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Indigenous Scientific Literacies in Nalo Hopkinson's Ceremonial Worlds

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Abstract

Increasingly our critical tradition is recognizing the prevalence of issues of indigeneity in sf. Whether this emerging emphasis reflects keener powers of observation on the part of readers or shifting preferences on the part of writers, it is clear that, as the idealism of a Golden Age melts into the dross of colonial aftermath, sf is beginning to reflect the West's rising awareness that manifest destinies, whatever fashion they wear, wield a violent science in pursuing control and care little for the cultures they displace and erase. Nor is it surprising that a genre noted for its pioneering exploration of subjugations based on race, gender, and sexual orientation would necessarily include the experience of indigenous peoples on its list of social themes. This essay views Nalo Hopkinson's canon as a transition from so-called "postcolonial" sf to sf that participates in "ceremonial worlds," a concept borrowed from First Nations thinking. This transition underscores the increasing contributions of authors whose imaginations extrapolate from an indigenous point of view. The analysis here examines Hopkinson's ceremonial worlds by focusing on her juxtaposition of indigenous scientific literacies in contrast with Euro-American western science. Hopkinson's ceremonial worlds acknowledge the often harsh experience of indigenous peoples while upholding hope that her cautionary tales, if heeded, may succeed in achieving sustainable alternative futures.

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Grace L. Dillon

In *Archeologies of the Future*, Frederic Jameson bridges the schism between science fiction and fantasy by recalling Claude Lévi-Strauss's discussion of "thinking Indians," specifically the Algonquin/Ojibwa, whose metaphorical totemic narratives display the allegorical mind necessary to navigate the imagined divide (61). Similarly, in the definitive book on Canadian sf and fantasy, David Ketterer points to native myth-making and Indian and Inuit peoples' folktales and legends as a major source of Canadian speculative literature, whose allegorical "consequential other worlds" emphasize spatial and temporal "otherness" reinforced by "the human other" and concentrate not only on alienation but also on the "recognition of constraints and respect for the powers of Evolution, History, and Nature" (166–167). Brian Attebery reconstructs aboriginality in sf as the indigenous Other becoming a part of the textual unconscious "always present but silenced and often transmuted into symbolic form" (387). He sees sf as a contact zone that "links [Aboriginal] traditional oral literatures with a high-tech or post-tech future" (402).

Whether or not we will remain satisfied with these categories, fantasy, sf, and speculative fiction often rely on so-called "cautionary tales" to depict dystopic worlds where the slavish embracing of advancing western technologies leads to environmental decay. And, increasingly, tellers of cautionary tales are juxtaposing the technologically compromised natural order with native and indigenous worldviews, as Attebery, Ketterer, and Jameson observe. Further refining distinctions, we sometimes include this emerging movement within the larger category of "postcolonial sf" because it reintroduces "indigenous" elements that fifteenth- through twenty-first-century colonization has marginalized.

Drawing on First Nation Ojibwa/Anishinaabe tradition invoked by Jameson, we might go further and characterize postcolonial sf's cautionary tales as

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"ceremonial worlds." Environmental philosopher Jim Cheney defines ceremonial worlds as "worlds or stories within which we live, the worlds—myths if you like—that have the power to orient us in life" ("Truth, Knowledge" 110). Cheney implicitly points to the primacy of storytelling in the transfer of indigenous knowledge, where story functions as ceremony to preserve tradition—specifically, proper custom and practice. Examples are manifold throughout Native American experience, but in maintaining focus on the Ojibwa/Anishinaabe, one might consider the compilations archived by Basil Johnston (*Ojibway Ceremonies; Ojibway Heritage*). Ojibwa stories tend to exercise an allegorical spirit while explaining the origins and usage of natural resources, such as the tale of "Mandamin" (corn). Many stories detail the habits of animals, who are considered to have spirits and equal "personhood" status with humans. The tale of the little girl and grandmother picking blueberries illustrates the use of story to pass down knowledge of medicine while also emphasizing the relationship among generations, as the older serves to instruct the younger. A little girl watches as a snake pursues a frog until the frog takes refuge in a grove of poison ivy; fittingly, though, she had not noticed the drama unfolding on her own but was directed to take notice of it by her grandmother:

> Once out of the poison ivy the little frog fairly flew over the ground bounding without pause until he came to another grove of plants. Within that grove of jewel weed, the little frog twisted and turned and writhed washing every part of himself.... From the conduct of the little frog the Anishnabeg learned the cure for poison ivy. (*Ojibway Heritage* 42)

Like these orally transmitted ceremonial worlds, Nalo Hopkinson's *Midnight Robber* (2000), the preceding *Brown Girl in the Ring* (1998), and the later *The Salt Roads* (2004) and *The New Moon's Arms* (2007), blend history and myth in a manner that heightens the natural extrapolative qualities of sf while offering complex plotlines that at first may resemble dystopic soothsaying, but that inevitably unfold junctures of hope. As meditations on indigenous contact with colonial power, the ceremonial worlds created in these novels cast the landscape as the "dreamwork" of imperialism where indigenous or diasporic aboriginal peoples engage colonizers in conflicted (sometimes ambivalent) negotiations that potentially evolve into positive exchanges of commodities and customs. Whereas head-hard, street-wise '80s cyberpunk engaged neoliberal globalization policies from the low-tech back alleys of first-world corporate city-states, Hopkinson's postcolonial ceremonial worlds contemplate "third world" and "fourth world" future-worlds that overcome the exported "technoscientism" of '90s globalization practices. This overcoming occurs by going back, way back, to tradition through the telling of story/ceremony, and by going forward, way forward, by mining the imagina-

tion to construct an ameliorated technology informed by indigenous tradition and practice.

