the form of snakes and trees had agency to bring harm or wellness through their relationships with all other vital beings, *Xaallahetti*, such as rivers, rainbows, thunder, stones, and earth. *Xaallahetti* did not embody the souls of the ancestors; instead, they had a mutualistic relationship, like the fig tree and the wasp.

Stone beings also experienced old age and death and, as ancestral beings (*moyittilletti*) could impact the lives of humans. Like a human knapper, the dead hidscraper was buried in the household garden and returned to the earth. There, the hidscraper rejuvenated the lifecycle process, supplying the essence for new stone beings, like the essence of the leatherworker that transformed into an ancestral being (*moyittilletti*). Stone hidscraper bodies lived most of their lives within the confines of leatherworkers' households, segregated spatially from farmer-*malla* households. Isolation of leatherworker households was thought to prevent community accusations of *Bita*. Stone beings discovered to be wondering outside a leatherworker's home were prohibited and believed to cause infertility. Farmer-*malla* considered the presence of stone bodies outside artisans-*hillancha* land as *Bita*, a form of magic thought to cause harm to farmers-*malla*. A community's punishment for *Bita* practices was to separate the suspected partner of the stone, i.e., leatherworker, from community activities and to offer him no help in future.

To Catch a Core

The presence of a core in a fig tree was an affront to *Etta Woga*. When I inquired how the core had ended up in the tree, a group of elders scolded me, "the tree had caught the stone with its roots"! This time, there was no blame associated with a leatherworker. Instead, the stone in the tree was a means for the tree to communicate to the community. Of course, a person did not intentionally place the core in the tree. The tree actively pulled the stone into it. I had reverted to assuming a human agent was responsible and implied that this was the endpoint for the core. No person would do this, the elders said! The fig was interrupting its own life course and sending a message! In 2012, the core was not in the tree. At that time, I witnessed young Pentecostal farmers-*malla* removing the fertile soil near the fig tree. They moved the soil to their household gardens. I understood immediately when the elders explained further that the core in the *Etta* tree was a sign that youth should stop removing the rich soil from this sacred

place. The youth did not stop, and there was extensive erosion to the north and west of the tree. Then, in 2018, locust consumed their crops, and a drought began that continues to the date of this publication. The youth have stopped robbing the soil.

According to *Etta Woga*, living the correct path reinforced a perception of the world in which the lives of human beings and all other beings (matter and non-matter) were immersed in a shared permeable existence (Arthur 2018). Life did not move in a single direction, and humans did not hold a hierarchical position over other beings. In contrast, the Boreda Fig Tree Path emphasized a universe consisting of trans-beings with mutualistic connections—like the wasp and the fig tree, who were entirely dependent on one another for their reproduction¹. In a universe of mutualism, humans cared for and ensured all other beings' longevity. Similarly, the lives of stone and human beings were altered by their interactions with one another and other beings within their environment (humans, water, earth, and trees). They sometimes proceeded along a different life course, an emergent reality. I learned poignantly how Boreda ontology, *Etta Woga* [The Fig Tree Path] defined being and prescribed how (reproduction), where (sacred forests and homes), and when (life course and seasons) beings should interact. A long life in which the fetus-nodule in its earth-womb matures to egg/infant-core (*uka*), to boyhood-hidescraper blank (*na7a*), to circumcised youth-unused hidescraper (*pansa*), to married-hafted hidescraper (*wodala*), to respected titled adult-useful hidescraper (*wozanota*), to elderhood-discardable hidescraper (*cima*), to ancestor-discarded hidescraper (*moyetti*), then to a rebirth-recycling, and so on.

According to Boreda ontology all life experienced the reproductive life cycle, which structured all Boreda technological practices, including knapping. The process of acquiring a new status in life required assistance from individuals with the status of full adult (*wodala*). A hafted stone tool, '*wodala*,' cut human umbilical cords at birth, foreskins and clitorises at puberty, and hair and nails at marriage and death. Each life stage event occurred at 'wombs' (caves, homes, sacred ground) with seminal fluid (river water) and sacred trees (male and female attributes). In turn, only men with the status of *wodala*, who also demonstrated their fertility by conceiving children, were allowed to work with stone beings alone. The perception of stone as a male-living active being who demanded respect dictated that the life course of the stone paralleled the life course of Boreda men: birth/procurement (*yella*), circumcision/knapping (*katsara*), maturation in seclusion/storage (*dume*), marriage/hafting (*bullacha*), and death as re-incorporation with the earth/discard.

