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Sugarbag Dreaming: the significance of bees to Yolngu in Arnhem Land, Australia

Introduction.

> *We pile out of the dusty four-wheel drive troop carrier and begin walking in separate groups of two or three, bare feet crunching through the dry grass. The only other sounds are occasional resonant taps from an axe testing whether a trunk is hollow; or when the women periodically call to each other to keep within earshot amongst the scattered stands of stringybark trees. It is easy, open walking through country. The extended family group I came with care for the land by setting fire to the grass during the drier months, particularly at this time of year, sugarbag season. I observe while the women in their brightly coloured skirts with their young children or grandchildren look closely at the trunks of the trees and up into the canopy at the blue sky beyond, scanning for signs of the tiny black stingless bees. Today offers good conditions for finding honey. If the conditions are too cool or windy the bees tend to stay in their nest, not venturing out to forage. We hear a yell in the distance indicating that a nest has been found and walk to the small, scraggly-looking tree. The teenager, who located the bees, begins to chop down the tree to get at the nest inside. Children hold onto their jars and containers in keen anticipation of the rich, sticky honey within the tree. Once the women have opened up the nest, they do not only consume the liquid honey but collect everything with the beaten end of a stick: the wax, larvae, pollen and the odd entrapped stingless bee.* — (Fieldnote, August, 2012, see video segment at: https://vimeo.com/88737231)

This vignette and accompanying video segment illustrates a favorite activity of young and old, men, women and children in northeast Arnhem Land: walking through the bush in search of tiny "wild, stingless bees" to extract their honey.[1] A stingless beehive is a complete meal for Yolngu — not just a hit of glucose and fructose from liquid honey but an important carbohydrate with additional protein, fat, and essential minerals from the larvae (Crittenden; O'Dea et al.).[2] The colloquial term of "sugarbag" is an all-encompassing word containing everything related to honey, including the stingless bees themselves, not just the honey.

Figure 1. A woman and two children in search of stingless bees, northeast Arnhem Land. Still from "Sugarbag Dreaming" video segment, by the author.

The practice of searching for sugarbag is integrated within many Yolngu ceremonies and is linked with key ancestral beings. For example, the ancestor Ganbulapula, celebrated at the site of the annual Garma festival in northeast Arnhem Land, hits trees with his walking stick to disturb bees from their nest. He shields his eyes from the sun with his hand as he looks up into the sky, while the tiny bees hover around the nest of a hollow tree near a waterhole. While looking upwards he traces the flight of the bees to their nest. A Yolngu residential college featured the image of Ganbulapula as the school emblem, a metaphor for striving for excellence (the honey), while looking up and ahead into the future (Dhupuma College).[3]

A long line of ancestors with a deep connection to this part of northeast Arnhem Land has searched for sugarbag in a very similar manner over the millenia. The practice may have been very long indeed, as this part of the world has been inhabited for over 45,000 years (David et al.). There is archaeological evidence from radiocarbon dates derived from wax figures found in rock shelters that sugarbag products have been utilized in northern Australia for at least 4,000 years (Nelson, et al.).[4]

In a paper published in 1976 the ethnobiologist Darrell Posey asks, "Why have anthropologists and cultural biologists almost totally ignored the impact of insects upon human societies?" (147). This is still largely the case today, despite bees having co-adapted to human encroachment and raiding of their nests across the world.[5] As Freya Matthews writes, "it would

be fair to say that today, outside entomological and amateur beekeeping circles, honeybees have little place in our cultural imagination. It has not entirely slipped our minds that the honey on our tables is produced by bees, but bees' role in the process of pollination … [is] generally only vaguely understood and entirely taken for granted" (160).

There is a profusion of rock art from the Mesolithic depicting humans climbing ladders to extract honey from rock crevices. According to Eva Crane "Mesolithic honey hunting techniques shown in rock art have striking similarities to those used by present-day honey hunters among the same peoples" (43-44). Previously it was thought that meat was a likely factor in early human development but it is now thought that the nutritional value of honey was a major contributing factor, providing crucial fuel for the hominid expansion in brain size (Crittenden). It has been proposed that the "sweet tooth" in humans developed through a reliance on honey as an abundant and nutritional food source (Allsop and Miller). The large quantity of fructose and glucose contained in honey would have allowed humans to focus not only on survival but also on other tasks, such as cultural activity.

Sugarbag Dreaming occurs across Arnhem Land, a remote part of the Northern Territory of Australia, where I spent time amongst Yolngu in small homeland communities. Yolngu are efficient in managing honey for consumption through their knowledge of the surrounding environment and established hunting practices. They categorize stingless bees and honey in relation to humans and other beings. Indeed, honey, stingless bees, and the entire sugarbag complex are significant to Yolngu, not just as an important source of food, but culturally as well. I want to show the multi-layered relationship between the Yolngu and sugarbag as part of what Deborah Rose refers to as an "indigenous philosophical ecology" (Rose). For Rose, this ecological philosophy has "mutual benefits, and shows patterns, and a broader meta-pattern, in which life is both for itself and for others, and in which connectivity and stability are achieved through densely recursive benefits" (294).[6]

In search of nests. Although there are no records of the First Australians domesticating stingless bees in hives, they do make their lives easier by using strategies that facilitate the location of nests. On the broadest ecological level, First Australians search for nests in Arnhem Land during *Rarranhdharr*, or late in the dry season (generally late August-October) and within particular environments, such as stringybark or paperbark swamp habitat. Yolngu seasonally return to places where they have prevously found nests.

More specifically, as David McKnight learned from the Wik-mungkan of Cape York, the best time of day to search for sugarbag is in the morning or late afternoon, when it is easier to see the glint on the tiny stingless bee's wing. According to my Yolngu teachers, searching cannot begin too early in the morning, as the bees require warm temperatures in order to venture out of the

nest. When passing trees, one taps the trunks with an axe, or if there is likely to be a nest inside a particular trunk, then hunters may place their heads against the trunk and listen for the sound of bees in their nest.