A key element of Hopkinson's ceremonial worlds is what I call "indigenous scientific literacies." Indigenous scientific literacies are those practices used by indigenous native peoples to manipulate the natural environment in order to improve existence in areas including medicine, agriculture, and sustainability. The term stands in contrast to more invasive (and potentially destructive) western scientific method. And since indigenous scientific literacies are shaped by the diverse natural environments of the indigenous groups that use them, no single set of practices summarizes the possibilities. However, Charles C. Mann offers a useful review of practices for the Americas while establishing the continuity and sophistication of their sustainable approach to resource management:

> Until Columbus, Indians were a keystone species in most of the hemisphere. Annually burning undergrowth, clearing and replanting forests, building canals and raising fields, hunting bison and netting salmon, growing maize, manioc, and the Eastern Agricultural Complex, Native Americans had been managing their environment for thousands of years…they modified their landscapes in stable, supple, resilient ways…. But all of these efforts required close, continual oversight. (353)

M. Kat Anderson underscores the ideological differences between indigenous scientific literacies and western scientific method. Noting that "the first European explorers, American trappers, and Spanish missionaries entering California painted an image of the state as a wild Eden providing plentiful nourishment to native inhabitants without sweat or toil" (1) who played out a "hand-to-mouth existence" (2), Anderson establishes that the paradise discovered by colonial explorers was the outcome of "sophisticated and complex harvesting and management practices" (1). But more importantly, she focuses on the element of spirituality that lies at the root of indigenous resource management. Take, for example, her study of the word "wilderness":

> Interestingly, contemporary Indians often use the word "wilderness" as a negative label for land that has not been taken care of by humans for a long time, for example, where dense understory shrubbery or thickets of young trees block visibility and movement. A common sentiment among California Indians is that a hands-off approach to nature has promoted feral landscapes that are inhospitable to life. "The white man sure ruined this country," said James Rust, a Southern Sierra Miwok Elder. "It's turned back to wilderness" (pers. comm. 1989). California Indians believe that when humans are gone from an area long enough, they lose the practical knowledge about correct interac-

> tion, and the plants and animals retreat spiritually from the earth or hide from humans. When intimate interaction ceases, the continuity of knowledge, passed down through generations, is broken, and the land becomes "wilderness." (3–4)

The essence of indigenous scientific literacy, in contrast to western science, resides in this sense of spiritual interconnectedness among humans, plants, and animals. If the historic resource management of the Americas by indigenous peoples was for the most part successful, as Mann and Anderson argue, the reason is not because resources were so abundant that hard work and systematic thinking simply were not required, or that indigenous groups did not inflict environmental damage simply because they did not aspire to grand public projects. Instead, to echo Anderson's study of indigenous thinking, the concept of indigenous scientific literacy suggests that sustainability is about maintaining the spiritual welfare of natural resources rather than simply planning their exploitation efficiently so that humans do not run out of necessary commodities. Wilderness is not an undiscovered country renewing the possibility of new development; it is the loss of continuity with the land and the decay of generational memory.

By recapturing and sharing indigenous scientific literacies, Hopkinson's ceremonial worlds offer an alternative to Ulrich Beck's contemporary "risk society," whose defining features are public unease and skepticism over "distribution and management of hazards such as global warming that result from techno-economic development itself" (Demeritt 173). Indigenous scientific literacies in Hopkinson's ceremonial worlds offer indigenous technologies as pathways to sustainable existence.

Indigenous Scientific Literacies Today

What economic and social aspects of western exploitation of indigenous scientific literacies are relevant to our discussion of postcolonial ceremonial worlds? Anthropologists, social scientists, scientists, and international lawyers connected to environmental science and interacting with transnational trade policies are mired in the potential for exploitation of biomedical and botanical indigenous resources. Much like their nineteenth-century counterparts in ethnography, twentieth- and twenty-first-century ethnobiologists engage indigenous cultures and territories to gain traditional knowledge of medicinal plants; natural insecticides and repellants; fertility-regulating drugs; edible plants; animal behavior; climatic and ecological seasonality; soils, forest, and savanna management; and skin and body treatments. Ethnobiologists must grapple not only with intellectual property rights but also with issues of what Frans de Waal's *cognitive altruism*, or altruism with the other's interests explic-

itly in mind, with "reciprocal altruism," a kind of system of repayment that de Waal characterizes as "a complex mechanism based on the remembrance of favors given and received," a system to be distinguished from simpler forms of cooperation (qtd. in Newmyer 77–79).

