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Paul Formisano
University of South Dakota

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The Paradox of Desert Writing: Bridging Epistemological and Discursive Gaps in Craig Childs’ *The Secret Knowledge of Water*

Paul Formisano (University of South Dakota)

In the opening pages of *The Secret Knowledge of Water* (2000), Craig Childs, a modern-day desert explorer, describes a journey to a Southern Utah slot canyon in full flood stage. As the deluge subsides, Childs enters the canyon to examine the water, and it is within the depths of this chasm that he reveals water’s unique and perplexing presence in the desert. With the “sour taste of dead animals and fresh mud” on his lips, he explains, “[t]here are two easy ways to die in the desert: thirst or drowning. This place is stained with such ironies, a tension set between the need to find water and the need to get away from it. The floods that come with the least warning arrive at the hottest time of the year, when the last thing on a person’s mind is too much water” (xiv). Musing on the consequences of too little or too much water, Childs invokes a central theme of the literature about the deserts of the American Southwest: paradox.¹

Cleanth Brooks argued more than half a century ago in “The Language of Paradox” that this motif plays a key role in the poet’s efforts to unify what may initially appear as contradictory emotions, ideas and symbols (17). Of the contempt that many have given to paradox in relation to poetry, Brooks notes that this motif has often been regarded as “the language of sophistry, hard, bright, witty” rather than the “language of the soul” (3). He further suggests that “[o]ur prejudices force us to regard paradox as intellectual rather than emotional, clever rather than profound, rational rather than divinely irrational,” and that under such preconceived notions “[i]t is the scientist whose truth requires a language purged of every trace of paradox” (3). However, as I contend throughout this article, it is precisely the scientist, who, like the poet, eventually comes to rely on paradox to both represent the desert’s otherness from human existence and the connections between humans and the desert that shape and influence both entities.
Childs’ use of this trope in representing the desert bioregions of the American Southwest is nothing new. In their respective works on the American desert writing tradition, scholars Peter Wild and Patricia Limerick trace the apparent contradictions expressed within the desert narratives by Spanish explorers and missionaries, Anglo scientists and adventurers, and more contemporary nature writers. Wild suggests that “over the last hundred years or so, we have embraced a huge set of contradictions. Our culture has turned the desert, as if it were a limitless, exotic putty, into just about anything people want it to be” (Opal Desert 3). To make sense out of these literary unconformities, Limerick categorises the outcomes of such encounters in three distinct but related views towards deserts that derive their power from pervasive myths about the fabled Great American Desert (3). These include “attitudes toward nature as a biological reality in human life—vulnerability to hunger, thirst, injury, disease, and death [...] as an economic resource—a container of treasures awaiting extraction or development; and as an aesthetic spectacle” (6). And although Limerick acknowledges that “the phrase attitudes toward nature throws a thin cloak of simplicity over a mass of complexity” (6), this unifying categorisation of key themes and developments proves extremely useful in approaching a large body of work that represents significant leaps in time and space.

As ongoing drought and increased development and urbanisation further stress the region’s limited water resources, we would be wise to take a closer look at this “thin cloak of simplicity,” for as Limerick argues of such representations and those who create them, “there is room to acknowledge subtlety, contradiction, and paradox” (9). By casting a more critical eye upon the texts representing the American deserts, we may discover how the attitudes towards the desert might, through the irony, paradox, and wonder they express, suggest for the reader alternative ways of knowing and acting towards these ecosystems. The purpose of this article, then, is to consider paradox as a key rhetorical device employed by Childs to shape his responses—and coincidentally ours as well—to the desert bioregions of the American Southwest and their current environmental challenges.
To understand how Childs employs paradox, I locate his writing within the explorer-scientist tradition of the American West and its reliance on the holism of Humboltean science that defined much of nineteenth-century scientific inquiry. Childs’ forays into the Southwest’s deserts resemble those by the mountain men, traders and ensuing soldiers, explorers and scientists of the nineteenth century who followed on the heels of the Spanish and Mexican movement into the region. Lacking the cartographic information accumulated over three centuries of Spanish and Mexican colonisation, these groups comprise what historian William Goetzman identifies as the “Rediscovery of the Southwest” wherein the “the essential task confronting them was one of rediscovery, of regaining the knowledge that had been lost” (38–9). Their investigations of the region led to later incursions sponsored by the Corps of Topographical Engineers beginning in the 1850s, which charged its expeditions to record “the plants, animals, Indians, and geological formations of the country traversed” in order to create “the broad outline, the comprehensive catalogue that was basic to any long-range scientific consideration of the region” (303, 329).

Unlike today where more clear-cut epistemological lines delineate what does and does not fall under the rubric of scientific inquiry, these borders were not so rigidly drawn in the nineteenth century. Thus, the Corps’ trust in “scientific consideration” meant a broad swath of knowledge across disciplinary and philosophical boundaries for nineteenth-century science “was a number of areas of enquiry, which did not necessarily all share common goals and methods” (Fulford, Lee and Kitson 2). These competing perspectives are perhaps best evidenced in the pioneering work of famed German geographer Alexander von Humboldt whose conclusions would directly influence the likes of Charles Darwin, Ernst Haeckel and the scientist-explorers venturing into the Southwest’s deserts including Childs. Donald Worster explains that Humboldtean science integrated a host of fields including botany, geology, climatology and economics to understand the interconnections between plants and their respective habitats. At the same time, however, this desire to move toward a sense of ‘truth’ about the natural world
was infused with an aesthetic of nature typical of the Romantic worldview (*Nature’s Economy* 132–36).

