

HEI, HAWAIIAN STRING FIGURES: HAWAIIAN MEMORY CULTURE AND MNEMONIC PRACTICE

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This article explores the question, “How did our kūpuna (ancestors) remember long narratives?” A long narrative, *Kūhau Pi’o ka Lā*, is presented and analyzed for mnemonic device and structure. In addition, the nine string figures made to accompany *Kūhau Pi’o ka Lā* are analyzed for mnemonic structure and meaning. This study explains how auditory, visual, kinesthetic, and cultural mnemonic devices in both oral performance and written text synthesize to form a system—a memory culture. While Hawaiian chanters kept this oral text alive for generations, performance knowledge of the string figures seems to have nearly disappeared except for directions recorded by Lyle Dickey. However, *aides de mémoire* embedded in the text and in the string figures themselves as left to us by our kūpuna make the reconstruction of the *Kūhau Pi’o ka Lā* possible.

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PROLOGUE

I grew up on the western border of Honolulu where the district of ‘Ewa begins on the island of O‘ahu. The old ones called this place Kapukakī or The Spouting Hole. We called it Red Hill. When postal packages arrived in those days, they were bound with heavy string and we appropriated this string to play cat’s cradle. My older cousins and neighbors were my first teachers of cat’s cradle. We started with the basic position which I later learned was called Opening A. Then we took turns creating figures we named Chopsticks, Diamonds, Chinese Jump Rope, and so forth until someone could not solve the string puzzle. No one ever lost, however, because we were eager to help anyone who was stumped so we could continue playing for as long as possible. String figure making to us was only a game or pastime. Looking back at those days, I see that some powerful socialization took place. Socialization and playing together he alo a he alo (face to face) is something you rarely see today as children are increasingly preoccupied with hand-held electronic devices or with social networking on web-based sites.

The first hei or Hawaiian string figure I learned was Two-Eyes for the chant “Eia ke kaula,” a chant composed by Aunty Nona Beamer (1972), a long-time advocate for hula (Hawaiian dance) and beloved educator at Kamehameha Schools. I learned “Eia ke kaula” from Mrs. Sarah Quick, under whom I worked as a Hawaiian language aide in the Explorations summer program for Hawaiian children not enrolled at Kamehameha Schools. This was my first exposure to chanting while creating string figures, and this was when I discovered that Hawaiian string figures were used for instruction and learning.

I learned more hei from ‘Āina Keawe, an elder who worked for the City and County of Honolulu’s Hawaiiana Department. It is not always recognized that this department was once a bastion of Hawaiian culture and art and arguably one of the reasons for the successful resurgence of interest in hula, Hawaiian sports, Hawaiian musical instrument making, Hawaiian slack-key guitar, Hawaiian arts and crafts, and language. ‘Āina Keawe, Alice Keawekāne, Alice Nāmakelua, Hoakalei Kamau‘u, George Holokai, Adeline Maunupau Lee, and other notable Hawaiians who worked in this department endeavored to keep the Hawaiian culture alive and vibrant especially among the youth of Hawai‘i. “Aunty ‘Āina,” as we called her, perpetuated her love for lā‘au lapa‘au (herbal knowledge) and shared her knowledge of hei with interested youth. She taught me One-Eye, Seven-Eyes, Thirteen-Eyes, and Winking Eye. She also encouraged us to search for

Lyle Dickey’s *String Figures from Hawai’i* to learn other traditional figures. After reading Dickey (1928), I decided to learn *Kūhau Pi’o ka Lā* because he wrote that “the chant is known to many Hawaiians who do not know how to make the string figure” (p. 14). Two years after learning hei from Aunty ‘Āina, I learned the chant *Kūhau Pi’o ka Lā* which I performed in *kepakepa* style, a rhythmic recitation of chant. I set mastering the making of the string figures accompanying *Kūhau Pi’o ka Lā* as one of my goals in life, and my research began with that decision. This article describes how I integrated the understanding of the chanted narrative, performance, and physical construction of the string figures of *Kūhau Pi’o ka Lā*. As such *Kūhau Pi’o ka Lā* is a case study of Hawaiian mnemonic practice.

HOW DO WE REMEMBER?

A people rely on memory for their knowledge of what is important to them. Memory or recollected knowledge can be transmitted orally and is often situated in chant and song. Memory is also actualized in ritual, ceremony, the arts, and other traditional practices. According to Paul Connerton (1989), performative memory—gestures, manners, musical or dance performance, and other socially negotiated practices—is where memory is “sedimented” into the body (pp. 94, 102). Ong (1982), who wrote extensively on oral cultures, noted that oral memory has a high “somatic [of the body] component” (p. 67). Similarly, Peabody (1975) noted,

From all over the world and from all periods of time... traditional composition has been associated with hand activity. The aborigines of Australia and other areas often make string figures together with their songs. Other peoples manipulate beads on strings. Most descriptions of bards include stringed instruments or drums. (p. 197)

Furthermore, the performance aspects of oral memory are enhanced by mnemonics, aids to memory, that stave off the effects of transience or forgetting. Jeanette Rodriguez (2007) wrote,

Memory culture is the process by which a society ensures cultural continuity by preserving with the help of cultural mnemonics its collective knowledge from one generation to the next, rendering it possible for later generations to reconstruct their cultural identity. (p. 1)

In traditional Hawaiian society, Hawaiian memory culture was highly developed by the *kāhuna*—knowledge keepers often referred to as priests, ministers, physicians, or professional experts. The mnemonics they developed were performative—ritual, gesture, music and dance performance—and based on cultural principles of memory development such as *kūpina'i* (repetition), *ka'ina* (order), *pilina* (association), *paukū* (segmentation), *ka pāna na'au* (emotional affect), and *ho'omakakū* (visualization).

Hawaiian performative memory often included accompaniment such as a *pahu* (drum) employed together with *oli* (chant) and *ha'a* (Hawaiian dance) to enhance ceremony. The wide array of instruments in Hawai'i assisted the chanter in recounting history, epic deeds, genealogy, human emotion and affairs, as well as love for the land. While a looped string is not a musical instrument, it was used to accompany the songs and stories told of classical dance. These songs and their string figures embodied one kind of mnemonic practice.