This reciprocity or gift-giving has been a facet of indigenous environmental ethics in stories re-told throughout time. For example, cross-fertilization of philosophy and anthropology that western social scientists label either "ethnometaphysics" or "cultural studies" is a mainstay in Ojibwa tradition. Original transcriptions, translations of Ojibwa narrative, and interpretive essays explore the intricacies of *pimadaziwin*—good health and long life—as an aboriginal scientific literacy (Callicott and Nelson 100–135). In literary studies and the social sciences, ecocriticism details ecological imperialisms and moves the social ecological perspective from a preoccupation with the merely pastoral or wilderness to places of hinterland that are no longer pristine: open-pit uranium mines on or near reservations, for example. Ecocritic Greg Garrard invites us "to take a hard look at the contested terrains where increasing numbers of poor and marginalized people are organizing around interrelated social and environmental problems, [where there is] no 'vanishing Indian' but ongoing struggles against improbable odds, in which no conclusions can be taken for granted" (123–131).

Traditional Ecological Knowledge (TEK) can be thought of as an intersection between researcher and indigenous knowledge, a collaboration rather than an appropriation. The hybrid nature has taken two paths. The neocolonial path models TEK as taxonomy: that is, as a set of categories and facts used to legitimize western management systems. The decolonial path posits TEK as a negotiated event and process. Because indigenous knowledge is embedded within a cultural context and "expressed through language, ceremony, artifacts, cosmology, and social relationships" (Paci and Krebs 269), it should not be wielded as a rational intellectual methodology aimed at discovering exploitable (and exhaustible) natural resources. Exploring the complex convergence of indigenous local knowledge and the interests of the academic community in their consideration of TEK, James Paci and Lisa Krebs ask: "Can TEK be a force for decolonization, of knowledge and power, or will it be appropriated and then serve only as an engine for neocolonization?" (263).

Notwithstanding these concerns, TEK is moving from the arena of social science to the "harder" sciences in practice and empirical content. Stephen Bocking traces the history of scientists' evolving perceptions of indigenous knowledge in northern Canada, where knowledge is often transmitted orally through story-form, and is complemented or mixed with the increasing emphasis on taxonomic classifications or behavioral information that can be readily understood in western scientific terms. Science, here, indicates "a complex amalgam of practical skills, technical devices, theory, and social strategies

tied to its wider political, social, and institutional contexts" (236). The inspiration for this new academic inclination included a shift in biology towards mandating native input in wildlife management decisions. At the same time, native self-determination and land claims negotiations necessitated increased study of land use and harvesting practices.

Finally, Ruth Mathis and Terry Weik's *Indigenous Archeologies: Decolonizing Theory and Practice* represents a milestone in the developing relationship and counter-hegemonic practices between western science—whether in the garb of ethnographer, ethnobiologist, or anthropologist—and the aboriginal and indigenous subjects of its research. Mathis and Weik offer the "first volume in indigenous archeology that has more Indigenous than non-Indigenous authors" (9). It is dedicated to the indigenous peoples in seventy-two countries world-wide and re-defines archeology theory as "integrating material culture such as historical linguistics, poetry, music, dance, oral histories, and folklores" (10).

Of interest to the present analysis, Mathis and Weik argue for a broadening of African-American diaspora studies to include the social and political relationships between diasporic Africans, African Americans, and Native Americans, particularly within the context of evolving scientific research that redefines itself from the vantage point of indigenous and African diasporic scholars. Sven Ouzman expands the notion of indigenous knowledge ("held and developed by specific autochthonous people, usually long-term residents of a landscape") to work with an additional form of "embedded knowledge"—one that has been built by "a variety of people who have lived on a landscape; some of whom may not be indigenous" but are almost identical, "akin to a storyteller and her apprentice" (209). Tradition, here, is posed as "those beliefs and practices that are consciously cast in opposition to colonialism, globalization, and the like" (217).

In counterpoising a monolithic indigenous view with a variety of international indigenous elements, Hopkinson takes a similar direction. Her novels, especially the tour de force *Midnight Robber*, cover transnational geographies from harsh bush and vast hinterlands to urban landscapes of decay, from contaminated Cayaba salt pits to transplanted cashew groves, while at the same time acknowledging the transferences that historically have occurred among African, Caribbean, and Amerindian indigenous and diasporic peoples. She derives material from the Anishinaabe/Ojibwa of First Nations Peoples in the northern United States and Canada, West African Yoruban and Caribbean Yoruban, Australian Aboriginals, the non-vanished Taino/Arawak, and Maroon communities, perhaps especially Jamaican Blue Mountain, John Crow, and Haitian locales. In personal terms, she aligns her own history with the Taino/Arawak, which she traces through her grandmothers' Maroon ancestry (Mohanraj 2; Rutledge 600). Her family traditions are supported by

archeological research in the region. E. Kofi Agorsah comprehensively establishes Maroon-Amerindian fusions and suggests that the first Maroon settlements in the Caribbean were in fact earlier established by Spaniard-enslaved Arawak aborigines who escaped into the less accessible parts of Jamaica, such as the Blue Mountains (165–167). Archeological digs lead Agorsah to conclude that Arawaks were the first people in Nannytown and were gradually absorbed into later Maroon migrations (182). Underscoring obscured lines of ancestral transmission, contemporary indigenous organizations such as Trinidad's Santa Rosa Carib Community (SRCC) are in strong contact with northerly counterparts, such as Canada's Assembly of First Nations and Seminole communities, to begin exploring historical connections and to facilitate the cultural revival of the so-called "extinguished" Taino and Arawak and Caribbean Amerindians (see Forte).