This epistemological nexus would inform the natural history writing tradition during this period as well, a tradition which sought to reconnect humanity and nature through a unique fusion of science and emotion.7 From this genre arises “a clarifying of perception inherent in this refocusing, which opens up something like a new world,” a world that “may eventually be seen as a more important discovery than the finding of new lands” (25). This explanation of what may be the genre’s largest contribution to understanding the environment is central to Childs’ work and his connection to the explorer-scientist tradition. While he does not discover new territory per se, he nonetheless introduces the reader to relatively uncharted imaginative terrain through his unique approach to “harmonize fact knowledge with emotional knowledge” (Lyon 3). This mingling of disparate forms of knowing, coupled with the casting of old knowledge—that established by earlier explorers and inhabitants of the region—within the new knowledge of his own observations and scientific pursuits, brings paradox once again to the forefront of desert writing as a powerful means of reconciling the region’s complex physical and imaginative realities.

To better understand how Childs navigates both the physical terrain of the deserts and the competing and often contradictory discourses represented in the traditions above, I turn to the pragmatic theory of rhetoric and ecocriticism’s recent materialist turn. In *A Pragmatic Theory of Rhetoric* (1987), Walter Beale offers an “objective model for talking about human constructions of reality” (10), which proves useful for considering how Childs relies on scientific and poetic discourses to make sense of his surroundings. Beale defines scientific discourse as “the kind [...] whose primary aim is the discovery, construction, and organization of knowledge, particularly in those areas or sub-areas in which facts, classifications, and general laws can be verified by rational and empirical procedures” (94). To chart this relationship, I expand my analysis of desert discourse beyond the typical genres of “reports of historical, statistical, field or laboratory investigations” that typically define scientific enquiry evident in the region’s historical
treatments (94). Poetic discourse, on the other hand, focuses on “the construction of an object of enjoyment and reflection, using the materials and resources of language” and is found in such genres as “[p]oems, stories, and novels” (94). Added to this rhetorical framework is Jane Bennett’s work on vibrant matter, which asks us how we might better address our environmental crises if “we gave the force of things more due” (viii). Together, this rhetorical mapping and consideration of matter’s agency allows us to read Childs’ construction of the deserts as a physical and philosophical contact zone where we confront the borders that mark epistemological systems, the divisions between the human and the nonhuman, and the discursive and disciplinary strategies and positions used to evoke the mystery and wonder of these bioregions. Reading The Secret Knowledge of Water through these lenses encourages us to rethink our relationships with aridity and the vast spectrum of matter (human and nonhuman alike) shaped by this reality with the broader goal of identifying how we might more effectively imagine and enact bioregional habitation.

The little scholarship that exists on Childs’ writings places the entanglements of scientific and aesthetic epistemologies at the forefront. Matthew Teorey has suggested in his study of this text that Childs’ work “is less about sharing scientific data and recounting exciting backpacking adventures than it is expressing an ecocentric outlook, whereby readers begin to comprehend and grapple with humanity’s eco-reality and biological selfhood” (3). To facilitate this new vision of nature and society’s relationship to it, Teorey argues that Childs employs an “ecological discourse, an articulation of nature’s intrinsic value and humanity’s responsibilities as a member of the biotic community” (2). Although I agree with Teorey’s assessment of The Secret Knowledge of Water as a means of reorienting the reader’s mind to a more ecocentric perspective, I find that Childs’ scientific training, awareness and the scientific discourse that speaks to his motivation to know the desert and its water, plays an integral role in defining his unique vision of these entities. Indeed, it is precisely Childs’ scientifically motivated discourse that gives way to more aesthetic responses to the desert and the poetic discourse of reflection. Thus, paradox comes to define not just what Childs observes through his explorations but the
type of discourses he employs as he seeks knowledge. And it is exactly his use of paradox that Childs creates a slightly alternative vision of these bioregions shaped less by an attitude projected towards nature than through one open to nature wherein the desert exerts agency or “speaks back” to the writer. Ultimately, this vision enacts “nature’s voice,” the “non-personified authority as a speaking subject that communicates, in its own way, to all living beings, including humans” to create a more complex view of the desert and its water (2). The Secret Knowledge of Water is therefore Childs’ account of how the desert has instructed him and how, when confronted with paradox on an observational and experiential level, he has to rely on different discourses to make sense of this desert phenomenon and to ultimately offer new ways to engage the deserts of the Southwest through inquiry, observation, reflection and restraint.

Childs begins The Secret Knowledge of Water reflecting on an experience within one of the desert’s countless canyons wherein he admits that “I realized that part of my life was here, something I would have to seek with full attention, dictated by the water from my mother’s spring sent from her body into mine” (xvi). As he further emphasises his connection to the desert-as-home rather than desert-as-destination, Childs’ treatment of desert water in these opening pages reflects Jane Bennett’s “thing-power,” “the curious ability of inanimate things to animate, to act, to produce effects dramatic and subtle” (6). From this opening reflection to the experiences with water throughout the text, Childs hones in on desert water’s agency and its ability to influence his life though its effect on both his physiology and his career as a writer. To understand water’s influence in shaping all that comes in contact with it, Childs appeals to scientific discourse to provide a more objective and possibly more accurate vision of the desert and its water than one steeped entirely in a Romantically-charged imagination.