HAWAIIAN MNEMONIC BODY AND PRACTICE

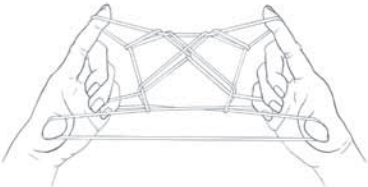
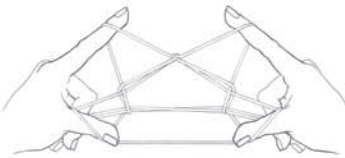
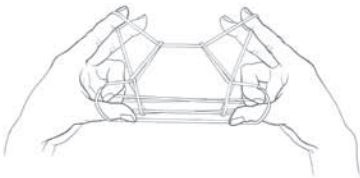
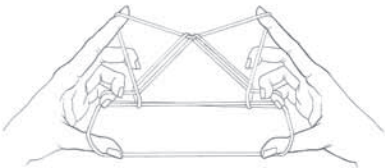
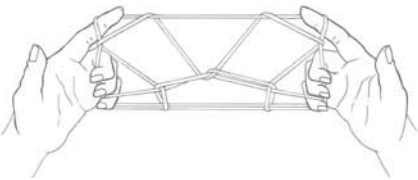
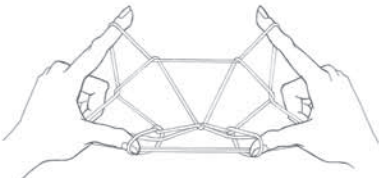
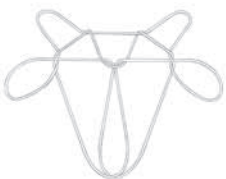
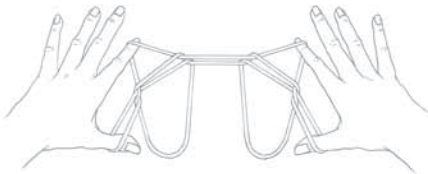
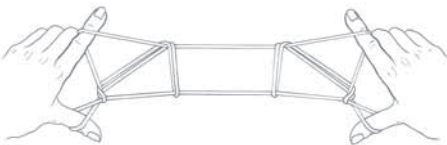
The classic chant *Kūhau Pi'o ka Lā* is selected as a case study because it is the longest text to accompany the making of string figures in Hawai'i—possibly the world—and thereby provides much content to analyze (Table 1). In addition, the nine progressive string figures (Table 2) provide a uniquely holistic view of Hawaiian mnemonics at work. *Kūhau Pi'o ka Lā* is a particularly rich example of the Hawaiian mnemonic body and practice.

TABLE 1 *Kūhau Pi'o ka Lā*, a text for string figures with an English translation by the author.

Kuluwaimaka text (1997)	English translation
1. Kūhau pi'o ka <i>lā</i> ^a	The <i>Sun</i> ^a rises and teeter-totters
2. Ka <i>lā</i> i ke kula o 'Ahu'ena	The sun over the plains of 'Ahu'ena
3. Komo i ka la'i o Kailua <i>lā</i> , 'O <i>Kona</i>	It enters into the calm of Kailua, now at <i>Kona</i>
4. 'O <i>Kona</i> ia o ke kai malino	This is <i>Kona</i> of the calm seas
5. He lae o waho o Kapūlau	A cape outside of Kapūlau
6. Kani ke 'a'o i Wai'ula'ula, 'O <i>Ka'ū</i>	The puffins cry at Wai'ula'ula, now at <i>Ka'ū</i>
7. 'O <i>Ka'ū</i> ia, 'āina kua makani,	This is <i>Ka'ū</i> , a wind-blown land
8. hauna i ka lepo	suffuse with earthiness
9. Lele koa'e Kaumea <i>lā</i> , 'o <i>Puna</i>	Where the tropic bird flies, now at <i>Puna</i>
10. 'O <i>Puna</i> ia o ke kai kōloa i ka ulu hala	This is the <i>Puna</i> district where the sea roars in the pandanus grove
11. E nū ana ke kai o Kea'au <i>lā</i> , 'O <i>Hilo</i>	And the sea of Kea'au groans, now at <i>Hilo</i>
12. 'O <i>Hilo</i> ia o ka ua kinai	<i>Hilo</i> of the never ending rains
13. Kinakinai i ka ua mao 'ole <i>lā</i> ,	Inextinguishable are the rains that never clear
14. 'o <i>Hāmākua</i> ,	now at <i>Hāmākua</i>
15. 'O <i>Hāmākua</i> i ka pali Ko'olau	<i>Hāmākua</i> of the windward cliffs
16. E nahu ana ka niho i ka ipu	The teeth bite into the gourd container
17. I ka pali o Koholālele	Along the cliffs of Kohalālele
18. 'O <i>Waipi'o</i> lāua 'o <i>Waimanu</i>	Now, the valleys of <i>Waipi'o</i> and <i>Waimanu</i> appear
19. 'O <i>Kohala</i> iki, 'O <i>Kohala</i> nui	Great <i>Kohala</i> , Small <i>Kohala</i>
20. 'O <i>Kohala</i> ua 'Āpa'apa'a	<i>Kohala</i> of the 'Āpa'apa'a wind
21. 'O <i>Pili</i> lāua 'o <i>Kalāhikiola</i>	Now appear <i>Pili</i> and <i>Kalāhikiola</i> hills
22. 'O nā pu'u haele lua o ke kanaka	The companion hills of man
23. 'O <i>Kāne</i> 'o'opa e ne'e ana	Lame <i>Kāne</i> is creeping
24. ma ka hu'ahu'a	amidst the sea foam
25. me ka 'ala'ala pā'ina pōhaku	with ink sacs bursting open.
26. Aloha kākou. ^b	We remember with love.

^a Place names appearing in italics represent when the string figure is made, moved, or slid.^b Line 26 is added in oral performance and not included in most written texts.

TABLE 2 String figures for *Kūhau Pi'o ka Lā* in sequence.