In many different regions across Australia, when a bee is located the Aboriginal hunter may place a feather, hair, or grass on the bee's abdomen, or sprinkle the bee with flour, so that it can be easily detected in flight when returning to the nest (Schwarz). Even silk teased out from a spider can be used as a way to mark the bee; meanwhile, the hunter may sing to the bees to "go home" (Spencer). In another practice (as depicted within part of the Djungguwan ceremony below) the hunter observes the behavior of the much larger bee-fly and uses it to indicate where a nest is as it hovers at the entrance, or, alternatively, tracks a predatory wasp, also known to hover near the entrance before entering the nest (Halcroft, et al.). There are even accounts that the bees' nest can be smelled from a considerable distance, as the pheromone of the bees is detectable by well-attuned individuals (Crane). A hunter may claim specific trees by cutting a notch in the tree's trunk (McKnight). "There are trees considered sacred, from which Byamee cut honey and marked them for his own, just as man even now, on finding a bee's nest and not being able to stay and get it, marks a tree, which for any one else to touch is theft" (Parker 86).

Alistair Campbell describes ways in which Aboriginal groups produce food, rather than purely hunting and gathering, including an instance where women encourage bees to establish a nest within a favorable hollow tree. He refers to an account from Duncan-Kemp in the Channel Country of Inland Queensland,

> Standing sentinel on a flat between two blunt-nosed sandhills was a ghost gum draped about with bunches of yellow flowering punjilla. Bees hovered near and buzzed persistently over a hollow in the side of a tree. Aboriginal women wishing the bees to settle there had carried the scented bush five miles and soon reaped the rewards of their labours. (208)

This is one of many historical examples throughout Aboriginal Australia that demonstrate the influence of such influence of planned management on both flora and fauna (Gammage).

Categorization of stingless bees. Yolngu think of stingless bees and sugarbag within a complex structure of relationships and interconnections with their extended human family and the other-than-human world. Historically, scientists have tended to categorize everything in the world in terms of taxonomy and morphology, mapping the animal kingdom according to a visually arresting tree-based network, starting from simple, single-celled organisms and gradually leading to more "complex" mammals and ultimately to humans. The honeybee (*Apis*) does not quite fit within this progression from simple to complex, since, although the bee's brain is approximately the size of a sesame seed, it can accomplish remarkably complex

cognitive tasks and has a sophisticated means of communication and navigation (see for example, Dyer, von Frisch).

In entomological terms, until quite recently stingless bees in Australia were separated into two separate genera in Australia, *Austroplebeia* and *Trigona*. These two genera of stingless bee were first described by Hockings in 1883, following a visit to the northern regions of Queensland where local Aborigines pointed out that one kind of stingless bee was called "kootchar" and the other "karbi" (Michener, "Observations on the Nests"). The very large genus of *Trigona* was applied to stingless bees across the American tropics, sub-Saharan Africa, and Indo-Australia, but the stingless bee species in each distinct region have now been found to be quite different genetically with divergent evolutionary histories. There is considerable variation in terms of scientific taxonomic classification. For example, within a single book dedicated to stingless bees, one species is referred to as *Austroplebia austra*lis in one chapter and the genus *Trigona* in another (Vit et al.). *Trigona* has now been reclassified scientifically as the genus *Tetragonula* (Michener, "The Meliponini").

Austroplebeia is usually distinguished in the scientific literature by cream or yellow markings and by the nests being found mainly in dead trees, whereas *Tetragonula* are very hard to distinguish from one species to another, due to their morphological similarity as a genus. Yolngu categorize bees by their distinctive ecology and behavior, rather than relying on external morphology and subtle differences in physical characteristics. Instead of focusing on different species of stingless bee according to the Linnean scientific nomenclature system, I will consider stingless bees henceforth according to Yolngu categorization and terminology.

According to John Rudder, in the Yolngu view of the natural world, "[t]here is no attempt to be exhaustive in the naming of species and while there are over six hundred named species, those that are named are the ones that are significant in some way or another" (*Qualitative Thinking* 148). Rudder categorizes the Yolngu cosmology of the natural world by subdividing groups of living beings (or those "having life" [*walngamirr*]), such as all plants with woody stems (*dharpa*, such as trees); all land and freshwater mammals (*wäyin*); or all fishes (*guya*). Bees and all honey-related products, or *guku*, reside at this level of categorization (Rudder, Qualitative Thinking and *The Natural World*). It is clear, then, that this category *guku*, or sugarbag, is particularly significant within the Yolngu worldview. Sugarbag is also categorized as a non meat-based food source (*murnyan*), along with other vegetable foods (*ngatha*) (Rudder). This separate categorization as a food source makes sense when sugarbag is one of the most valued foods in the Yolngu diet (Meehan).

The Yolngu see the world in terms of separate elements within an interconnected system, rather than according to a compartmentalized, hierarchically based structure. Individual bees do not

tend to be categorized according to whether they are the Queen bee, princesses in waiting, worker bees, or drones. Instead, sugarbag may be distinguished based on the taste or texture of the honey; whether the stingless bee bites in defence of its nest; or on the basis of its specific habitat. The nest is also an important means of identification. For example classification might be according to the tree in which the nest is located; by where the nest is located in relation to the tree as a whole: i.e., whether the nest is in the canopy, low down on the trunk, or in a hole in the ground; by the formation of wax at the entrance to the nest; or the elaborate internal structure of the nest itself.[7] The Yolngu emphasize these distinctive features of the sugarbag complex to distinguish bees within a particular context, rather than focusing primarily on physical differences in the anatomy and morphology of individual bees.