Hinte Songs, Maroon "Break-aways," and Oral Traditions: The Transmissions of Indigenous Scientific Literacy

In *Midnight Robber* Hopkinson sets out to imagine "a world rooted in Caribbean culture and folklore, particularly the Trinidad carnival," in an effort to speculate "what paradigms for technology a society might develop without the all-pervasive influence of American technology" (Hopkinson, "Code Sliding" 1). The story focuses on Tan-Tan, "a little girl living on her home planet who gets yanked hither and yon between her parents as they carry on a hugely troubled relationship" (1). A runaway from this abusive situation, Tan-Tan becomes a folk hero reminiscent of the "midnight robber" of Trinidad Carnival fame. The midnight robber is "a powerful metaphor for exile and longing for home and strongly references the Caribbean history of the African slave trade" (1).

The worlds in Midnight Robber, especially New Half-Way Tree, express the nature of a deep time earthshaper story, reflecting the Algonquin tradition under the ostensible guise of a Maroon-embedded griot tale. For "woodland Indians" used to surviving the harshness of the bush and the fierceness of the hinterland, the animate and inanimate worlds, including humans (such as the Runners and settlers), other creatures (such as the douen), and the land itself, exist in a constantly negotiated set of reciprocal relationships. Managing and manipulating the ecosystem through controlled fires, selective harvesting of desirable species, and horticulture, indigenous communities deploy a flexible resource base and a diverse settlement strategy, one dubbed by Schaghticoke elder Trudie Lamb Richmond and anthropologist Russell Handsman as a "homelands model," or a site where individual and communal activities take place and where all relationships negotiated between humans and non-humans within that territory occur over a long span of time (Bruchac 59–61).

Algonquian stories and Maroon griot tales are "family stories" marked by the transmission of sophisticated knowledge.

In this landscape of memory, doing battle with superhuman elementals and "molding giant megafauna down to their present size" (Bruchac 61) are the tasks of earthshapers and transformers; fossils of megafauna extinct species, Pokumtuck giant beaver stories, and Great Lakes Anishinaabe transformers such as "Naanabozho" mirror New Half-Way Tree's huge dinosaur-like mako jumbies and the heroic non-human douen who defeat them in battle.

In Hopkinson's imagined world, the fantastical hinte, packbirds to the colonists but wives and beloved comrades to the male douen (who are deprived of flight unless partnered with hinte) sing nonsense songs and warbles that echo the more obviously scientific literacies of organic computer Granny Nanny, Nansi's Nanny song (*Midnight Robber* 173). Their prophetic urgency promotes interactions and negotiations with the colonizing "tallpeople" from the planet Toussaint, a compromise that the indigenous douen and hinte must accept if they expect to survive. On Toussaint, would-be colonists prepare for their journey to New Half-Way Tree by watching a computer-generated history lesson that projects the simulacra of the douen and other species indigenous to this new world as terrifying creatures that had to become "extinct to make it safe for people coming in on nation ships" (32–33). Simulated Toussaint history therefore prepared colonizers by illustrating the "naturalness" of douen, mako jumbie, and hinte extinction. Toussaint tallpeople think of the indigenous douen and hinte as non–human, categorizing them as species of fauna or flora. In this way the narrative asks its readers to consider the question: What constitutes "personhood" and which beings deserve that status?

Toussaint Runners, so-called for their occupation as pedicab runners, live in Headblind homes that are inaccessible to Granny Nanny's neural networked ears and eyes. Others view them as a 50-year-old Luddite sect that has reverted to "break-back" labor in order to survive without Nanny (*Midnight Robber* 4–12). Ironically, their preference for work in the fresh air and for homes that do not lock out other community members is mistaken for primitivist escapism. In fact, they actually are more technologically savvy than other inhabitants of the planet. One history nearly buried in oblivion is Nanny's own near-dismantling. It was the Runners who had saved her by tapping into her operating language, her argot, creole, and Nannysong, a fusion of computer language and protocols in Eleggua, Marryshow, and Calypsonian tongue, a song so complex it had been mistaken for "fuzzy logic" garble (50–52).

Herbal science is another measure of their knowledge. Maka, with "the massive chest and tree branch arms" of a Runner, carefully conducts scientific experiments on mice with woorari, a toxin later disseminated in battle. This weighing of scientific literacies of biological mutualism, distinguishing the bio-

medical usage of poisons, and understanding the balance of medicinal and toxic qualities of flora, is a pronounced characteristic of both the Runner society of Toussaint and the douen and hinte society of New Half-Way Tree. One of Chichibud's first lessons to Tan-Tan focuses on distinguishing between look-alike edible and poisonous plants, between, for instance, the water vine and the more dangerous jumbie dumb cane. Devil bush can poison and blister, but one who knows how to smoke it properly can acquire visions in which the plants "heal tallpeople and [they] see the voices of our own dreams" (98–99). Both the Runners who are exiled from Toussaint to New-Half Way Tree and the indigenous douen engage in what Carolyn Cooper calls "resistance science" in discussing griots and "break-aways," famous Maroon men and women, "walk-bouts" who were "slave piknis" and resorted to poisons in battle (109–112).