	
1. Kūhau pi'o ka lā	2. Kona
	
3. Ka'ū	4. Puna
	
5. Hilo	6. Hāmākua
	
7. Waipi'o and Waimanu	8. Kohala Iki and Kohala Nui
	
9. Pili and Kalāhikiola	

Note: Drawings were commissioned by the author and are by Kimberlie Wong.

Kūhau Pi'o ka Lā persisted in Hawaiian memory primarily as a chanted story. According to Dickey (1928), *Kūhau Pi'o ka Lā* was the most famous of Hawaiian string figures (p. 14). That it was well known is a testament to its appeal, significance, and value. I would argue that it also persisted due to the mnemonics it employs.

AUDITORY MNEMONICS OF HEI

Auditory mnemonics improve memory by stimulating auditory pathways to the memory center of the brain. An example of an auditory mnemonic is “My dog has fleas.” Young learners of the ‘ukulele learn to sing this to remember the sound of the notes of each string, “G, C, E, and A.”

The auditory mnemonics of heī can be appreciated by understanding how the composer crafted the chant. It is important to remember that paper and pencil was unavailable to the composer, so he or she created the story internally. Using evocative images, the composer settled on words having significant meaning and that were acoustically and aesthetically pleasing. The haku mele (composer) implanted mnemonics into the story chant so that he or she could remember it again, and, if it was deemed memorable by those who heard it, be recited over and over again.

Kūhau Pi'o ka Lā belongs to the island of Hawai'i, which is apparent through an analysis of the place names in the text. It is also a love story. It recounts the travels of two young lovers on Hawai'i who meet in Kona, a district on the leeward side of Maunaloa, the central mountain on that island (see Figure 1). They break apart in Ka'ū over some gossip but reunite in the district of Puna. Next, they travel to Hilo and prosper. Later in their lives, they pass through the steep cliffs of Hāmākua. Finally, they end up in Kohala—the northern quadrant of the island. As the chant moves from district to district, progressive string figures, consecutive configurations built from the former, are made to recount this journey. Each new figure represents a district and a different phase of the lovers' story. Moreover, this oral travelogue serves as a story plot. Instead of following a story plot chronology based on Freytag's (1863) story pyramid (exposition, rising action, climax, falling action, and revelation), the Hawaiian story plot is place-based and geographically organized. A Hawaiian place-based story plot is somewhat circular in nature and not typically crafted in a linear fashion with a singular spike in the narrative.

FIGURE 1 Map of Hawai'i Island



A place-based story plot typically situates the listener and establishes relationships to the story vis-à-vis the deep meanings and feelings attached to Hawaiian places. For example, Hilo is known for its never-ending rains. The mention of “Hilo” at community gatherings inevitably prompts the memory of other well known sayings such as those recorded by Pukui (1983, p. 107): “Hilo of the Kanilehua rain” or “Hilo, land of Hanakahi.” Hanakahi was a wise chief whose rule was peaceful, and the name itself denotes “unity.” The many traditional geographical epithets within *Kūhau Pi’o ka Lā* (see Table 1) are timeless, because they are repeated and remembered in songs that are still sung at family festivities and commemorative events. Place names evoke powerful memories and are themselves mnemonic devices.

In Western traditions, rhyme is typically employed as an auditory mnemonic. However, as rhyming is absent in the Hawaiian literary tradition, repetition is frequently used instead (Elbert & Mahoe, 1970; ho’omanawanui, 2007; Kimura, 2002). Note how the name of the district is repeated in the subsequent line:

Kani ke ‘a’o i Wai‘ula‘ula, ‘O Ka‘ū
The puffins cry at Wai‘ula‘ula, now at Ka‘ū

‘O Ka‘ū ia, ‘āina kua makani,
This is Ka‘ū, a wind-blown land

Another favorite technique of Hawaiian composers is the use of linked assonance; that is, a sound in a previous line, usually the last word, is linked to, echoed, or repeated in the subsequent line, usually the first word. This technique can be seen in the following example:

‘O Hilo ia o ka ua kinai
Hilo of the never ending rains

Kinakinai i ka ua mao ‘ole lā,
Inextinguishable are the rains that never clear

In this example, “Hilo” acts as a catalyst for memory and images. In fact, all the districts in *Kūhau Pi‘o ka Lā* are *loci memoriae* (sites of memory), the *lieux des memoires* described by Nora (1989). We have two terms in Hawaiian for *loci memoriae*. The first is *wahi pana* (storied place) and the other is *kulāiwi* (homeland). The composer selected *wahi pana* within each district with a storied past. For example, Waipi‘o (Table 1, line 18) is a storied place associated with King Līloa, Pāka‘alana temple, and Hi‘ilawe waterfalls. Another example is Pili and Kalāhikiola (Table 1, line 21), beacon hills to travelers in the heavily misted lands of Waimea.

Kulāiwi, the other term for *loci memoriae*, evokes feelings of family and nation. *Kulāiwi* are literally the places where the bones of the ancestors were interred and thus are familial, ancestral lands. *Kulāiwi* are also where families hid and secured the umbilical cord of the young, a traditional practice that insured the future of the newborn. I identify Hāna, Maui, and Anahola, Kaua‘i, as my *kulāiwi* or ancestral lands and remember in particular my great-grandmother Kamila and her perseverance in keeping our family lands in family hands. These *kulāiwi* are important to me because the *iwi* (bones) and *piko* (navel) of my ancestors are buried there.

The idea of “homeland” is not new for Hawaiians. We traditionally refer to our ancestral homeland as *Kahiki*. *Aupuni* (nation) is a 19th-century notion as Hawaiian families traditionally aligned themselves to chiefs and relatives who governed and resided within certain districts or islands. The use of homeland as “nation” did not occur until Kamehameha I united most families, septs, and chiefdoms of the archipelago into a single nation-state. Kaua‘i and Ni‘ihau were steadfastly governed by Kaumuali‘i until he and Kamehameha struck a peace accord in 1810 (Kamakau, 1867).