Yolngu elders have a good knowledge of the internal structure of the Meliponidae nest and can label all the separate elements, often represented in cross-section in bark paintings featuring sugarbag dreaming. The heart of the nest is the brood chamber where an individual bee is reared from egg to adult.[8] In Northeast Arnhem Land the white dots in bark paintings depicting the larvae within the heart of the nest can also be a metaphor for the nurturing of children at the center of one's community.[9]

Yolngu matha language speakers often relate what is being named according to different parts of a body, for instance, connecting a landscape where an ancestral being left a bodily mark to analogous parts on the anatomy of a plant or animal (Tamisari). Naming the correlated parts of one's own body emphasizes the similarity among humans, other beings, and the land. For example, a man of the Yirritja moiety, Neparrnga Gumbula, described his kinship with the *Birrkuda* (or 'short-nosed bee'):

> My mouth is the entrance to the beehive. My nose is beeswax. My eyes are nuts from the *warraga* ('cycad palm'). My hairs are the fine roots of the *mayku* ('paperbark tree') and the *wulu* ('white foam') that they produce in the swamp at Djiliwirri. My head and my knowledge are *guku* ('honey') from the *wangarr Birrkuda* ('Short-Nosed Bee'). In death, my name is no longer Neparrnga. It is *Birrkuda.* (Corn 1)

David McKnight refers to five different kinds of sugarbag categories amongst the Wik-mungkan of Cape York. The bees are distinguished by habitat, or ecologically based criteria, but with particular reference to the relative length of the entrance to the nest. He details two extremes, the male *mai kuyan* and the female *mai atta*:

> The entrance of the *mai ku*yan is a small narrow protruding pipe known as the *kunch*, which is also the word for penis. This is a male sugarbag; the *kunch* may stick out more than three inches or more. In contrast the entrance of the *mai atta* is a longitudinal opening, concave and flush with the tree. Since it lacks a *kunch* it

> is considered to be female. It is this sugarbag [that] contains the most honey. The *mai kuyan* is regarded as being especially important and particularly powerful not only because of its prominent phallic entrance, but because it is mentioned in the mythology, plays an important part in initiation and is associated with a story place. (201)

There are food taboos particularly placed on *mai atta* because of its phallic connotations. for example, a son cannot give this kind of sugarbag to his parents, a younger sister to her brother, nor can a son-in-law take sugarbag from his mother-in-law.

Lloyd Warner, one of the first anthropologists to write an ethnography based in Arnhem Land, stated that for the Yolngu there is nothing in the universe that does not have a place in one of two categories: Dhuwa and Yirritja. Yolngu themselves, all other animals, plants, the stars, the land, and bodies of water are grouped according to these two organizational systems of kinship (see Warner). In accordance with this, the Yolngu also group sugarbag (*guku*) into these two categories, each with its own separate totemic complex. The two sections below provide a detailed illustration of the significance of two kinds of sugarbag belonging to two oppositional moieties, the Dhuwa *Yarrpany* and the Yirritja *Burrkuda*.

Dhuwa Sugarbag. Dhuwa moiety sugarbag refers mainly to the long-nosed *yarrpany*. This kind of sugarbag is referred to as "long-nosed" because the nest (*yarrpany worrutj*) projects out from the stringybark tree (*gadayka, Eucalyptus tetradonta*) in the form of an extended tubular entrance. Note that the reference is in relation to the nose as a body part in Yolngu matha instead of the linguistic analogy of another body part, the penis, amongst the Wik-mungkan of Cape York Peninsula. This tubular protuberance functions as a defence against small intruders in search of the nutritious contents of the nest, such as the bee-fly or wasp. Other kinds of Dhuwa sugarbag exist but they are not as ceremonially significant and are deemed inedible ("too salty") due to the bee's incorporation of bitter plant resins within the honey.

In the second part of the "Sugarbag Dreaming" film segment that accompanies this paper, Djurambil Mununggur jokes with another woman ranger about their child-mother (*yothu-yindi*) relationship with regard to Dhuwa sugarbag (see https://vimeo.com/88737231). While scooping out the honey from the hollowed out log with her finger, another ranger says in Yolngu-matha, "Do it properly, the sugarbag is my child! (she laughs)." Djurambil replies "I'm doing it this way because it's my mother! Sugarbag is Jimmy's, Elsa's and my mother, so why are you telling me what to do?" Djurambil is indicating that they are custodians for the Dhuwa sugarbag because they are maternally linked to the sugarbag totem and to sacred *guku* sites on their clan land. Animals, plants, and in this case sugarbag are often referred to in kinship terms, as a recognition of each individual's personal relationship to other significant elements of their

world. Their light-hearted banter is a reaffirmation that everything is interconnected through kinship and sociality according to Yolngu cosmology.

The sugarbag hunter Wuyal. Yolngu make sense of bees through stories from their ancestors, connecting bees as part of their cosmology. When I expressed an interest in learning about bees from the Yolngu, a senior ranger from Dhimurru Aboriginal Corporation took me up to Nhulun, the prominent hill overlooking the mining town of Nhulunbuy, to point out the connection of this significant place with the stringybark trees, the bees, and their honey. The talented cross-cultural, or "two-way," educator Dr Marika[10] relates a Dhuwa sugarbag story in connection with the Nhulun sacred site. Dr Marika draws from oral accounts passed down by her father and father's brothers. The following are extracts from her story of the travels of Wuyal, particularly related to sugarbag:

> We, these five clans, sing of his adventures and the travels of Wuyal as he danced and named places of significance in the homelands of these clans. He roamed the area looking for Dhuwa sugarbag (wild honey) called *Yarrpany*, a special sweet honey for Dhuwa people, following after the bees (*dawurr*). We dance in movements depicting those of Wuyal as he moved and looked for sugarbag. The places he trod mark his country and the places he stopped are sites of significance…
>
> As Wuyal came up the path to Nhulun he was covered in *raman* (literally feathered down), the fluff of a sort of wattle, stuck all over him with the honey he was eating … He collected honey on top of the hill and put it in his dilly bag (*buyuminy*) [on the top he named the surrounding places he saw] … He walked down the hillside, his chest covered in stringy bark (*gadayka*) leaves, leaves of the Dhuwa tree where he could find his *yarrpany*. (Wilkinson et al. 407-409)