However, as the above quote suggests, Childs’ quest is just as much a journey into the self as it is one in pursuit of desert water. He is seeking that part of his life connected to the desert’s water and exploring the genealogy of that water which courses through his veins. Therefore, for Childs to understand these entities, he must understand himself. For him, truth is at the heart of his quest into the desert and into his soul. Unlike a quest for
scientific veracity apparent in the passages above, this desire to know the truth of his life
is more poetically motivated as it emphasises reflection. Thus, from the text’s outset
different perspectives and means of expressing them arise in the author’s epistemological
journey. Ironically, as Childs’ introductory comments strive to establish his connection to
the desert as an insider, he nonetheless adopts the clichéd motif of entering the deserts to
find truth, a theme stretching back thousands of years as people retreated to the desert
for enlightenment and which flourishes today through the wilderness myth that promises
its followers a more real, truthful existence through nature’s wild places. It is the
attentiveness to one’s own pursuit of knowledge that “the focus becomes so concentrated
that the desert—the supposed subject—begins disappearing, replaced by the viewer’s
own reflected image. It is a journey from expansiveness into self-absorption” (Wild, Desert Literature II).

However, Childs’ writing resists a full-blown paean to the self. Instead, he shifts
from a more subjective position to one more objective as he defers to his scientific
training acquired through graduate studies in desert ecology at Arizona’s Prescott College
to bolster his position. Raised between homes in Arizona and Colorado, Childs spent
much of his youth exploring the deserts and rivers of the American Southwest on foot and
by boat, becoming intimately acquainted with the unique characteristics of this region.
Underlying much of Childs’ writing, and what is clearly visible in The Secret Knowledge of
Water, is his attention to and reliance on the scientific method as an organising principle.
Chasing a burning question about the desert, Childs enters it to test hypotheses, record
observations and work towards conclusions. Consider his remarks in the closing chapter
of this text, which speak to his methodology: “I had spent two years tracing the
bloodlines, meticulously studying the documents, then walking to see if it was true, if the
desert was, indeed, bound by water as I had believed” (266). While this statement reveals
the overall rationale for his travels, it also suggests a reliance on history, tradition and
procedural knowledge to inform his scientifically-motivated excursion. Rather than create
an ahistorical desert where he will make first tracks, Childs is keenly aware of the long
human presence within the desert. Thus, as he embarks on his various treks, he often
follows the paths others have blazed before him, willing to acknowledge their contributions to the region’s body of knowledge and his own gaps in understanding.

Pursuing a question and a hypothesis, Childs finds himself in some of the most remote locales of the continental United States where his preparation in desert ecology helps him reconcile the anomaly of desert water. In the text’s first section “Ephemeral Water,” Childs travels to places like Thousand Wells along the Arizona-Utah border to search for waterpockets in a land of pure rock and the Cabeza Prieta National Wildlife Refuge in Southern Arizona’s Sonoran Desert to map water holes, or tinajas, as part of the refuge’s commitment to preserving and protecting desert bighorns. In the case of the Thousand Wells region, which John Wesley Powell once described as an area of “innumerable basins” (333), Childs seeks out possible waterpockets after coming across one man’s graduate fieldwork about a tadpole shrimp. This small desert crustacean, referred to by Childs as Triops, happens to be “the oldest living animal on the planet” and requires a reliable pool in which to propagate (Secret 47).

Through Childs’ consideration of Triops’ relationship to ephemeral waterpockets, the author negotiates various epistemological and ontological systems and explores the human/nonhuman interface. Childs considers the survival mechanisms of this species, which must endure extreme drought, and informs the reader of the process of anhydrobiosis or more simply “Life without water” (Secret 61). As the author explains, this is a condition in which the shrimp “shrivels up until they are dry as cotton balls, releasing all of their water” (Secret 61). From this basic description, Childs goes into a multi-page explanation about science’s understanding of these organisms. He refers to their ability to produce trehalose, a special compound to enter this particular state, and their ability to withstand x-rays and radiation without harm, go decades without water, and endure constant temperature fluctuations. He also describes how this species, along with numerous other organisms, live through phenotypic plasticity or “the ability to alter the body’s shape in step with its environment” (67). Thus, as the pool shrinks, Triops slows its biological processes down; as the pocket grows with additional runoff, Triops grows.
Through this point in the narrative, Childs’ text is motivated scientifically as he seeks to understand the phenomenal behaviour these organisms exhibit.

At the same time, however, the adaptations that Childs describes become a larger metaphor for the chapter “Water That Waits,” and thereby seem to be aesthetically or poetically motivated as he sets up the metaphor to help the reader draw connections between Triops and humans. Beginning the chapter by recognising his own limitations in the desert and the amount of water he has to carry in order to survive just a few days, he turns his attention to what he calls the “prophetic knowledge” of Triops and other similar organisms as they easily adapt to their surroundings. From his observations of this and other desert creatures, Childs concludes that “my own life had to be measured by completely different standards” (Secret 69). The juxtaposition he creates between his own existence and that of Triops through his scientific inquiry and research allows him to marvel at the resiliency and permanence of this creature and also recognise his and our culture’s limitations in attempting to adapt to the harsh conditions imposed by aridity.