Suffice it to say, when place names, wahi pana or kulāiwi, are heard in the Hawaiian collective, they bring to mind memories of place, of family, of important events; they hold mnemonic power. Despite efforts that would have us forget our language, place names endure as loci memoriae. Benham and Heck (1998), Kame‘eleihiwa (1992), and Silva (2004) described how government policies such as the 1896 ban on the use of the Hawaiian language as a medium of instruction in schools had detrimental effects on the Hawaiian language, literacy, and cultural identity. Fortunately, *Kūhau Pi‘o ka Lā* was remembered and inscribed by its methodology. As a practice, it survived in the interstices of modern historical consciousness because language is a potent force in forming a collective and sustaining memory despite governmental policy. Auditory mnemonics rely on and are built on language. They are powerful tools in helping us to remember, and this memory is always visual.

VISUAL MNEMONICS OF HEI

Visual mnemonics work by associating an image with characters or objects whose name sounds like the item that has to be memorized. For example, the back of the Bactrian camel is shaped like the letter “B” and the back of the Dromedary camel is shaped like the letter “D.”

The visual mnemonics of *Kūhau Pi‘o ka Lā* are the string figures themselves. As explained above, each figure is associated with a district, and each district evokes a set of emotions and memories associated with the storied places and ancestral lands therein. Unlike the visual mnemonics learned in American schools, for example, ROY G. BIV (color spectrum of a rainbow), the visual mnemonics in hei are more akin to Japanese *kanji*, writing characters that stem from the original Chinese ideograms or visual representations of real things in nature (e.g., river, mountain, fire, bird).

Hei figures are visual representations. These representations often have spiritual meaning. For example, the figure for *Kona* (Figure 2) is a house, and the house represents the unity and harmony of the couple in the story. In transitioning from the *Kona* figure, the gables of the roof are separated, thus representing disharmony in the next district, *Ka‘ū* (Figure 3). The text suggests that the reason for this disharmony is gossip: “The puffins cry at Wai‘ula‘ula” (Table 1, line 6).

Evidently, the pair reconcile by the time they reach the Puna district as the figure for *Puna* (Figure 4) is a large house representing reconciliation and abundance. *Hilo* (Figure 5) shows large clouds, a symbol of wealth. *Hāmākua* shows the precipiced district and its narrow opening representing difficulties. *Pili* and *Kalāhikiola* are companion hills representing renewed relationships and life. The last image shows the two hills moving away from each other representing the conclusion of the story as well as the lovers' life together as a couple.

FIGURE 2 Kona

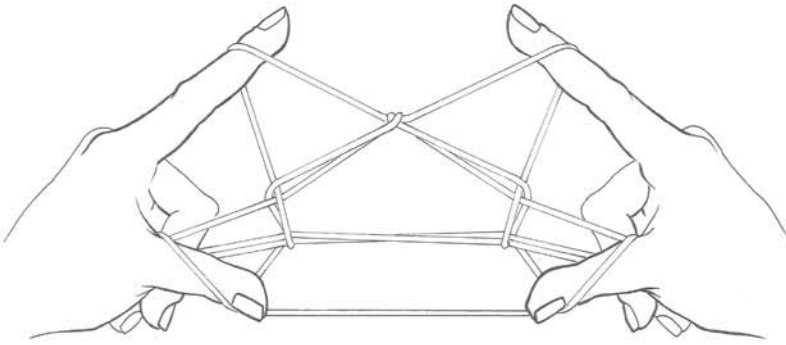


FIGURE 3 Ka'ū

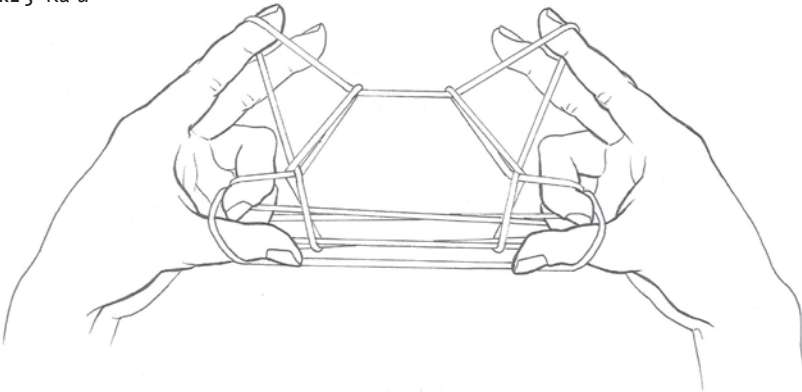


FIGURE 4 Puna

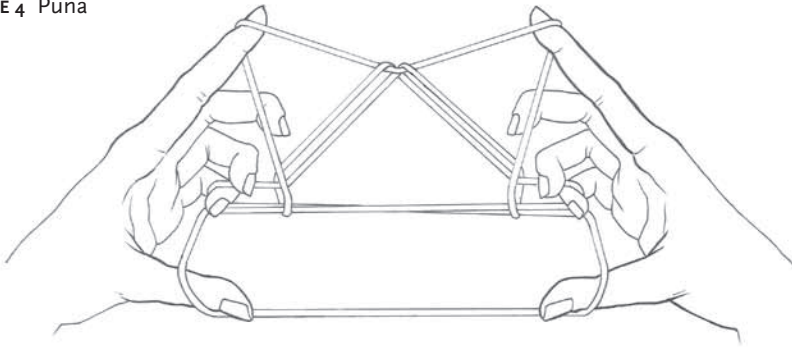
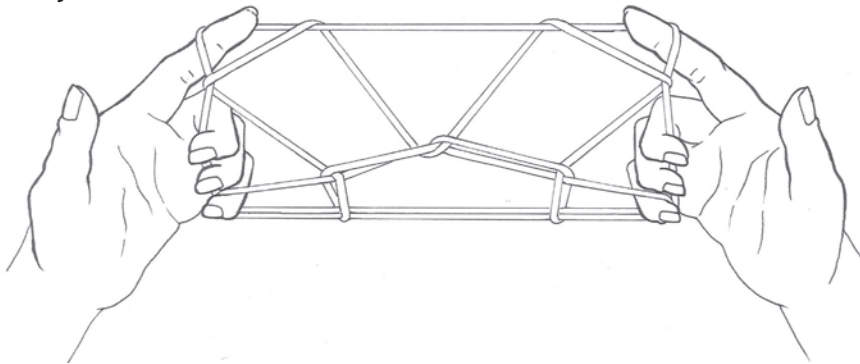