Wuyal travels on to another place, mixing honey with fresh water from a rocky island. He strains the honey through a grass that grows there and drinks it, giving special names to this honey,[11] and then follows a swarm of bees. A big depression in the land gives evidence of the swarm settling. Dr Marika then summarizes the significance of Wuyal, the placenames, landmarks, and the link with bees:

> We follow in the footsteps of Wuyal and other ancestral creators. We are tracing and treading in their likeness. Our ancestral heritage, through the stories, paintings and verses provide metaphors that we use to interpret our experiences in the world today. In this way our ancestral realities become today's realities. (409-410)

Clearly, Dr Marika understands the Yolngu mind as mediating between the ancestral domain and the lived world not only as metaphor and symbolism, but as metaphysics. By hunting for honey just as their ancestors did, the Yolngu continue the knowledge and wisdom of their ancestral past, and then reinforce it through culture, such as the participation in ceremony.

The Wawilak sisters. The Dhuwa moiety ceremony concerns the mythology of the Wawilak women. In 1974 Ian Dunlop and an accompanying film crew filmed this ceremony with anthropologist Howard Morphy present as an advisor. Morphy incorporated elements of this Djungguwan ceremony and the story of the Wawilak sisters were incorporated in Morphy's analysis in his thesis Too Many Meanings and subsequent book *Ancestral Connections*. The journey of the Wawilak sisters is associated with searching for honey (*yarrpany*). According to Morphy,

> The songs record how [the ancestral beings] cut down the trees with stone axes, or in the case of the Wawilak sisters with hooked boomerangs. The trees crashed to the ground, clearing areas of forest and sending beeswax, honey and splinters of wood flying through the surrounding forest (133).

Large poles, or *Djuwany* posts, represent both these ancestral women and the stringybark trees that were cut down in search of wild honey. The *Gundimulk*, or ceremonial ground, with accompanying sand sculpture, represents the structure of the beehive with its wax divisions. Men take on the persona of the Dhuwa bee, singing, while squatting in a line with their elbows bent, indicating the bees' wings whirring near the nest. The sound of the bees is a reminder of the ancestral being retracing its journey (Morphy, *Aboriginal Art*). The key male participants in the Djungguwan ceremony experience unity with worker bees as they dance in single file below the feather string toward the hollow log *Djuwany* (the nest), becoming become integrated as part of the sugarbag complex.

A Dhumarr, or large trumpet-like didgeridoo, represents the abdomen of the bee-fly (a fly classified within the Bombyliidae family), which hovers at the entrance of the long-nosed bee nest (*yarrpany*). Ian Dunlop explains: "Dundiwuy told me Dhumarr 'regards' the honeybee all the time and through its hovering leads Yolngu to their much sought after honey" (Deveson 87). The white dots on the Dhumarr represent the white flowers of the stringybark, an important source of nectar for the bees; reciprocally, the bee is an important pollinator of the stringybark tree. The bee-fly feeds on the nectar and pollen of the bees and, like the bees, is also an important pollinator. At the climax of the Djungguwan ceremony, the Dhumarr is droned, like the resonant sound of the bee-fly, along the length of a feather string rope, with the rope signifying the larvae within the nest. The white feather-string suspended over the ground, the Djuwany posts, and the Dhumarr trumpet denote a set of overlapping meanings, akin to a stage

set in a theatre production, where they represent different but integrated elements of the sugarbag complex.

Scientifically, the bee-fly is parasitic to bee and wasp larvae, but to the Yolngu the bee-fly is a "restorer of life to the bees," as it is said to lick dying bees, bringing them back to life. Yolngu clearly view the relationship between stingless bee and bee-fly as a mutualistic, rather than a parasitic one and the bees are part of a multilayered and interconnected system.

Figure 2. The extraction of honey pots filled with bright yellow pollen from a Yirritja stingless bee nest, within a stringybark trunk. Still photo from "Sugarbag Dreaming" video segment, by the author.

Yirritja sugarbag. The Yirritja bee, called *birrkuda*, is described as the "cheeky bee," as it bites in defense. They do not sting as a European honeybee would, but these "stingless" bees still defend their nests vigorously by swarming around an invader and biting. The Yirritja sugarbag complex has its own set of songs, dances, power names, and sacred objects. As Howard Morphy states, "The wild honey ancestor in Munyuku country consists of the whole complex of things associated with honey: the bees, the grubs [or larvae], the pollen, the honey, the nest and the trees. Fire is [also] part of the wild honey complex" (*Ancestral Connections* 173). He believes that this is because the hunters use fire to clear the ground while looking for the bees. Yirrita sugarbag is associated with the time of year (*Rarranhdharr*) when fires are lit and honey is ready to be collected (Rae, et al.). The association with fire is also due to the necessity of smoking out these bees to avoid their defensive bites. The *Birrkuda wangarr*, or ancestral being, is also associated with freshwater and floodwater because this particular stingless bee is located in paperbark (*Melaleuca*) swamp habitat, where the bees obtain pollen from paperbark trees in flower.

Figure 3. Scooping up liquid honey using a makeshift spoon made from a stick with a frayed end. Still from "Sugarbag Dreaming" video segment by the author.

The renowned Yolngu lead singer of the band Yothu Yindi, Dr Yunupingu, described in English his philosophical connection with Yirritja stingless bees. The band had just released an album entitled "Birrkuta, 'honeybee,'"[12] designed to convey a Yolngu means of communication and sharing through his special connection with bees.