Indigenous and embedded knowledge of biological mutualism and the strong connection to Maroon societies grounded in *Midnight Robber* are even more transparent in *The Salt Roads*, a novel that portrays the interactions among diasporic African communities enslaved on a plantation and the Maroon freedom fighters who seek their liberation. Enslaved on the plantation owners' soil, Patrice makes his way to "the bush [that] the maroon runaways had made" (95). Going on a "marronage" is the "best way to get freedom in this wicked new world" (107), but he comes back to help his people in their struggle for freedom. Even the common-place rendering of the grinding out and eating of cassava takes on potency when noting that the cassava tuber, a crop often specific to Africa, but found also in the Caribbean, has high levels of cyanide and produces lethal effects if not properly processed. Understandably, the loss of indigenous knowledge of how to process the cassava has led contemporary scientists to wield agricultural biotechnology in an effort to eradicate its toxic effects (Makinde 120). Makandal, a powerful bokor who is "wise with herbs" (*Salt Roads* 107), comes up with a revolutionary plan: a spread of "physickes" slipped into the bakra's food, wine, and water through sharpened straws that are normally reserved for injecting remedies into the bloodstream (206). This narrative element reminds one that African communities had perfected the technology necessary to perform inoculations well before the usage was documented elsewhere (Brooks 157–161) but also conveys the ambiguity of a scientific literacy whose weapons "sometimes can slip and cut one's own people" (*Salt Roads* 201).

Brown Girl in the Ring depicts a pseudo-apocalyptic futuristic Toronto that has been abandoned by those wealthy enough to escape it; left without the comforts of western technologies, the remnants return to traditional indigenous farming and husbandry in order to survive. Grandmothers reclaim old memory and dispense "bush medicine" because federal, provincial, and city aid no longer exists. The state-influenced media blame the lack of civilized social

services on the sovereignty efforts and land claims of the nearby Temi-Agami Anishinaabe Indians (*Brown Girl in the Ring* 11–13). The alternative urban Indian and diasporic Caribbean landscape imagined here depends for survival on adaptive fit and the oral transmission of knowledge to younger generations. Historical precedent is established particularly in the assiduous gathering and transmission of homemade medicines. "Among Caribbean people, bush medicine used to be something private, but living in the Burn changed all the rules" (14). The secrecy needed to ensure that those enslaved still acquired access to medical comforts is stripped under these fatalistic conditions. Secrecy is a means of survival; in the slavery days, one could get in trouble from the stories told (50). Ultimately, however, adaptive fit might not succeed. It is one thing to replace pharmaceutical products with homemade cures, but Mami's bush doctor herbs suffer and lose their potency over the course of Toronto's long, bitter winters, and healers can only speculate about dosages and possible side effects. Willowbark, for example, is a good painkiller, but too much quickly causes internal bleeding. Mami's daughter Ti-Jeanne desires the commercial drugs and views her mother's remedies as "old-time nonsense" (25–37).

The need for adaptation and the disharmony created by neocolonial globalization practices is one subject of Hopkinson's recent novel, *The New Moon's Arms*, whose plot revolves around the menopausal magic wielded by Calamity, a middle-aged but newly made "orphan" who discovers her ability to find lost things, suggesting a metaphoric take on the self-reflection that accompanies aging. The novel's setting (Calamity's home) evokes the theme of globalization: Cayaba island *is* hypercommodifed environmentalism. Ecotourist enterprises intermingle signs such as "Welcome to Cayaba: Home of the Rare Seal Monk" with mermaid images "exotically brown but not too dark," expensive "boo-teeks," and a "Tourist Entrapment Zone" where imported reggae contends with the island's indigenous tumpa music and tourists put on their best Hollywood Jamaican accent (222–223). Hidden away from this zone are the struggles of the local salt farmers and fishermen. The US-based Gilmor Saline Company has operated a salt production factory on Cayaba since 1955, along with a second factory at Dolorosse, creating artificial salt ponds next to the natural salt areas on the local coasts. The promise is extra waterbuses, a boosting of cell phone reception in the area, and increases in service on the ferry route (245). Oppositional leaders such as Caroline Sookdeo-Grant warn about accepting more financial aid from foreign multinationals when local fisherman already are in debt to the Fiscal Foundation for Worldwide Development: "The FFWD demands that we reduce trade restrictions as a condition of lending us money. This allows foreign multinationals [...] to grow unchecked [...] forcing small farmers out of business" (246). Independent salt farms, she further states, will go under, and farmers will be forced to seek minimum wage

work in the Gilmor Saline factory (246). The recognition that the FFWD along with China and other creditor banks will help Cayaba repay their past due loans, whose escalating interest charges already exceed $150 million, brings no comfort (273). The very real international globalization policies scrutinized here recall *Brown Girl in the Ring*, where the Ontario premier uses Anishinaabe nation-state sovereignty and land claims as a pretext for not funding inner-city needs (38–40), as do the intergalactic reshapings of *Midnight Robber*, where one questions how "humane" it is for "the Nation Worlds to exile their undesirables to a low tech world where they are stripped of the sixth sense that was Granny Nanny" (247).