FIGURE 5 Hilo



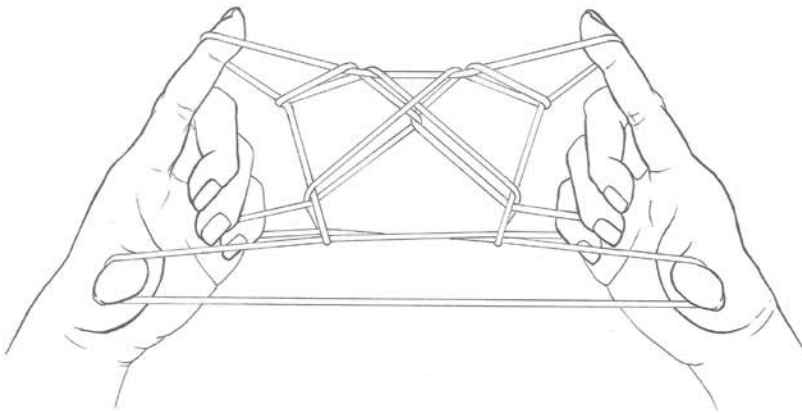
Hei uses structural depth to strengthen the visual association to the images of the chanted text. Consider the first lines of the chant:

Kūhau pi'o ka lā
The Sun rises and teeter-totters

Ka lā i ke kula o Ahu'ena
The sun over the plains of Ahu'ena

The figure for the *Sun* (Figure 6) is shown as a man with arms and legs. The smiling face of an audience member is the head of the *Sun*. In addition, the arms of the figure also represent the peaks of the mountains looming over the Kona coast of Hawai'i Island—Maunaloa, largest volcanic mountain in the world, and, Hualalai, the peak most Kona people adore and remember in song and chant. The sun rising over these peaks seems to balance on the ridges, peeking over the mountain, hence the teeter totter, or *kūhau pi'o* effect of the sun. The strings held on the extended thumbs show the plains of Ahu'ena, a series of lava fields near the ocean. This string position creates a three-dimensional effect.

FIGURE 6 *Kūhau Pi'o ka Lā*. Ahu'ena is a plain shown by the space created from strings stretched from thumb to central figures.

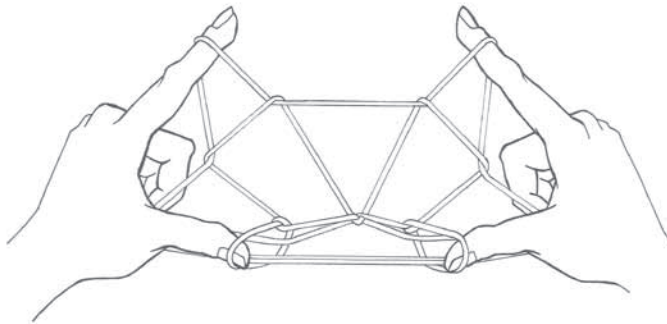


Again, the figure for *Sun* is a visual mnemonic very much like Japanese *kanji* where the written symbols are visual pictographs of real objects. Hawaiian string artists such as my teacher, 'Āina Keawe, recognized the *Sun* figure as the symbol for a person with its “rays” as personified arms and legs. Similar opening moves are found in string figures such as *Lonomuku*, “Maimed Lono in the Moon,” as well as *Hawai'i Nui a Kāne*, “Great Hawai'i of the god Kāne” (see Dickey, 1928). *Lonomuku* and *Kāne* are ancestors and thus utilize the same *Sun* or person figure. A string artist need only remember this one *Sun* image to construct any of these string figures.

In the Hawaiian tradition, the *Sun* is the god Kāneka'ōnohiokalā. He walks across the land each day, slower in the winter and faster in the summer. Our ancestor Maui lassoed his legs and persuaded him to walk slower so that his family and the rest of mankind would have sufficient time to labor. He is the same *Sun* day after day. So unlike our saying, "Today is a new day," each day is actually the same day in the Hawaiian worldview because the same *Sun* appears and disappears each day. Hei is a perfect medium for demonstrating this because the figures, too, appear and disappear. It is memory that causes the figure of the *Sun* to reappear.

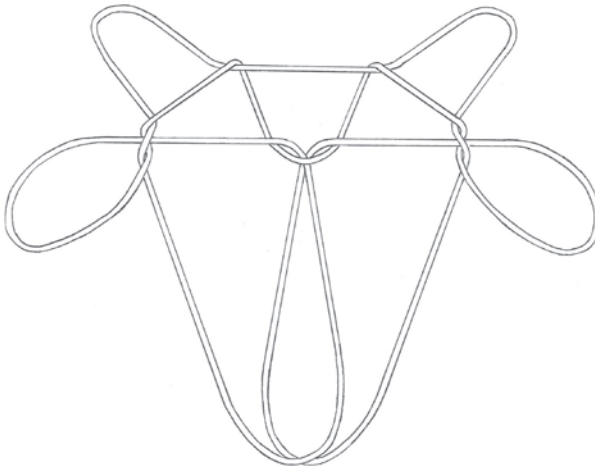
Hei belong to Hawaiian storytelling tradition where the visual images of the figures are reinforced with chant or story. The visual mnemonic is further intensified by involving the stringer in the creation of the visual representations as storyteller. For example, when creating *Hāmākua* (Figure 7), I pull two lateral loops toward me with the thumbs causing the previous figure for *Hilo* to shrink downward thus forming two district border entrances into the precipitous mountain district of Hāmākua. This visual representation reminds me of the epithet for Hāmākua: "*Hāmākua puka kihikihi*" or "Hāmākua of the narrow opening."

FIGURE 7 Hāmākua. The thumb loops show the "narrow opening" into the precipitous district.



When chanting the line for *Hāmākua*, “E nahu ana ka niho i ka ipu. *The teeth bite into the gourd container*” (Table 1, line 16), I grab hold of the lead string that represents the rim of a gourd with my teeth and separate the two dangling loops in the air, the resulting hanging loops representing the beautiful valleys of Waipi’o and Waimanu (Figure 8).