> It's a deep message, where I have been able to draw from Aboriginal understanding, Yolngu understanding, about the honeybee. What it does and the way we are connected to it, in terms of the way it survives and what it produces. All those things are part of how we think of "the best", or being perfect, or how we think of goodness, or sweetness.
>
> […] This theme encompasses the understanding Yolngu people have within a structure. It can become available for one's existence; one's survival and it can also be a part of sharing. The understanding from the bee can be part of a sharing aspect in terms of being part of a community, being part of a society.
>
> […] There is a nexus - a beehive full of activity - all those type of things that we have as people, as human beings, we have that connection…we [Yolngu] think about that.

He tells how the bee is significant to his six daughters, as they have the rights to the accompanying *miny'tji*, or ancestral designs, and describes the album as a gift to his daughters, to the next generation, linking them back to their two grandmothers. To Yolngu philosophy, the sugarbag complex is not just a metaphor but is intrinsically connected with the kinship structure, to specific clans and individuals, through the characteristics Yunupingu so eloquently described.

Sugarbag Dreaming across northern Australia. Sugarbag Dreaming extends right across Arnhem Land from the east to the west but varies slightly from one clan to another, illustrating how sugarbag dreaming is passed on through painting, sand sculpture, dance, song, and storytelling.

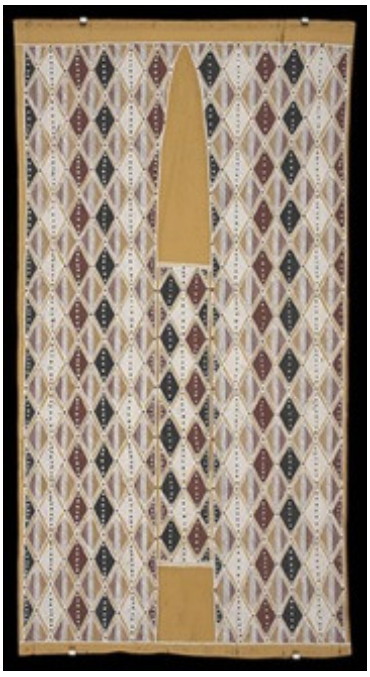

Figure 4. Bark painting of "Sugarbag Dreaming" by Jimmy Wululu, ATSIAA collection, National Museum of Australia.

A painting entitled "Sugarbag Dreaming" by Jimmy Wululu from Central Arnhem Land, reveals different layers of meaning about sugarbag (Figure 4). Here the Sugarbag design expresses the artist's own identity as part of the Yirritja moiety, using the characteristic diamond-shaped design, which is painted on the chests of initiates during ceremony to indicate the significance of sugarbag, one of the artist's main clan totems.[13] Morphy states that the "painting of the design on a person's chest or contact with a sacred object is thought to result in the transfer of ancestral power to that individual, the design afterwards becomes a sign for part of the spiritual dimension of that person" (*Aboriginal* 131).

More functionally, the central pole represents the stringybark tree with the nest in the hollowed out heart of the tree. The diamond shapes represents the cells of the bees' nest and the different colors indicate whether the cells are empty, partially filled, or full. The lines of black dots are the bees, while the white dots are the larvae. The repetitive pattern also reflects the auditory impression of the repetitive whirring of the wings of the bees, linking the painting with Sugarbag Dreaming songs and dances.

The classic ethnographic film *Waiting for Harry* (McKenzie) features elements of Sugarbag Dreaming in a burial ceremony of the Anbarra people, whose country lies across the western boundary of the Yolngu-speaking area. During the ceremony a sand sculpture is constructed into the form of a beehive, and feathered string above represents a line of bees returning with honey. The deceased man's classificatory brother sings about the bees' nest, connecting it to the hollow log that will later house his relative's bones just as this species of bee constructs nests within hollow stringybark trees. Frank Gurrmanamana sings poetically within the film, almost making ones mouth water, while he sings about the significance of the rich, dark honey in the nest:

> Where bees swell the honeycomb
>
> Ripe for sucking
>
> Spirit women gather honey in baskets
>
> Bees in a line
>
> Hollow log coffin
>
> It follows its true path.

Later in the film he sings:

> Dry tree trunk
>
> Oozing drops of dark honey
>
> Dry tree trunk
>
> Waxy cells oozing thick fermented honey
>
> A long line of bees
>
> Honeycomb. Sugarbag
>
> Drips from the mouth of the hollow log

(subtitles from McKenzie "Waiting for Harry").

Clunies-Ross gives a detailed analysis of this "Sugar Bag and Hollow Log" (*Wama-Dupan*) song series, describing sugarbag as being of "central importance to the myths expressed in Djambitj, for Wama (sometimes called *yarrpan[y]* [or Dhuwa moiety sugarbag]) provides the spiritual food for a group of powers celebrated in the song-series" (150). One function of the ceremony is to increase the supply of honey by encouraging bees to return to their nests. Gurrmanamana conveys this to Clunies-Ross by saying, "Hang up the Sugar Bag string [the ceremonial feather-string], then (*barra*) the bees will come dancing back to the tree" (152).

Ronald and Catherine Berndt give an example of a non-sacred story entitled "The First Bees" from northern Gunwinggu (or alternatively spelt Kunwinjku) further from northeast Arnhem Land, to the west of Arhnem Land. The story begins, "Once they were men, all those bees" (392). From different clans the ancestors came together in one place to trade gifts but began fighting, with nobody to restrain them.

> When dawn came they didn't go out hunting, but stayed in camp all day, fighting. At last they fell to the ground and just lay there, simply bodies. But sweat still came from them: it was like wild honey. As time passed little wings grew, and hairs emerged. Gubalag spoke first: "Don't stay lying down like that!" He tried to run, and bit those two, Nabiwu and Gaddari: he had changed ("made himself"). As for their bodies, lying dead after they had speared one another, in the holes they had made in their bellies they saw bees crawling, their own honey bees. Their speech was like the speech of bees, as they spoke to one another: "Let us not go on fighting. Let us become bees, and go off to find separate trees." That's what they did […] They farewelled ("sent away") one another, eating from flowers to make honey. And people, we human beings, taste it and say, "This is real honey." (392-392)

This story explains kinship relations and fighting between clans, but it is also a good description of the actual behavior of stingless bees. Stingless bees swarm differently from the *Apis* genus of honeybee used in beekeeping.[14] If stingless bees from one nest detect other invading bees nearby, the two colonies begin fighting in a "fighting swarm." According to a study focusing on swarming defense in stingless bees, fights between two workers are almost always fatal for both individuals (Gloag, et al.). The swarming of stingless bees in this manner was not noted in the scientific literature until relatively recently, when the combatants were pointed out to visiting museum entomologists by Mayan informants in the Yucatan (Schwarz and Bacon). This ethological knowledge, however, was also clearly passed on in an oral form amongst the Aboriginal peoples of Arnhem Land for many generations before a scientist recorded the phenomenon.