"Lizards in trees feed me and teach me how to be invisible"

The Hopkinson canon strongly engages with a second component of Aboriginal scientific literacy: reciprocal altruism, a facet of learning and modeling sustainable behavior after, or along with, animal species. J. Baird Callicott and Michael Nelson's recent study is an exemplary form of scholarship that intertwines a philosophical and interdisciplinary analysis of what is sometimes referred to currently as the ethnometaphysics of Aboriginal thinking of animal-people and the scientific literacy to be gleaned from careful attentiveness to Ojibwa narratives. Animal-people form strong attachments to human-people in Hopkinson's stories; they range from douen/hinte as Lizard people/Packbirds to manicou rats to mermaids and mer-people to tree-frog creatures of the almond tree to monk seals. Notably, this form of ethnometaphysics can also be linked to Taino myths in a primordial world where rocks, plants, and animals can "speak" to each other, actors "can suffer transformations from one state (for example, "human") to another (for example, plants, rocks, or animals), usually after a specific behavorial act that changes their role" (Oliver 142). In some cases in Hopkinson's ceremonial worlds, the main characters may shapeshift into animals, such as Tan-Tan's metamorphosis into a manicou rat (*Midnight Robber* 74). Similarly, at the age of 53 Calamity finds herself to be a creature of the almond tree and very much "like a tree-frog" (*The New Moon's Arms* 105–106). But this is not mere simile. Calamity experiences many moments as a tree-frog throughout the novel, recalling Taino mythology that associates the feminine/women with water and that genders aquatic and semi-aquatic creatures, including frogs, as female (Oliver 153). And Makandal's ability to be a gaulin bird while speaking in human tongue to his friends or changing into a dog is described as the Yoruban "ouanga" or changing into other beasts (*Salt Roads* 111). Sometimes, in moments of deep distress, the need for this shapeshifting appears to produce more permanent effects. The dada-hair lady has the power to change humans' arms into flippers and their bodies into seals (*The New Moon's Arms* 317). Her gift is diaspora. The shack-

led peoples about to be marketed as slaves or cannibalized by the boss-men are thus transformed and dive into the sea where they can live freely as bahari (318).

The animal-people become strongly linked to selective methods of hunting, ones that sustain and balance the ecosystem, and to methods that preserve knowledge of migratory patterns and relocations. These features can include successful and sustainable hunting of animals, reciprocal gifts, right attitudes, genuine need, and the proper disposal of bones. In the Ojibwa tales, the animals are literally gifted with elements such as utensils, clothing, and body ornaments. Bones are respectfully returned to the element they are taken from while the animals, much like the douen and hinte in *Midnight Robber*, are understood to be "other-than-human-persons." Animals receive the genuine status of personhood in the traditional Ojibwa worldview; they are capable of reason, reciprocity, revenge, and even speech (Callicott and Nelson 112–119). In *Midnight Robber*, the bright-green-frilled douen or Lizard-people are "jokey-looking beasts" to the tallpeople, but through the experience of Tan-Tan, we come to respect their personhood. She is taught to survive in the bush by Chichibud, whose Taino name signifies honey, sweetness, medicine, and cure (Oliver 152). Through Chichibud's tutelage, Tan-Tan acquires the prowess necessary to kill a rolling calf, a fierce creature that only master hunters have the courage to confront (*Midnight Robber* 229). Tan-Tan's adventure with the fantastical rolling calf recalls the historical *cimaroon*, another Spanish naming of the Maroons and Arawaks. The Arawak-Maroon Amerindians became known as expert hog-hunters, not of tame pigs but of wild boars or "hogs of the wilderness" (Mackie 28–49). Moreover, Tan-Tan's suffering in the "The Tale of Dry Bones" incorporates the Taino/Arawak association of consuming of bones with the source of life itself and the power to create ordered life in the universe out of the deads' bones (Oliver 147–150). The impregnation or swallowing of bones recycles eventually into renewed life and hope for guilt-burdened Tan-Tan. Dry Bones swallows greedily the food that burdened Tan-Tan must bring him, gleefully stating: "You ain't go shake me loose until I suck out all your substance. Feed me, Tan-Tan" (*Midnight Robber* 201). But this "skin-and-bone man" in turn is swallowed by Master Johncrow, corbeau bird and buzzard (211) and Tan-Tan is free to journey out of Dead Duppy Town "where people go when life boof them, when hope left them and happiness cut she eye 'pon them and strut away" (198).

The fine line between analogy (such as colonists' analogizing of Amerindians and animals) and genuine animal-person cross-overs in these ceremonial worlds also separates rigorous "scientific" taxonomies. Monk-seals, phocids in the tropics that should not exist, "balanced on an evolutionary knife edge," are Cayaba seals, *Monarchus manachus*, Mediterranean monk seals that mysteriously appear in Caribbean waters (as witnessed in *The New Moon's Arms*

111–112). Evelyn cannot resist the challenge to imagine the scientific possibilities of actual mer-people. In adapting and living in the sea, one would need body fat to protect the body from cold, broad rib cages to make room for much larger lungs, hyper-developed lats and delts to help with swimming, relatively short limbs or arms, webbing between fingers and toes, and nictating membranes in the eyes (134–135).