FIGURE 8 Waipi’o and Waimanu valleys



The entire retelling and performance of *Kūhau Pi’o ka Lā* has spiritual intent whose meaning is dealt with more fully in the cultural mnemonics section of this article. *Kūhau Pi’o ka Lā* begins with a visible sunrise and ends with an invisible sunset. The rising sun symbolizes youth and the beginning of life and the setting sun represents old age and the end of life. Visual mnemonics collaborate with auditory mnemonics to tell this story, and both of these systems synergize with kinesthetic mnemonics as *aides de mémoire*, aids to memory.

KINESTHETIC MNEMONICS OF HEI

Dickey (1928) observed that “The Hawaiian is fond of motion or change in a string figure” (p. 11). *Kūhau Pi’o ka Lā* is an excellent example demonstrating this fondness for motion. While the story is chanted, the first figure changes and transforms several times resulting in a kind of slideshow. Other hei transform once or twice and some none at all.

The opening movements to *Kūhau Pi’o ka Lā* are kinesthetic mnemonics because they are identical or similar to the opening moves of other figures mentioned before, such as *Lonomuku* and *Hawai’i Nui a Kāne*. They belong to a family of figures that have the “person” image. The string artist recognizes the movements through a kind of muscle memory and executes them accordingly and automatically. Repetition builds this muscle memory, and some Hawaiians believe that this muscle memory can be passed on to future generations, manifested as a *welo* or hereditary trait.

Auditory mnemonics synergizes with kinesthetic mnemonics. For example, when the chanter says “*Komo i ka la’i o Kailua lā, ‘O Kona*” (Table 1, line 3), he is cued to insert both indexes below each arm of the sun-figure since *komo* means “to enter.” Another example occurs at *Ka ‘ū* (Figure 9). When one chants *lele* meaning “to jump” (Table 1, line 9), the loop held by ring fingers is released and it “jumps” upward revealing the new figure, *Puna* (Figure 10). At *Puna* when the word *nū* meaning “to groan” is chanted (Table 1, line 11), the index fingers twist over another looped string causing the figure to buckle and sway like a groaning sea. Key words appear throughout the chant to assist the hei figure maker in the storytelling. They serve as auditory cues to the brain and muscle memory. These nuances in the chant are understood by those who know and speak the Hawaiian language.

FIGURE 9 Ka'ū. The strings held on the ring fingers are released on *lele koa'e* (tropic bird flies) which creates the next figure for Puna.

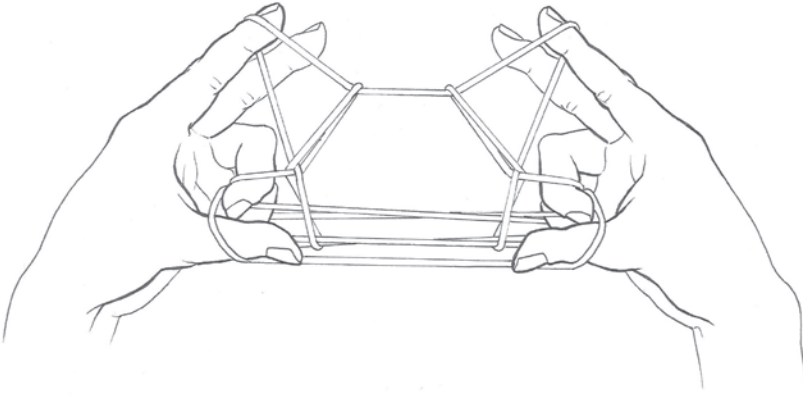
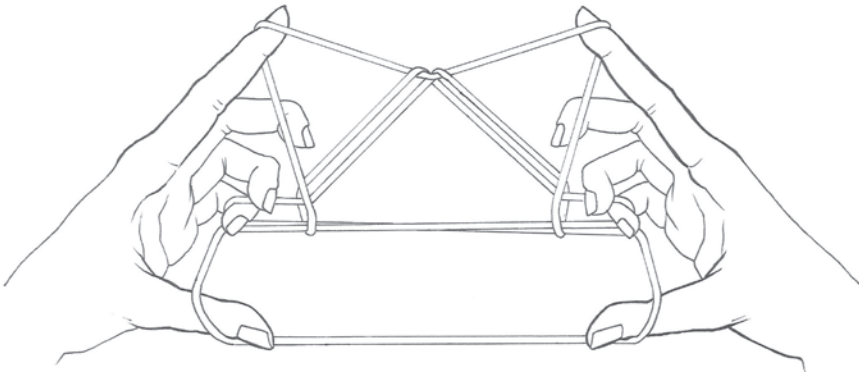
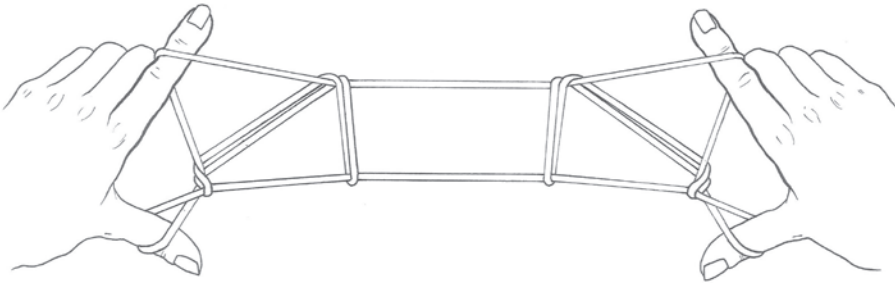


FIGURE 10 Puna. The thumbs enter into the index loops freeing the indexes to turn back in and around the former thumb strings on the word *nū* (groan) causing a buckling and swaying.



Dickey worked for the Hawaiian kingdom as a land surveyor. Though he managed to learn Hawaiian, he confessed that he was not confident about understanding the deeper, esoteric meaning of the chants he collected (Dickey, 1928, p. 11). He suggested, for example, that the lovers of *Kūhau Pi'o ka Lā* lived happily ever after in the district of Kohala. However, when the string practitioner chants the last line of the chant, “e ne'e ana ma ka hu'ahu'a. *creeping amidst the sea foam*” (Table 1, lines 23, 24) the index fingers and thumbs manipulate the figure so that the two hills of *Pili* and *Kalāhikiola* (Figure 11) actually move away from each another. They also get smaller and will actually disappear when extended to the fullest. This suggests a more natural conclusion and less of a fairy tale ending. The two lovers have indeed come together but also gradually separate as they end their natural journey in life together.