The totemic philosophy behind hunting for sugarbag. The bee expert Richard Jones mistakenly states, "It is but a short evolutionary step from honey hunting to beekeeping" (220), implying that any society would inevitably choose to engage in beekeeping once the idea occurred to them and assumes that the process of domestication is more advanced than opportunistically hunting and gathering. Jones goes on to say, "so a hollow tree becomes a hollow log; the log is cut in such a way that it can be opened and resealed by the owner and thus beekeeping is *born*. This *first step* certainly occurred in the area dominated by the Maya civilisation" (220, emphasis added). He assumes that Mayans were on the rungs of the ladder toward a civilized society by taming and keeping stingless bees in hives than those who opportunistically hunted for honey.

In Meso-America the Mayans from the Yucatan Peninsula, prior to contact with colonizing Spaniards, independently practiced beekeeping with stingless bees. The Mayan stingless beehive consists of a horizontal hollow log with an enclosure on each end plugged by a disc of wood or stone and sealed with mud. According to the writing of Oviedo in 1550, at the time of the first Spanish invasion the taming of stingless bees was a highly important occupation with accompanying sacred rituals and ceremonies (Bennett). Stingless beekeeping is now only very rarely practiced amongst the Mayans through the abundance of introduced, European-based beekeeping (Crane).

In contrast, I could find no accounts of Aboriginal Australians bringing bee nests back into a community or camp to be housed in hollow logs to extract honey at a later date.[15] Why did the First Australians not independently adopt beekeeping in hives, prior to European colonization? One practical reason may be that, in comparison with the honeybee, it is easier to extract stingless bee nests from their natural habitat since, because they are often close to the ground and in small trees, they are more easily accessed. Extracting honey from honeybees is also considerably more dangerous than it is from stingless bees because of honeybees' potentially fatal defensive stings. I demonstrate, however, that the main reason that Yolngu in Arnhem Land still collect honey from the bush is primarily philosophical.

In Philippe Descola's terms, the Aboriginal Australian totemic ontology differs from a western naturalist ontology but also from an analogical schema such as the Mayan cosmology. Descola distinguishes these various schemas according to how different people view interiority and physicality of other beings. In brief, a totemic ontology involves viewing humans as having both a similar interiority and a similar physicality to other beings. This similarity is central to the Aboriginal concept of the Dreaming, where particular beings share mutual essences with one another due to their shared ancestral heritage. Both human and totemic beings, in certain

contexts, share the same core internal characteristics, or personalities, but also originally shared the same physicality in their shared ancestor.

Fiona Magowan refers to this idea of mutual essences shared with other beings, or even natural phenomena, in Yonlgu ontology, as being "co-substantive." She provides a nice example of the meeting of two rivers: "whereby an ancestor, human or part of the landscape or seascape is seen as being simultaneously held inside the other" (27). "These two waters are connected through a polymorphic relationship in that they share *the same co-substantive essences* of froth, allowing them to be viewed simultaneously as ancestral entities and as particular kinds of human relations, each being subsumed inside the other" (27-28, emphasis added). She applies this co-substantiality and this co-interdependence to both landscapes and seascapes. Similarly, the concept of consubstantial essences can be applied in specific contexts to totemic beings, such as the crocodile (see Fijn), or in this case, sugarbag.

Conclusion. Knowing that sugarbag is part of an interconnected system, linked to the hunters of the honey, bees, nests, eucalyptus trees, flowers, a particular bee-fly, and a specific season, we can see that it would be counter to Yolngu philosophy to separate the bees from the sugarbag complex as a whole in order to produce a greater amount of honey in the form of containing bees in hives. Why would individual Yolngu want to change their methods when the technique they have passed on over the generations has functioned well for perhaps tens of thousands of years? Why would Yolngu discard the valued experience, excitement, and knowledge of hunting for honey in the bush and, just as importantly, the loss of cultural meaning attached to sugarbag? As I have shown here, if Yolngu were to adopt alternative techniques for acquiring honey they would have to change how they engage with bees, honey, and the broader sugarbag complex, including their connection to the land. It would involve an ontological reorientation away from their ecological philosophy.

Yolngu know when it is honey season by signs and cues from their surrounding environment. Everyone in the community keenly observes when the stringybark eucalypt is fully in flower and the flying foxes are fat and tasty, and have many other interconnected cues and signs from the land to tell them when the honey is ready. Being in the bush and going out with extended family in search of honey is part of community life and is a joy for them. If a homeland community wants honey they wait for the right season and travel to a reliable place where they are able to find a plentiful supply for their needs just by venturing out and looking for it.

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Aboriginal Corporation, and The Buku-Larrnggay Mulka Centre. The painting by Jimmy Wululu is used with permission of the estate of the artist, licensed by Aboriginal Artists Agency Ltd.

Notes

1. I refer to the Apidae family generally as bees, but *Apis* as a genus as "honeybees" and Meliponini as "stingless bees." In this paper I focus primarily on the Meliponini, rather than *Apis*.

2. Insects were a valuable contribution in the traditionally low-fat diet of Aboriginal Australians, particularly larvae of insect species and sugar-containing species (Meyer-Rochow and Changkija). It is interesting to note that other peoples from South America who hunt for stingless bee nests also consume the larvae (Crane).