Childs’ attention to this unique organism and its ability to thrive in conditions that would quickly kill a human being evokes a didacticism that defines much American desert writing.10 True, there are lessons to glean from Childs’ consideration of Triops. We can certainly read his interest and dedication in understanding this species’ survival as an admonishment to try to adapt in our own way, to not become habituated to more water than is necessary, to work with what is available, and to make the most of the circumstances. We could even extend this vignette’s line of reasoning to suggest that if humans could just learn to adapt to the unpredictable nature of water that perhaps, in the course of time, humans could evolve to pattern their own biological processes to better align with desert water’s ephemerality. Yet Childs never comes to these conclusions, at least not explicitly. He never turns away from the dominant scientific narrative to suggest to the reader: and this is why this organism is important for us to know about. Rather, he lets the science speak for itself as it describes Triops’ qualities. The most we get from Childs is his recognition that he and his traveling companion are worlds apart from Triops in their ability to live in these harsh conditions. “Tom and I were lithe,
short-lived creatures who would never know how to sleep for an entire hundred years,” Childs reflects (69). “This was a different strand of life from my own” (69). But by deferring to science to describe *Triops* and its incredible adaptations, Childs paradoxically grants nature a voice through the persistent metaphor that lurks beneath the surface of objectivity he hopes to establish.

The impacts of this choice to foreground science are manifold. By emphasising *Triops*’ physiological properties rather than digressing into his connection to the species, Childs allows the audience to come to its own conclusions about this creature and its relationship to the desert. Likewise, by invoking the organism’s otherness—its existence in a world far different from his own—Childs prevents himself from purposefully using *Triops* as a metaphor in the service of human society. Instead, he foregrounds scientific discourse and thereby exercises, surprisingly, a sense of restraint and distance that derives from the role that objective and accurate scientific enquiry purports. Establishing the known facts about *Triops* and then resisting the desire to further an agenda that comes from these observations, even if a benign one, Childs creates a nuanced vision of the desert. While reliant on an epistemological system that seeks to explain all the complexities of natural phenomena, he nonetheless creates an alternative portrayal of nature that enables it to exert its own voice—a true ecocentric gesture that grants him an even greater ethos as an expert explorer and observer of the desert.

Although Childs builds his narrative on the scientific method by formulating hypotheses, developing methodologies, and then testing results, he recognises its inability to capture the full mystery of the region and looks instead to other ways of knowing to aid his growing comprehension. In his 2004 book *The Way Out*, Childs and his hiking partner find themselves in an unnamed portion of the Colorado Plateau, struggling to negotiate a path through an expanse of cryptobiotic soil. Their hesitancy to move forward derives from their understanding of this crucial component of healthy desert ecosystems, this living soil composed of cyanobacteria, lichens and mosses which provides nutrients and stability for other organisms (Belnap). Trudging ahead with no alternative route across, Childs considers the implications of his actions:
Science is easy for me, with all of its neatly turning gears and ratios. I can put my weight against it in discussions with learners of obscure disciplines: fluvial geomorphology, osteology, microbiology. But I have also known that I should not put my weight there. With this limited human spectrum of sensations, our blithely unquestioned bias of self-superiority, how can I possibly confide in the imagined purity of science? Devastated beneath my boots are colonies of rare desert mosses and these brittle, creeping colonies of blue lichen. Spore heads no larger than drops of mist bind and crush. Hard science barely allows for mystery, for true sacrifice and loss. It robs this soil of what I see right now. (Way Out 87)

This brief reflection amidst Childs’ larger purpose of relating how he and his friend attempt to navigate their way through a maze of sandstone speaks to Childs’ ongoing negotiation of the role of science and other epistemologies in his work as he seeks to understand the deserts of the American Southwest. It also speaks to his awareness of the larger human ecological footprint upon the earth and the materiality of the microbes with which he interacts. Evident in this passage is Childs’ “attentiveness to matter,” which Bennett believes “can inspire a greater sense of the extent to which all bodies are kin in the sense of inextricably enmeshed in a dense network of relations. And in a knotted world of vibrant matter, to harm one section of the web may very well be to harm oneself” (13). Childs’ understanding of the life processes of cryptobiotic soil, gained through close observation and his scientific training as well as his attentiveness to wonder and this complex entity comprised of organic and inorganic matter, allows him to see this living dirt as a key player in healthy desert ecosystems and integral players in shaping human systems. Childs speaks of stepping on this special soil as “sacrifice and loss” as footprints kill the organisms that mitigate erosion and transportation of desert soils.11

Similar to his observations in The Secret Knowledge of Water, this passage avoids didacticism and opts instead to have the science and the image he creates speak for themselves to offer possible correctives to how humans interact with the natural world. While his technical expertise leads him to understand the role of this living soil and see
its connections to the larger ecosystem, it nonetheless fails to adequately convey the effects of destroying one of the oldest organisms on the planet. Placing limits on scientific knowledge, Childs opts for other epistemologies to engage his surroundings and recognises that scientific knowledge is inadequate and incomplete in his quest to understand the desert. As a result, Childs argues for an alternative approach to the desert that evades the promises of his professional training in favour of a more poetically-motivated discourse that further allows the desert’s voice and agency to emerge.