Her description aptly fits a young child, Agway, whose appearance begs the question: Is this a human or an animal? But a stronger thread of mystery for Calamity is the relationship between her own parents. Her mother was in the habit of disappearing into the sea for a night or two at a time until on one occasion she did not return. Years later, Calamity discovers seal fur buried in the crevasse of a particularly twisted cashew tree and must question whether her mother had always been a seal or a mermaid who finally decided to go home. The interrelatedness of the evolutionary mutant monk seals, the appearance of mermaids and mer-people on shore, and the animal-human connections echo a theme of Ojibwa stories, "cross-species sexual intercourse" or human-animal marriage (a motif also found, of course, in folklore from many parts of the world). Notably, the sex is incidental. Strengthening of communal and societal bonds between animals and humans is the main reason for their marriages, which unite families, clans, tribes, and, at a royal level, nations. A human groom often takes an animal wife, clothed in fur as in *The New Moon's Arms* hybridization of human/monk seal (Ojibwa tradition often marries the human/beaver worlds). Reciprocity, respect for and proper treatment of the slain, giving goods as gifts, and exchanging horticultural and manufactured artifacts for flesh and fur ensures compliancy and happiness (Callicott and Nelson 119–121).

"Take one, give back two"

Consistently voiced throughout *Midnight Robber*, this mantra partially pertains to the restoration of a nation in danger of extermination. As in the reciprocal gift-giving exchange between animals and humans—or, more accurately, between non-human persons and humans—taking one and giving back two pertains to a replenishing of resources used on the trail or in the hinterland. Even the etiquette of sharing names forthrightly creates the courtesy of "trail debt" for the douen. Their world closely aligns with the Taino and Arawak Cosmos as Latin American archeologist José R. Oliver describes. Those of Taino and Arawak descent must learn how to steal, wrestle secrets through trial and error, and "learn how to make use of [cultivation, weaving, hunting, and fishing] for the benefit of mankind" (142–143). Taino tales such as the culture hero Deminán whose transgression (and yet eventual release of specific forms of knowledge of agriculture, fire and cooking) "lies in the act of

stealing (food) from Yaya," both man and the supreme being or Creator (144 and 150) parallels the *Midnight Robber* Queen of the Taino griot fantastical tale of Tan-Tan and her father Antonio's exile to Kabo Tano's world. These tales establish the expectation that Tainos "upon reaching adulthood" must be able to prepare and harvest "their own *conuco* (garden plot)" (Oliver 150). Thus, traditional storytelling both encourages new generations to derive "sustenance from their own efforts" and gives them instructions about how to do so (150). Kabo Tano's eerie, surreal bush in "Tan-Tan Learns to Thief" consists of knotted up trees with twisted uproots, dangerously cold temperatures, the funny aroma of bones in the air, bark more purple than brown, and light coming through trees not yellow but red. A magic tree with cassava roots suggests the blurring into another dimension (*Midnight Robber* 76–82). Tan-Tan observes the manicou rat's tactics, uses a cutlass to steal Brother Rat's life and Brother Wild Pig's too. In the wattle and daub of huts, learning how to hunt and trap, she must also plant and leave portions of her hard labor to nourish the beasts of the land (89). These tactics restore this planet, Earth, which "was in a bad way":

> All she waters brown and foul. It ain't have no people living there, only dead fish floating on the surface of the oceans and rivers, stinking up the place. The land barren too; dry and parched. Tan-Tan and Antonio watch the sun hot up a patch of Earth so much it burst into flames. The air above Earth full with grey, oily smoke. The only thing growing was a thin, sharp grass that would cut up them feet if them not careful. The beasts of the Earth gaunt and hungry, for the grass wasn't giving them nourishment enough. (81–82)

Tan-Tan's wrenching decision to chop down the Kabo Tano tree, the source of all food, and her sharing and reciprocity, giving back two for one with the beasts of this planet, transform ruined earth into the land of the New Half-Way Tree (90). She must fight instincts that belie generosity (in a desperate time of survival, who has the will to share with others?), but her acquisition of a spirit of sharing quiets the chaos of the four dimensions of the Taino/Arawak world that were unbalanced by the arid and parched Earth.

Tests and struggles remain, however. The douen and hinte, like many Aboriginals, assume no one to be strangers but graciously lodge "guests" within the territory and typically assign them to a local family or clan for education. This thinking reflects many Native ways of articulating "communitism," as Jace Weaver terms it, indigenous community values with the exchange and movement of "diaspora (reservation, rural village, urban, tribal, pan-Indian, traditional, Christian)" (qtd. in Pulitano 73). It underpins First Nations sovereignty struggles, both intellectual and material, as voiced by leading Native

scholars such as Elizabeth Cook-Lynn, Craig S. Womack, Gerald Vizenor, and Robert Warrior (Pulitano 59–70, 168–180). Those who give most generously and freely enjoy the strongest claims. In the branch of international law and treaty claims, the First Nations perspective simultaneously is both one of sharing and one of self-determination; it is the will, not the birthright, of Aboriginal peoples to ally with alien nations as a means of protecting Aboriginal values (Battiste and Semaganis 96–103). For example, the Tegami-Indians or Anishinaabe of *Brown Girl in the Ring* establish a shared territory of trust, promise, and protection; treaty federalism does not mean that the Aboriginal nation is a subject of the Crown remaining "alien" within its own land. Rather, it "walks side by side" with other established communities in the area. When the douen are thoughtlessly displaced by the Toussaint colonists who mistake them for monkeys or wasps, they must chop down their own daddy tree, their nation's sovereign home, and disappear further into the bush. Chichibud sums up douen relations with these colonists by wondering, "Maybe your people and mine not meant to walk together, oui" (283).