3. One element that has changed in Arnhem Land is that people are less inclined to scale large trees to extract honey. Ronald and Catherine Berndt describe how trees were climbed to obtain sugarbag in the past by "seeing where a bee has flown into a hollow tree, climbing up, using a rope or vine or just hands and feet, [then] chopping out the honeycomb with an axe" (115).

4. Wax (or cerumen) is still used in the manufacture of spears, woomeras, firesticks, and to fashion mouthpieces for the didgeridoo (*yidaki*) (Halcroft, et al.).

5. There are a couple of recent urban-based studies focusing on bees employing the use of multispecies ethnography (see Kosek; Moore and Kosut).

6. Aboriginal metaphysics does not generally align with western scientific premises but I use the term "ecology" in this paper, as this term is the closest approximation to Yolngu perspectives relating to interconnections between other organisms (or beings) and the land.

7. According to Posey, the Kayapó Indians of Brazil use a similar means of categorizing fifty-six species of stingless bee: consistency of the honey; aggressiveness of the bees; and differing nest habitat. (Posey, "Folk Apiculture")

8. See Figure 1.3 in Michener, "The Meliponini," for a zoological diagram of the structure of a stingless bee nest that looks remarkably similar to Aboriginal bark paintings of nests within hollow stringybark trees.

9. Leon White conveyed this to me as a sugarbag metaphor passed on to him by Dr Yunipingu.

10. I refer to both the late Dr Marika and Dr Yunipingu in terms of their surnames, as their first names are currently not mentioned in public for cultural reasons.

11. Crane describes a special fine grass that is chewed to make a kind of sponge to then dip into a honey and water solution and this is then sucked and drunk as a sweet drink.

12. More often spelt *Birrkuda*, the Yirritja moiety "short-nosed" honeybee.

13. The description of the painting as a self-portrait and representation of the artist's identity was conveyed in accompanying text within the exhibition "Old Masters: Australia's Great Bark Artists" at the National Museum of Australia, 2013.

14. To see an amateur video of a fighting swarm, see http://www.youtube.com/watch?v=maKx23bpufs Web. 26 Aug. 2013.

15. Various programs have recently been developed where Aboriginal rangers or elders are engaged in the transfer of colonies into hives to try to stimulate income within the community, tapping into the growing cottage industry surrounding stingless bee honey in Australia (Halcroft, et al; Rogers).

Works Cited

Allsop, Karen A. and Janette Brand Miller. "Honey Revisited: A Reappraisal of Honey in Pre-Industrial Diets." *British Journal of Nutrition* 75.04 (1996): 513–520.

Bennett, Charles F. "Stingless-Bee Keeping in Western Mexico." *Geographical Review* 54.1 (1964): 85–92.

Berndt, Ronald Murray, and Catherine Helen Berndt. *The World of the First Australians: Aboriginal Traditional Life: Past and Present.* Canberra: Aboriginal Studies Press, 1988.

Campbell, Alastair H. "Elementary Food Production by the Australian Aborigines." *Mankind* 6.5 (1965): 206-2011.

Clunies-Ross, Margaret. "The Structure of Arnhem Land Song-Poetry." *Oceania* 49.2 (Dec. 1978): 128–156.

Corn, Aaron. "Ancestral, Corporeal, Corporate: Traditional Yolngu Understandings of the Body Explored." *Borderlands* 7.2 (2008): 1–17.

Crane, Eva. *The World History of Beekeeping and Honey Hunting*. New York: Routledge, 1999.

Crittenden, Alyssa N. "The Importance of Honey Consumption in Human Evolution." *Food and Foodways* 19.4 (2011): 257–273.

David, Bruno et al. "Nawarla Gabarnmang, a 45,180±910 Cal BP Site in Jawoyn Country, Southwest Arnhem Land Plateau." *Australian Archaeology* 73 (2011): 73–77.

Descola, Philippe. *Beyond Nature and Cult*ure. Chicago and London: U Chicago P, 2013.

Deveson, Pip. "The Yirrkala Film Project Notes." Manuscript, Canberra: AIATSIS, 1997.

Dhupuma College http://www.territorystories.nt.gov.au/handle/10070/64920, Web. 23 Oct. 2013.

Dunlop, Ian. *Djungguwan at Gurka'wuy: a film monograph by Ian Dunlop made at the invitation of Dundiwuy Wanambi*. Film Australia, Film, 1989.

Dyer, Fred C. "The Biology of the Dance Language." *Annual Review of Entomology* 47.1 (2002): 917–949.

Fijn, N. Fieldnote, August, 2012, video segment at: https://vimeo.com/88737231

_____. "Living with crocodiles: an alternative perspective on engagement with a reptilian being." *Animal Studies Journal* 2.2(2013): 1-23.

Ford, Andrew, and Dr Yunipingu. "M. Yunupingu Remembered*."ABC Radio* http://www.abc.net.au/ radionational/programs/musicshow/m-yunupingu-remembered/4740890 Web. 06 Aug. 2013.

Gammage, Bill. *The Biggest Estate on Earth: How Aborigines Made Australia*. Crows Nest, N.S.W: Allen & Unwin, 2011.

Gloag, R. et al. "Nest Defence in a Stingless Bee: What Causes Fighting Swarms in Trigona Carbonaria (Hymenoptera, Meliponini)?" *Insectes Sociaux* 55.4 (2008): 387–391.

Halcroft, Megan, Spooner-Hart, Robert, Dollin, Anne. "Australian Stingless Bees" *Pot Honey: A Legacy of Stingless Bees*. Eds Patricia Vit, Silva Pedro and David Roubik. New York: Springer (2013): 35-72.

Jones, Richard. "Stingless Bees: A Historical Perspective." *Pot Honey: A Legacy of Stingless Bees*. Eds Patricia Vit, Silva Pedro and David Roubik. New York: Springer (2013): 219-228.