Childs begins to question science’s inadequacy years earlier as depicted in *The Secret Knowledge of Water*’s first chapter, “Maps of Water Holes,” and emphasises this realisation in much of the remainder of the text. Throughout, Childs finds himself teetering between the utility of empirical fact and science’s limitations to provide a complete picture of the desert. “When I began hunting for water in small, isolated holes,” Childs explains, “I had wished for a tangible knowledge, a line of information I could personally own” (*Secret* 75). He continues in great detail as he includes a typical entry of his measurements:

I had taken notes carefully and made my own maps, quantifying whatever I could measure. *On the top of the Navajo sandstone at the end of the summer rains. In steep, narrow canyons of granite, not in the arroyos below.* To prove my knowledge, I wrote academic papers on the positioning of waterholes, spatial distribution, ways of determining longevity, submitting these to scholarly reviewers for a master’s degree program I had applied to. My measurements of water holes in Cabeza Prieta came out in stunning, colored charts. Weeks of fieldwork from the wildlife refuge appeared in fifteen pages of:

Pool #33 104 1 (28 gallons)

*Coordinates: N 32° 20' 15.1" W 113° 48' 36.4"*

*Elevation: 1,650 ft*

*Depth(h) = .18m*

*Average width (2r) = 1.5m*
**Protection**: Protected

**Local Catchment Area**: Large

**Sediment**: Low

**Turbid**

**Invertebrates**: Mosquito larvae/pupae, chironomid larvae. (75–6)

As in his commentary on *Triops*, this broader explanation of his research about waterholes clearly demonstrates Childs’ reliance on his scientific training to make sense of his observations and experiences. But his time in the Cabeza Prieta quickly teaches him that scientific knowledge alone cannot reveal the secret knowledge of desert water. As Childs’ text progresses, he becomes more and more aware that the knowledge he believes to possess about water is insufficient and unsatisfactory. Whereas water holes are, in his words, “effortless to study [because] they have discrete boundaries that take easily to tape measure, a global positioning device, or a Brunton compass,” moving water, the subject of the text’s next section is, in the author’s words, “different” (76). Because moving water “furrows itself into shapes as it runs, immediately telling stories out loud,” he suggests that “[a]n alphabetic string of symbols is left in sand and on rock faces after it passes” (77). While trying to decipher these marks, Childs concludes that the knowledge he had accumulated about the water holes “turned suddenly arcane and restrictive. The knowledge was no longer so simple to possess. It was not as innocent as where and how much. It was now asking questions of me” (77). At this point in the narrative, Childs confides that this training is insufficient to grasp the phenomena of desert water that defy his understanding, a recognition which suggests that the desert is far more than a blank slate on which to project one’s own agenda. Despite Childs’ efforts to this end, he discovers that desert water resists these attempts as it behaves outside of his ability to control and order it according to his liking and technical expertise. In this case, the desert exerts its own agency and speaks to Childs, teaching him that its water is far more complex than his training would suggest.

To make better sense of his observations, Childs changes course to pursue another means of understanding not typically part of the objective scientist’s program: storytelling
by those that have come before him to this parched land and who have an intimate knowledge of its unique features. He writes that “[f]amiliarity with scattered water holes has become obsolete, left only for the bighorn sheep. Words are now missing from the story of ephemeral waters, severing critical pieces of information. Many people have died while crossing this desert, [...] They died because the story was forgotten” (10). Childs relates a powerful lesson here for desert dwellers, suggesting that our present society has forgotten the stories and instead tries to engineer its way out of reality with its “cement aqueducts to siphon distant rivers, and holes [...] drilled into ten-thousand-year old groundwater” (10). Yet, again, he skirts overt didacticism and blame by identifying any particular group who today has forgotten what kind of relationship it takes to live sustainably in the desert. Instead, Childs makes his observation very matter-of-factly, leaving the audience to consider where it stands in relationship to water, the desert and living with aridity.

In order “to put a story back together and recover parts that had been lost” (Secret 9) as Childs suggests, he embarks on a quest to consult the documents of previous explorers and to read the land more closely to see what information it can yield. As a contemporary desert explorer, Childs continues the tradition of his predecessors to the Southwest’s deserts who repeatedly sought time and again to restore the knowledge that had been lost or forgotten by previous expeditions. Turning to the travels of the seventeenth-century Jesuit priest, Father Kino, Childs defers his own knowledge to an earlier voice, relying on centuries-old knowledge to move from one water hole to the next. Nevertheless Childs does not rely solely on Kino’s experiences to find the water; he relies on much older knowledge that is inscribed on the land itself.

Traveling back and forth between a number of known tinajas that allow him to extend his search deeper into the refuge’s mountains and valleys, Childs notices faint lines or trails that crisscross the desert floor in logical patterns. Calling these trails “waterlines,” he explains that they are the ancient paths of the indigenous people who knew where to find reliable water as they migrated through the area. What is most significant about these waterlines is that they are, as Childs insists, “the opposite of
canals, moving people to water rather than water to people” (31). This new realisation about how prior generations survived in a challenging environment reinforces the author's previous observation about how our culture has forgotten the stories. In each case, Childs’ comments imply alternative means by which to engage the desert: “know the land and its maps, you might live” (31). Likewise, he suggests that our current process of bringing water to cities, often hundreds of miles from their source, is out of step with a deeper, more sustainable knowledge that earlier generations possessed. The paradox here exists in our reluctance to see the old knowledge inscribed on the land that speaks to the environment’s limitations. Despite our sense of progress and achievement, Childs’ comments suggest that in order to survive, we need a new paradigm of “success” if our civilisation is to endure.

It becomes clear the further one proceeds through the text that Childs cannot achieve a complete knowledge of desert water through science alone. Whereas the discussion about Triops and water holes grounds the text in view of reality motivated by scientific discourse, it becomes abundantly clear in the third and final section that Childs recognises that knowledge comes in various forms, including from nature itself. As “Fierce Water” describes the floods that leave death and destruction in their wake and push Childs to make his own life and death decisions, his text also reveals his negotiation between scientific and poetically attuned discourses as he searches for answers to events he struggles to understand. Where he could once analyse and measure water in numbers and figures, the floods come so unpredictably to the desert to leave him longing for a means of quantifying their behaviour. In the end, he concludes that “[i]t was no longer my own longing or my own body, not some piece of knowledge I could possess. Water now had the knowledge” (167–68).