"Letting the Sky into the Bush"

The fourth component of indigenous scientific literacy concerns the aesthetics and experimentation of husbandry, grafting, and planting in ways that do not significantly alter the landscape. To an outside eye, farmed areas can appear to be untouched forest or wild ecoscapes (Posey 30). The migratory patterns of many tribes such as the Ojibwa included the selective harvesting of wild rice grown on banks and cultivated in a manner that does not fit euro-western conceptions of "farming." The US Dawes Act in the late nineteenth century that sought to "civilize" Indians by giving them farming implements, a small plot of acreage, and a time-frame in which to demonstrate adequate production is one among many miscues. This is the perspective the tallpeople have of the douen; they seamlessly merge with their surroundings and somehow survive in the bush, but who could imagine that they have the ability to plan, implement, and thrive on an indigenous agricultural strategy?

The open-minded youth of Tan-Tan creates a space for tutelage by Chichibud, who relates the indigenous "art" of innovative grafting and husbandry. Ethnobotanists studying indigenous use of plant resources have described many horticultural and gardening practices that preserve species diversity. "For example, indigenous horticulturalists exhibit a keen interest in the location of rare and useful plants, replanting these when necessary. They often intervene in pollination and succession, thereby protecting threatened species.... They may also create anthropogenic islands of forests" (Mulder and Coppolillo 95). Significantly, Chichibud has noted the settlers' disgust for a local parasitic fungus, and one of his first interactions with Tan-Tan empha-

sizes the beauty of this tenacious plant, which exists where nothing else catches, in places of rock lacking any soil (*Midnight Robber* 98). Chichibud remarks on douen sovereignty that "Every douen nation have it own own daddy tree" (179), the sacred spot that Papa Bois has given to the nation for food and shelter. Its immensity is suggested automatically by the sheltering of so many douen and hinte in its boughs and reminds one of the Ceiba or giant silk-cotton or kapok tree considered sacred by the Taino, as well as by many African people who arrived later in the West Indies (Highfield 162). Like a mangrove, fluorescent fungus becomes a guiding light in its chambers, and the wasp-nest structure is carefully woven by the hinte's beaks. The douen graft all kinds of plants onto the tree, relying on its root system for nurture. Any non-indigenous invasive species introduced accidentally by the tallpeople's arrivals become for the douen an experiment in adaptation and grafting (182–221). In times of crisis or a sudden need to migrate, the remains of the daddytree are carried with the nation to preserve their statehood. When discovered (though not well-discerned), the douen destroy their home and move away, "letting the sky into the bush" (274–277).

Ceremonial Worlds

The metanarrative of all four novels replicates the aboriginal method of conveying scientific literacy through storytelling rather than a rote set of instructional procedures, a manual handbook, or a sharply demarcated taxonomic system. "Anansi" stories like these are adaptive stories, techno-trickster tales and narratives that chronicle the stratagems of the West African Yoruban spider, Anansi; of the great white hare and rabbit, the Ojibwa Anansi and Naanabozho; and of Brer Anansi, a "cunning little man who could become a spider" (*Midnight Robber* 31), part human, part animal-person, part immortal, and a Native, indigenous, and African diasporic metaphor for the intricately structured Web of Being.

Indigenous scientific knowledge is necessary for adaptive fit, the notion that we survive not by conquering the world but by recognizing ourselves as part of it and "seeking the proper road on which to walk" as Ojibwa colleague Dennis McPherson speaks of it (Cheney 118). In the ceremonial world, metaphors are literalized, and an allegorical spirit haunts taxonomic thinking. In such a world, scientific literacies stand out by slowing us down. In contrast to the accelerating effect of techno-driven western scientific method, the salt-making of the Maroon communities; the herb-cultivating of indigenous, Caribbean, and diasporic communities; and the husbandry of the douen and of the Cayaba islands people offer quiet meditations on the state of the Earth. In practice, her narratives maintain hope through the depiction of regeneration—specifically, of the younger generation's reawakening to cultural tradi-

tion, including scientific literacies. *Brown Girl in the Ring* depicts the reclamation of Toronto's inner city. *Midnight Robber* shows a new generation's reconnection with Granny Nanny with the birth of Tan-Tan's son Tubman, "the human bridge from slavery to freedom" (329). Attracted by local and global indigenous revival movements, Calamity's daughter joins the campaign against the salt farms. By illustrating the trajectory from indigenous primacy to global affliction, Hopkinson offers a holistic worldview in which scientific literacies happen every day.

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