FIGURE 11 Pili and Kalāhikiola. The hills slide apart and horizon diminishes.



Lastly, a Hawaiian kinesthesia is at play in *hei*. There are cultural rules for movement that also assist the *hei* maker in remembering the sequence of moves in the story. In the Hawaiian dance tradition, for example, a hand gesture that moves away from the body must return to the body. A gesture that moves upward must return downward. If the dancer moves forward, the dancer returns back to position. These gestures follow the text and language and demonstrate the Hawaiian worldview (see ‘Aha Pūnana Leo & Ka Haka ‘Ula o Ke‘elikōlani, 2009). For example, in speaking one says, “*hele aku, hele mai*” (goes, comes) and never the opposite for the latter implies loss and even death. It is culturally inappropriate to even imply loss or death in speech among the living especially when saying farewell.

These same cultural rules apply to the kinesthetics of hei. If the figure is made with the fingers going out and away from the maker, a reciprocal move is made with the fingers returning back toward the maker. If the string artist is lost or forgets a move, this cultural sense of movement assists in remembering and problem solving. This cultural sense is described below.

CULTURAL WORLDVIEW MNEMONIC

Hawaiian memory culture integrates several cultural mnemonics—auditory, visual, and kinesthetic. In addition, another kind of mnemonic is evidently at play and can be described as a cultural worldview mnemonic, a gestalt that includes spirituality.

The Hawaiian worldview was shaped by the relatively isolated location of the islands. The earliest geographical survey developed by the inhabitants of the islands of Hawai‘i was in song. Mele pana or songs of storied and sacred places mapped the islands and their features in narrative form. This method of loci and the way this survey took place followed cultural rules:

Mary Kawena Puku‘i says that old people advised her when seeking knowledge of the past to travel with her right (strong) arm on the side of the mountains, where strength lies; if one journeys for relaxation or to assuage grief, he journeys with the sea on his left (weaker) side, so that it may wash away his sorrows and tribulations. (Elbert & Mahoe, 1970, p. 50)

Noted Hawaiian scholar and writer Mary Kawena Pukui described the island circuit device of the well known song “Hilo Hanakahi.” It describes the beautiful districts of Hawai‘i Island beginning in Hilo and travelling around the island in a clockwise direction going from Hilo to Puna, Ka‘ū, Kona, Waimea, Kohala, Hāmākua, and back to Hilo. Kamakau (1869) wrote that the island circuit was a way in which the ruling chief named and surveyed his lands:

Penei hou kekahi kapa ana i na kukulu o ka mokupuni ma ke kaapuni ana a ka Moi nona ke Aupuni, no kekahi oihana nui paha no ke Aupuni. Ina e noho ana ka Moi ma ka aoao hema o ka mokupuni, a manao oia e kaapuni i ka aina, a hoomaka oia e hele kukulu hikina, a huli kukulu akau mai, a huli kukulu komohana, a kaa lalo hema mia, he kaa lalo kulkulu hema keia kaapuni i ka aina a pau. Ina e kaapuni ana i ka mokupuni, o ka lima akau maloko o ka aina, ao ka lima hema mawaho, he kaa kukulu akau ia i ka aina, he aua i ke Aupuni ke ano. Pela aku o Kaopulupulu i ka Moi Walia. (p.1)

If the ruler were on the southern side of the island and began his circuit toward the east, then went north, and then down to the south to complete his circuit, he made what was called a *ka'a lalo kukulu hema*, a "left-circuit." If he made the circuit with his right hand "in" (*maloko*) toward the land and his left hand "out" (*mawaho*) toward the sea, this was called a *ka'a kukulu 'akau*, a "right-circuit" of the island. This signified a retention ('au'a) of the kingdom—as Ka'opulupulu, the kahuna nui of O'ahu, said to the chief Walia [Kahahana]. (Kamakau, 1976, p. 5)

This ancient performance and bodily practice as "sedimented" ancient memory is evidenced in song such as Pukui's example of "Hilo Hanakahi" as well as this article's example, *Kūhau Pi'o ka Lā*.

Place memory was a mnemonic link system in classic antiquity and is sometimes referred to as a "memory palace" because according to tradition, Simonides was able to recall the location of victims in a collapsed palace by associating their seat position to their faces. Mele pana is the Hawaiian method of assisting the chanter in associating places to faces and events. Therefore, *Kūhau Pi'o ka Lā* is a mele pana that associates the districts and all the beautiful wahi pana within to the faces of loved ones.

Hawaiian stories do not begin with traditional temporal markers like “once upon a time” or “In 1492” or end with a familiar phrase like “they lived happily ever after.” Hawaiian stories begin with names of places or people. This method reinforced a strong collective memory. According to Maurice Halbwachs (1992, chap. 4), strong collective memories are attached to landscapes. For example, consider the Waimea landscape. Pili and Kalāhikiola are wahi pana within that landscape associated with warriors returning from battle, the cattle ranchers of contemporary Waimea, and the lovers in *Kūhau Pi‘o ka Lā*. Pili means “to be close, to cling” and Kalāhikiola means the “life-bringing sun” or “the day bringing salvation.” These hills are cultural monuments that mark a place in the collective memory. These cultural monuments are placed in songs as *aides de mémoire* and are examples of the cultural worldview mnemonic.

WHY REMEMBER HEI?

In the case of the string figure *Kūhau Pi‘o ka Lā*, it can be seen how our memories and recollections of traditional places are culturally and collectively rooted. The cultural worldview mnemonic acts as a pervasive and overarching aid to memory. Moreover, Hawaiian mnemonic practice does not employ a single mnemonic device but integrates several kinds of devices—auditory, visual, kinesthetic, and cultural—into a comprehensive system.