While science punctuates this last section to shed light on the apparent mystery of such inexplicable behaviour of a tapped aquifer to explain a Tohono O’odham story or through terms like “hydrologic jump” and the reference to a university researcher’s work on canyon erosion, Childs foregrounds story throughout this third section and its relationship to scientific knowledge to explain the paradoxical nature of these floods. In
the case of the Tohono O’odham account, Childs teeters back and forth between the knowledge that science and indigenous storytelling reveals. According to the narrative, a hunter once pursued a badger into a hole, and after poking his stick into its dark recesses, the hole exploded in a torrent of water that swept away a number of villages and threatened to drown all the people. Having exhausted all other options of stopping this sudden burst of water onto the desert’s sands, the people decided to sacrifice four children to the flood, throwing them into the hole with hopes of stopping the flow and saving the community. To their relief, the sacrifice proved sufficient, and as the water receded, a large rock fell into place capping the hole (176–77). At this site, a shrine to the children emerged and it is this gathering of rocks and other paraphernalia for which Childs searches. Of this quest he explains, “I was scientific about it,” as his keen eyes locate “an embankment of compacted, water-driven sand left far from any drainage, just out in the desert” (177).

At the same time that he is trying to be “scientific” in his search, he also turns away from a scientific explanation of this event. “Purposely,” he admits, “I did not mull over records of local geohydrology to isolate this story of water bursting out of the ground” (182). Instead, Childs chooses to emphasise the Native account. While he juxtaposes the narration of these events with information about general groundwater levels throughout the Southwest, Childs opts for this version of the water’s sudden appearance as it teaches him an important lesson about water’s relationship to the desert. “Our offerings to water, our requests of it in the desert, must be balanced carefully. Not too much and not too little,” he writes (183). While this statement argues for a tempered desire for water, it also mirrors Childs’ balanced approach in his consideration of the offerings made to water. They cannot be too firmly entrenched in scientific discourse, but should also involve story and poetic discourse to provide a broader spectrum of what the reality of desert water entails. Such an approach to understanding water differentiates Childs’ work from earlier explorers who placed the desert’s worth in the realm of science’s ability to dictate value. This negotiation also separates his writing from more contemporary nature writers who draw on the natural history tradition and who often make more didactic observations.
about human relationships to the natural world. Rather, Childs acknowledges that science has clear limitations, and its ability to procure and endow understanding only goes so far. Similarly, he refrains from making extended commentary about how we should live with the desert and its water, choosing instead to let the desert’s voice as captured through paradox and the gaps between scientific and poetic discourse to do the talking. In the case of “The Sacrifice of Children,” Childs defers his technical training to give space to another perspective on desert water, thereby placing indigenous ways of knowing on equal footing.

As the rest of the section unfolds, Childs’ understanding of water comes less from his academic knowledge and more from other sources that include the stories to which he is willing to listen. In this way, his writing becomes, as Teorey suggests, “a two-way conversation that requires humans to interact with Nature on its terrain” (11). Childs tells, for example, of the three hikers traveling up Phantom Creek in the Grand Canyon, where a husband and wife are pulled under and drowned while the brother-in-law is somehow able to ride on top of the flood and survive (216). Also, when he recalls finding himself caught in a canyon with a massive flood bearing down on him, he admits, “I had been studying water. I had read hundreds of scientific journal articles, taken innumerable pages of notes, produced papers, articles, treatises on the performance of water in the desert. It was all washed blank here” (272). Similar to many of the early explorers who ventured into the desert unknowns armed with the knowledge of cartography and other developing fields, Childs initially expects that scientific enquiry will provide the most reliable means of quantifying the desert’s unique characteristics. Yet despite his extensive technical training in the complex and paradoxical phenomena of desert water, he eventually finds this knowledge insufficient and even foolish to fully explain the how’s and why’s of this mysterious entity.

The question still at hand is what effect does Childs’ ongoing negotiation with scientific and other forms of knowledge that come through native myth and anecdotal evidence have on the larger understanding of the American Southwest? As a twenty-first-century explorer with roots sunk deep into the explorer-scientist tradition of the
nineteenth century, Childs’ work provides one approach to understanding the spectrum of knowledge possible when engaging the watershed’s deserts. By employing the well-used trope of paradox in writing about the desert Southwest, Childs brings a number of seemingly contradictory perspectives into play. With his academic training in tow, Childs aligns himself with nineteenth-century explorers who relied on objective observation, precise methods and thorough experimentation to break down nature’s complex phenomena. At the same time, however, Childs allows for vestiges of the Romantic nature writing tradition to infiltrate his work as he creates room for a more mysterious, potentially unknowable desert that resists empirical science’s reach.