Boreda ontology materially manifests on the landscape—visible to persons, even archaeologists, who are willing to lend themselves to respecting all non-human beings as active and alive. A consistency exists across the

Boreda landscape that is visible in the location (wombs, gorges with nodular chert and households) and timing (dry seasons) of human-stone activities (procurement, knapping, hafting, use, and discard). During the dry seasons, adult men made special-purpose trips to birth (*yella*) buried stones from river gorges (wombs' penetrated by active rivers 'seminal fluid'). The men were attracted to only nodular chert (*uka*) of specific viable colors, which emanated a luster (*xoomppe*). Knappers cut the cortex (omphalectomy, *katsara*) forming cores (*uka*) and cut (circumcision, *katsara*) flakes into blanks (*na7a*) at the quarry. Long-term apprenticeship ensured that the stone blanks (*na7a*) and unused scrapers (*wodala*) in each community of knappers conformed to a specific morphology. Stone blanks (*na7a*) were stored (*dume*) above the house door. At the end of the rainy season, just before the June and September rituals, the blanks were prepared to process hides made into musical instruments, bedding, and clothing for rituals. The blanks were trimmed again (circumcision) into useable tools (*pansa*) and entered the female haft (marriage, *bullacha*) near the household hearth (womb). The hafted hidescraper (*wodala*) grazed across (circumcision, *katsara*) the hide, removing the inner fat. The hidescraper was periodically resharpened until he was notably shorter and thicker, aging predictably in relation to his body size and become exhausted (elder, *cima*). The hidescraper was stored (*dume*) near the hearth until he was discarded (*sofe*) at the base of a tree in the garden.

For Boreda farmers-*malla* and artisans-*hillancha*, who adhered to *Etta Woga*, a being's importance was not based on individual accomplishments. Instead, one earned status by respecting other beings (Arthur 2018, 2019). A Boreda knapper engaging with other living beings, such as stones, must do so with the respect that ensures the longevity of the stone beings. From the perspective of Boreda humans, respect meant interacting with other earthly beings as prescribed cooperative male and female gender roles to ensure fruitful (re)production. The absence of women leatherworkers and knappers today is likely a result of late 19th-century incorporation of Boreda into the patriarchal Christian Ethiopian State that insisted on male control of resources (Arthur 2018). From the perspective of earthly beings, humans must be respectful to non-human beings, accept change, and long-term apprenticeships to acquire proper (technological) knowledge and experience for successful co-production to avoid waste, chaos, and infertility. Forgoing appropriate, respectful interaction results in chaos, death, and an inability to "continue to change like a snake" and "learn bit by bit."

Boreda ontology was a theory of reality in which humans and non-humans, including stone, were alive and, together with other beings, maintained existence through their interactions. The objectification of non-humans and even humans did not exist because there would be no existence without all beings. Life was a process in which one must act appro-

priately with the appropriate bodies and in the proper location. Respect for other beings and how humans interact with beings takes precedence. Boreda emphasis on process disrupts Western capitalistic values on standardization, efficiency, and material/morphological complexity of final products. Boreda and other Indigenous people are not remnant pre-capitalist societies, who endured because they hid or lived on the fringes of imperialism and capitalism—but despite it. Resilience and change are intrinsic to the Indigenous traditional knowledge system like *Etta Woga*. My goal is to share awareness of the possibilities garnered by an inclusive practice that reveals the explicitly wondrous skills and knowledge of our diverse world. A world in which a tree catching a chalcedony core, a being who a human left in a state of stagnant infancy, is a reminder to humans that non-human beings can capture human lives.

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Notes

1. Each genus of fig trees requires its own species of wasp to reproduce. Wasps nest in the fig and distribute the fig pollen in the fig, which enables the tree to make seeds and reproduce.
2. 7 is a high-level tone marker for the following letter “a” in Omotic languages.

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