There is intrinsic pedagogical value in hei. Hei is multisensory, and the effect of audio, visual, and tactile sensory cues on memory and learning is well researched (de Fockert, Rees, Frith, & Lavie, 2001; Kirkweg, 2009; Fitts & Posner, 1967). A colleague of mine who teaches math through hei has his students create their own figures and document each step in the creation process. Mathematical concepts like symmetry, correspondence, variance, degree, and angle are but a few of the things, he claims, that can be learned through hei. My associate also has an intriguing proposition that studying hei can aid his students’ understanding of String Theory, a research framework reconciling quantum mechanics and general relativity (Chalmers, 2007; Seiberg & Witten, 1999; Schwarz, 2000).

Hei can also be a mapping tool. Hawaiians created hei to serve as geographical maps of places such as the island of Hawai‘i in *Kūhau Pi‘o ka Lā*. *Wailua Nui* is a string figure that shows the location of heiau (temples), hills, and mountain ridges in the sacred district of Wailua, Kaua‘i. Other hei are celestial maps such as *Ka Heihei o Nā Keiki*, which show the stars of the constellation Orion, specifically the “spikes” of *Nā Kao* (Orion’s belt). Another figure, ‘*Uala*, is a scientific map showing the root system of the sweet potato.

Hei teaches and passes on the orature of the elders. Dickey (1928) observed that “Not only does the modern Hawaiian have more to interest him, but he, and particularly his child in school, does not know and understand the allusions that were the main attraction in the string figure” (p. 12). The many stories accompanying hei have much to teach, and Hawaiian language immersion schools and Hawaiian culture-based charter schools are some of the natural places where the orature of hei can be perpetuated. It would be a beautiful sight to see and hear the stories of hei performed again.

For many years the Kamehameha Schools Explorations program taught hei as part of its summer outreach program for Native Hawaiian children. Hundreds of children delighted in making and chanting “Eia ke Kaula” for Two-Eyes. They became so engrossed in hei that rules were developed to prevent them from constantly fiddling with the string in class. This experience and my experience as an educator affirm hei’s intrinsic qualities—qualities that can compete with contemporary media. Hei performance was eventually eliminated from the culminating night of the Explorations program partly because a community member reminded administrators that hei is not made at night. The thought behind this belief was that the hand gestures of hei resembled rigor mortis and the making of hei at night would somehow portend death. Subsequently, hei was also dropped from the day curriculum. Is it possible to respect tradition and continue to perpetuate the value of learning hei? Yes! The solution is to continue learning hei in the day curriculum and perform hei before sunset.

With the knowledge that hei utilizes a powerful mnemonic system to improve memory, we must continue teaching and learning hei. The collective memories within hei serve us as a people by keeping the stories of the kūpuna alive. *Lonomuku*, for example, tells a powerful story of spousal abuse and its ramifications but also preserves in its figure a reminder of her progeny, namely, Puna (ancestor of the chiefs of Kaua‘i and O‘ahu) and Hema (ancestor of the chiefs of Maui, Moloka‘i, Lāna‘i, and Hawai‘i).

Lastly, there is a little prayer in hei that is chanted when the loops become entangled in knots. Knots are frustrating but in the ritual use of hei they are considered an ill omen. The hei maker chants, “Elepaio kau mai, kaukau mai. *Hawaiian fly-catcher bird come and perch (upon the knot) and criticize it.*” The ‘elepaio was a bird who helped the canoe-maker find a suitable tree. If it perched upon a tree and started to peck on insects the canoe-maker knew it was not suitable, thus giving rise to the saying, “Ua ‘elepaio ‘ia ka wa‘a. *The canoe is marked by the ‘elepaio bird.*” The practical use of the chant was to calm the nerves and frustration of the string figure creator.

The string figure writer calls upon the same ally, the ‘elepaio. If there are any “knots” in this research, I chant, “Elepaio kau mai, kaukau mai.”

EPILOGUE

My ancestors and elders thought that there was an important story in *Kūhau Pi‘o ka Lā* for us to remember. While I do not know the true intent and purpose of the story, the composer intentionally used cultural mnemonics to help us recall the names of storied places, wahi pana. Wahi pana preserve ancestral names and whole genealogies, as well as being bookmarks to historical events.

I appreciate and remember these places that were loved by my ancestors, but I have to admit that I have different memories when I chant and perform *Kūhau Pi‘o ka Lā*. When I make *Kona*, for example, I think of Uncle Eddie Ka‘anana and Kamuela Kumukahi, noted fishermen of South Kona and strong Hawaiian men. When I make *Puna*, I remember Luika Keli‘iho‘omalua showing us teachers where to find ‘ōkole (sea anemone) and cooking it so we could taste its crunchy goodness. When I make *Hilo*, I think of my tūtū hānai (adopted grandmother), Elizabeth Kauahipaula, the beloved kupuna at Waiāu Hawaiian Language Immersion School, playing on the boulders as a child at the sea’s edge of Leleiwī gathering loli (bêche-de-mer) for her grandmother. I also remember my teacher ‘Āina Keawe walking along the roadside of Keaukaha gathering herbs, wearing her trademark scarf and hand-woven hat. When I make *Hāmākua*, I remember Tūtū Nālani Ellis telling us about puhi ‘inikiniki, little eels that she caught by running her hand through beach pebbles with bait between her fingers. In remembering these elders, I am reminded of what living as a Hawaiian was like. When I make *Kohala*, I remember

the old folks singing in spontaneous unison, “Maika’i ka makani o Kohala. *The wind of Kohala is fine!*” Moreover, when I chant *Kūhau Pi’o ka Lā* and make the figures, I am reminded of where I belong and who I am as a Hawaiian and, thus, my place in the collective. I am also reminded to pass on the legacy of hei and *Kūhau Pi’o ka Lā* to others so that they can share in this collective memory. I am reminded that I, too, walk the circuit of *Kūhau Pi’o ka Lā*, life’s circuit and a path lined with all kinds of encounters—love, fear, goodness, prosperity, and difficulty.

The study of mnemonics is not as important as what was intended to be remembered. However, as an important cultural mnemonic, hei captures the memories of our Hawaiian people. Without our memories, we would forget what it is to be Hawaiian.

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