As Childs intermingles scientific and poetic discourses, he invites nature’s own knowledge and voice to surface. While critics have scorned the pathetic fallacy and anthropomorphism as a literary liability, they nonetheless perform a very powerful function in nature writing. Lawrence Buell dubs the pathetic fallacy “nature’s personhood,” and argues that to prohibit its use “would be worse than to permit its unavoidable excesses. For without it, environmental care might not find its voice. For some, it might not even come into being” (Environmental Imagination 218). It is through this tool that an author weds “ecology to ethics,” thereby creating a useful technique by which to influence an audience’s perspective on the natural world (201). This approach then becomes what Bryan L. Moore calls “ecocentric personification,” a further development of the pathetic fallacy or nature’s personhood, to “persuade an audience that all living things are connected” (author’s italics 10). This iteration of the pathetic fallacy aligns closely with the “psychological phenomenon of ‘awareness’” which likewise functions to provoke a reader to consider the natural world, and the desert in Childs’ case, on a more profound and personal level (Slovic 3). At the same time, they allow nature to have a voice of its own—not literally, of course, as the words we read are the author’s—but by a humble gesture of acquiescence and deferral to nature’s own processes and decisions.

More recently, Jane Bennett has argued that anthropomorphising nature (or matter) might also have merit in establishing a more ethical relationship to nature.
“[M]aybe a bit of anthropomorphizing will prove valuable,” she suggests, “[m]aybe it is worth running the risks associated with anthropomorphizing (superstition, the divinization of nature, romanticism) because it, oddly enough, works against anthropocentrism: a chord is struck between person and thing, and I am no longer above or outside a non-human ‘environment’” (120). Viewing the nonhuman in this regard, as a fellow sojourner on earth “tends to horizontalize the relations between humans, biota, and abiot. It draws attention sideways [...] toward a greater appreciation of the complex entanglements of humans and nonhumans” (112). Thus, while *The Secret Knowledge of Water* primarily employs scientific and poetic discourse to understand nature, this attention to evoking nature’s voice, which then surfaces as an instructor and a behavioural corrective, creates a fusion of three different epistemological positions that continuously mingle in light of the various circumstances in which the author finds himself. Together they become emblematic of what Teorey sees as “[t]he respectful collaboration of nature’s voice and human language [that] can reestablish a story of health and prosperity” within these bioregions (7). This story constructs a new reality, one based on the existence of the desert’s agency, autonomy and own knowledge that Childs reveals through his close engagement, patience and willingness to recognise and accept his otherness from the desert. But rather than use this difference as a way to exploit and profit from the desert, it invites a reverence for a closer engagement with an entity that exceeds human’s inability to fully comprehend its mysteries.

Childs’ deferral to the desert’s voice through his use of paradox relies on harmonising divergent epistemologies into a greater whole. As he does this, Childs resurrects nineteenth-century scientific discourse and its various branches to create a new vision of the Southwest’s deserts. To achieve this, Childs synthesises the disciplinary disconnect Laura Dassow Walls views between science and the humanities: “[i]nsofar as each discipline is founded on a single mode of vision, then no one discipline can cash out the entire universe: not literature for all its scope and beauty; not science, for all its range and power” (200). Childs’ text embraces this perspective as he comes to explain that
science is not the definitive source of knowledge while story, or literature, is not entirely adequate on its own as they are too easily altered or forgotten over time.

Viewing Childs’ text in this light positions it as a contemporary embodiment of a more integrated and interdisciplinary approach to knowledge that Walls observes in the work of nineteenth-century luminaries like Humboldt, the British polymath William Whewell, and Henry David Thoreau. Thus, by bridging science and poetic discourse and their respective discourses and disciplines grounded in constructions of objective or subjective realities, Childs creates what Walls describes as “‘relational knowledge,’ not of subject against object but of the new whole that subject and object make together” (204). Such is the epistemological and discursive vision Childs embraces in *The Secret Knowledge of Water* as he spans disciplinary boundaries and acknowledges the relationality of the knowledge that he acquires to construct a text motivated by various modes of expression to underscore paradox and the desert’s materiality. Accordingly, Childs’ experiences reflect what Walls discovers in Whewell’s writings: the coming together of various perspectives “to form a new, coherent truth” (qtd. in Walls 205). Walls’ consideration of this “truth” or enlarged vision, as I see it, is a useful approach to examine Childs’ work and its representations of the Southwest’s deserts. Adopting the model of a river to explain the convergence of divergent knowledge, Whewell explains that “the stream of knowledge from various classes of facts will constantly run together into a smaller and smaller number of channels; like the confluent rivulets of a great river, coming together from many sources, uniting their ramifications so as to form larger branches, these gain uniting in a single truth” (qtd. in Walls 205). Although Childs’ work does not pursue a unified ‘truth’ as did Whewell and other scientist-philosophers, his work nonetheless attempts to synthesise various epistemologies to create a more comprehensive and holistic understanding of the Southwest’s deserts.

This model of a river’s confluence provides an effective heuristic by which to understand Childs’ perspectives on desert knowledge. From biological data about *Triops* and cryptobiotic soil to the geographical surveys of a land commission and the stories gleaned from the Tohono O’odham and national park rangers, boaters, flash flood
survivors, and what the desert itself reveals, Childs creates a mosaic of ‘truth’ about what the desert is and what it does. Unlike the unified reality Whewell imagines, Childs navigates his way through past and present knowledge of the deserts and their water, never positioning one approach as the definitive way to access this secret knowledge. And as I have suggested above, by drawing on these apparently paradoxical epistemological approaches, Childs allows the desert and the water that has shaped the land to have a voice of their own. By bringing all these voices into conversation within the text, Childs demonstrates that the desert does not just mean something but that it does something as well: it exerts both its own agency to shape human and nonhuman entities and reveal its knowledge that only those willing and patient enough—and perhaps even lucky enough—can only begin to understand.