Kosek, Jake. "Ecologies of Empire: On the New Uses of the Honeybee." *Cultural Anthropology* 25.4 (2010): 650–678.

Matthews, Freya. "Planet Beehive." *Australian Humanities Review* May (2011): 159-178.

McKenzie, Kim. *Waiting for Harry*. Canberra: AIATSIS, Film, 1980.

McKnight, David. "Sexual Symbolism of Food Among the Wik-Mungkan." *Man* 8.2 (1973): 194.

Meehan, Betty. "Hunters by the Seashore." *Journal of Human Evolution* 6.4 (1977): 363–370.

Meyer-Rochow, V.B., and S. Changkija. "Uses of Insects as Human Food in Papua New Guinea, Australia, and North-East India: Cross-cultural Considerations and Cautious Conclusions." *Ecology of Food and Nutrition* 36.2-4 (1997): 159–185.

Michener, Charles, D. "The Meliponini." *Pot Honey: A Legacy of Stingless Bees.* Eds Patricia Vit, Silva Pedro and David Roubik. New York: Springer (2013): 3-18.

_____. "Observations n the Nests and Behavior of Trigona in Australia and New Guinea (Hymenoptera, Apidae). *American Museum Novitates* no.2026." (1961). pp. 1-45.

Moore, Lisa Jean, and Mary Kosut. "Among the Colony: Ethnographic Fieldwork, Urban Bees and Intraspecies Mindfulness." *Ethnography* (2013): 1466138113505022.

Morphy, Howard. "Too Many Meanings: An Analysis of the Artistic System of the Yolngu of Northeast Arnhem Land." Thesis: Canberra, ANU [1977] https://digitalcollections.anu.edu.au/handle/1885/8038 Web. 20 Aug. 2013.

_____. *Ancestral Connections*. Chicago: U Chicago P, 1991.

_____. *Aboriginal Art.* London: Phaidon, 1998.

Nelson, D. E. et al. "Radiocarbon Dates for Beeswax Figures in the Prehistoric Rock Art of Northern Australia." *Archaeometry* 37.1 (1995): 151–156.

O'Dea, Kerin et al. "Traditional Diet and Food Preferences of Australian Aboriginal Hunter-Gatherers [and Discussion]." *Philosophical Transactions of the Royal Society of London*. Series B: Biological Sciences 334.1270 (1991): 233–241.

Parker, K. Langloh. *The Euahlayi Tribe: A Study of Aboriginal Life in Australia*. London: Constable, 1905.

Posey, Darrell A. "Entomological Considerations in Southeastern Aboriginal Demography." *Ethnohistory* 23.2 (1976): 147-160.

_____. "Folk Apiculture of the Kayapò Indians of Brazil." *Biotropica* 15.2 (1983): 154-158.

_____. "The Importance of Bees to Kayapò Indians of the Brazilian Amazon." *The Florida Entomologist* 64.4 (1982): 452-458.

Rae, C. J. et al. "The Role of Bush Foods in Contemporary Aboriginal Diets." *Proc. Nutr. Soc. Aust*. 7 (1982): 45-49.

Rogers, Eliza. "Bee Project Buzzing Along" *ABC Radio*, http://www.abc.net.au/news/ 2013-12-13/qld-native-bee-project/5155178. Web. 13 Dec. 2013.

Rose, Deborah. "An Indigenous Philosophical Ecology: Situating the Human." *The Australian Journal of Anthropology* 16.3 (2005): 294–305.

Rudder, John. *The Natural World of the Yolngu, The Aboriginal People of North East Arnhem Land*. A Restoration House Publication, 1999.

_____. *Qualitative Thinking: An Examination of the Classificatory Systems, Evaluative Systems and Cognitive Structures of the Yolnu People of North-East Arnhem Land*. Thesis, Canberra: ANU, 1983.

Schwarz, H. F. "Stingless Bees (Meliponidae) of the Western Hemisphere. Lestrimelitta and the Following Subgenera of Trigona, Paratrigona, Swarziana, Parapartamona, Cephalotrigona, Oxytrigona, Scaura, and Mourella. Abejas Jicotes (Meliponidae) Del Hemisferio Occidental. Lestrimelitta Y Los Siguientes Subgéneros de Trigona, Paratrigona, Swarziana, Parapartamona, Cephalotrigona, Oxytrigona, Scaura Y Mourella." *Bulletin of the American Museum of Natural History* 90 (1948): 1–536.

Schwarz, Herbert Ferlando, and Annette Louise Bacon. "Stingless Bees (Meliponidae) of the Western Hemisphere : Lestrimelitta and the Following Subgenera of Trigona : Trigona, Paratrigona, Schwarziana, Parapartamona, Cephalotrigona, Oxytrigona, Scaura, and Mourella." *Bulletin of the AMNH*; v. 90. (1948): digitallibrary.amnh.org.virtual.anu.edu.au. Web. 26 Aug. 2013.

Spencer, Baldwin. *Wanderings in Wild Australia*. Vol. 1. New York: Macmillan and Company Ltd., 1928.

Tamisari, Franca. "Body, Vision and Movement: In the Footprints of the Ancestors." *Oceania* 68.4 (1998): 249.

Vit, Patricia, Silvia R. M Pedro, and David W Roubik. *Pot-Honey: a Legacy of Stingless Bees*. New York: Springer, 2013.

Von Frisch, Karl. "Decoding the Language of the Bee." *Readings in Zoosemiotics* 8 (2011[1973]): 76-87.

Wilkinson, Melanie, Dr R Marika, and Nancy Williams. "'This Place Already Has a Name.'" *Aboriginal Placenames: Naming and Re-Naming the Australian Landscape*. Eds. Harold Koch and Luis Hercus. Canberra: ANU E Press, 2009: 403–462.

Warner, William Lloyd. *A Black Civilization: A Social Study of an Australian Tribe*. Harper & Row, 194.