To conclude, I turn to Frank Stewart’s observation about nature writers. He states, “Whether scientists or poets, nature writers make us aware that neither biology nor imagination by itself can illuminate the call of the last American timber wolf, [or] the tossing meadow grasses in a mountain rainstorm, [...] But both disciplines, working together, may give us a new, more powerful lens of perception” (xix). In the case of the deserts of the American Southwest, Childs’ text provides a unique perspective by which to approach this region, an approach that brings Teorey’s “story of health and prosperity” and Buell’s “vision corrective” into play (7, Writing 246). By negotiating various discourses and their traditions, Childs resists trying to reduce our understanding of these deserts to one epistemological model. In doing so, he demonstrates a willingness to accept the gaps in his learning, thereby granting the desert a sense of autonomy and agency that transcends human comprehension. By deferring to the desert’s and its water’s own systems of knowledge, systems which continually prove enigmatic, Childs allows these entities to become an instructor of sorts, one which inspires, challenges and refutes his previous assumptions and hypotheses about these unique entities. In a place where human and nonhuman communities are under significant pressure, The Secret Knowledge of Water demonstrates that no one approach to understanding and addressing these issues is adequate. Through his implementation of paradox as a way to highlight desert
water’s unique properties, Childs speaks to multiple knowledges, which at times appear contradictory, but which can and should inform our understanding of and interaction with the region.

Notes
1 These bioregions include the Sonoran, Chihuahuan, Great Basin and Mojave deserts which cover portions of Arizona, California, Nevada, New Mexico, Texas and Utah, and Northern Mexico.
2 Their studies examine contributions by individuals such as Cabeza de Vaca, John C. Frémont, William Manly, Mark Twain, Mary Austin, John Van Dyke, Joseph Wood Krutch and Edward Abbey among others. Other significant explorers and nature writers of the Southwest’s deserts include Zebulon Pike, Joseph C. Ives and John Wesley Powell in the nineteenth century and Ellen Meloy, Terry Tempest Williams and Ann Zwinger more recently.
3 The extreme drought currently plaguing California has put significant strains on the state’s water resources including the Colorado River, which drains much of the Southwestern states of Arizona, Colorado, New Mexico and Utah and makes Southern California’s agriculture and urban development possible.
4 The accrued knowledge was “lost” or rather unavailable to American explorers as the maps and other records created by the Spanish over a period of three hundred years of exploration and colonization were housed in Europe or Mexico (Goetzman 38).
5 Lieutenant Joseph C. Ives’ 1857–58 expedition up the Colorado River with the Corps of Engineers from the Gulf of California to the western end of the Grand Canyon speaks to these various perspectives. Of this journey he writes: “The region explored after leaving the navigable portion of the Colorado—though, in a scientific point of view of the highest interest, and presenting natural features whose strange sublimity is perhaps unparalleled in any part of the world—is not of much value” (5).
6 Haecikel first coined the term in 1866 and it, like science more broadly, has come to mean many different things. For a thorough history of this term and its various definitions see Worster’s Nature’s Economy and David Keller and Frank Golley’s introduction in the Philosophy of Ecology.
7 Natural history as a literary genre emerged during the Romantic period through the work of Gilbert White and his Natural History of Selbourne (1789). “One of the central burdens of the natural history essay,” Worster explains, was to “find an alternative to this cold science [of Darwin]—not by retreat into unexamined dogmatism, but by restoring to scientific inquiry some of the warmth, breadth, and piety which had been infused into it by [White]” (Nature’s Economy 17).
8 The American desert writing tradition relies heavily on the view of the outsider who, very often, has arranged from greener climes to muse on the wildness and otherness of the desert’s aridity and the plants and animals adapted to this condition.
10 For example, Joseph Wood Krutch looks to the adaptations of the kangaroo rat and spadefoot toad, for example, to aridity to formulate his “economy of scarcity” theory (Voice of the Desert 99), the idea that “the very fauna and flora proclaim that one can have a great deal of certain things while having very little of others; that one kind of scarcity is compatible with, perhaps even a necessary condition of another kind of plenty—for instance . . . that plenty of light and plenty of space may go with a scarcity of water” (Desert Year 81–82).
11 Extensive livestock grazing and other activities in the desert Southwest have damaged huge areas of cryptobiotic soils, exacerbating spring dust storms which ultimately have negative effects on the region’s water resources and on human health (Deems 449; “Dust Storms”; MacMillan).
12 Eusebio Francisco Kino (1645–71), an Italian priest, was instrumental in finding coverts and establishing missions among the Native peoples in Sonoran deserts through present-day northern Mexico and southern Arizona and charting a land route from Baja California to the mainland.
13 Childs will echo these exact sentiments in his larger work on flash floods: The Desert Cries (2002). Herein he admits, “Even all of my studies appear foolish as I try to frame the flood, to break it down into math” (138).
14 According to Donald Worster, Whewell was the first to use the term “scientist” (Nature’s Economy 130).
15 These narratives appear in the section “Fierce Water” where Childs relates harrowing tales of flash floods in the Grand Canyon and their victims.
Works Cited

Paul Formisano is an Assistant Professor and the Director of Writing at the University of South Dakota, where he teaches courses in Western American literature, ecocriticism, and composition. His research focuses on water issues and their literary and rhetorical production. He is currently working on a manuscript about marginalized discourses of the Colorado River Basin and a co-edited collection on the literature of dams.