

ABSTRACT

Stars Shed Light on Hawaiian Settlement dates, Voyaging, Catastrophic or "Extreme" Events in the Hawaiian Islands and a California connection

Society for Hawaiian Archaeology, 2005 (SHA)
Victoria S. Creed, Ph.D., Waihona 'Aina Corp.

Hawaiians encode not only a long history of astronomical events in their genealogies and literature, they also include catastrophic, or what today are called "extreme events." Many of these astronomical and extreme events are datable and, along with other fields of study, add more pieces to the puzzle of voyaging and early settlements. The genealogy of Kanalu tells of repeated catastrophes in the Hawaiian Islands with total or near decimation of early populations. Similarly, an encoded description of the sky, a spectacular star event along the Northern limit of the Tropic of Cancer, the ensuing catastrophe and a Hawaiian connection with the American continent appear in S.M. Kamakau's Kaua'i/O'ahu tale "No ke Ano Hoku" or Pupuhuluana. Hawaiian voyaging involved planning of every aspect of the venture - including catastrophes - and it appears that food plant nurseries were set up wherever they went, including on the west coast of the Americas, to access for replenishment after catastrophes. This tale may be a Hawaiian tie into the Chumash Indian site in Ventura County, California (Carbon date 601 A.D.).

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INTRODUCTION

In this paper I suggest that archaeologists not discard, but rather consider early carbon dates as separate settlements in a line of many resettlements of the islands. Also, that those who work within Pacific Ocean regions consider that early Polynesian navigators probably toured the entire Pacific looking for the best places to bring chiefly classes wanting to emigrate, leaving people and plants, and setting up nurseries where appropriate for resource renewal in case of catastrophes. From the assumption derived from these various texts, consider that the Hawaiian *kilokilo* or *kilo hoku* (observers—individuals who possessed skills in discerning the nature of land, water, ocean, the heavens, the spirit realm, and the myriad phenomena of the Hawaiian experience) were responsible for protecting their people from the many possible "extreme events," such as hurricanes, earthquakes, tsunami, heat waves, cold spells, floods, etc. Probably all coastal populations commonly had upland sanctuaries to which some, if not all, of the settlement would retreat during such times. Conjecture is the yeast of the theory I submit for your consideration. However, the sets of evidence are derived from known extreme events, astronomy, ethnology, genealogy and archaeology.

These are exciting times. A flood of information from many sources is becoming available in books and on the internet. Archaeologists and people in other domains are now beginning to answer some of the questions Hawaiians and the rest of us have posed about Hawaiian origins, Hawaiian settlements, voyaging and Hawaiian connections to elsewhere. Rubellite Kawena Johnson has known for a long time that Hawaiian and Polynesian genealogies and legends encoded the history of astronomy (Johnson, *Kumulipo*, 45). I began thinking in an interdisciplinary way about Hawaiian land with my chance reading - all at about the same time - of *Hawaiki* (Kirch and Green 2001); *The History of Kanalu: Mo'oku'auhau ' elua*, (Chun translator 2004); Kepa Maly's work on Hawaiian astronomy for the Mauna Kea project (Maly 2005); and with the seminal article by W. Bruce Masse

stating that legends and genealogies encode astronomical history. Masse says this record of celestial information "played a critical role in the artistic, intellectual, and political development of early civilizations. These data not only provide important insights into the development of civilization, but also provide important details and longitudinal records of astronomical events and phenomena which are otherwise not readily available for scientific scrutiny" (Masse 1995, p. 463). We all look forward to the work in progress by W. Bruce Masse, Rubellite Kawena Johnson and H. David Tuggle *Islands in the Sky: Astronomy and the Role of the Celestial Phenomena in Hawaiian Mythology, Language, Religion, and Chiefly Power* (in progress).

HAWAIIKI

Kirch and Green have given us the taste for retracing Polynesian peregrinations through a multi-faceted glass of archaeology, linguistics and ethnography. Through the triangulation of different disciplines the authors have derived pathways and settlement dates from Oceania to modern Polynesia.

KANALU

The genealogy of *Kanalū*, a priestly genealogy, describes multiple early re-settlements, presumably in Hawai'i, due to repeated *ka nalu*. Malcolm Chun, in this work, is the first one to translate *ka nalu* as tsunami. The *Kanalū* genealogy tells us early populations were repeatedly wiped out by *ka nalu* and had to begin again. Early Hawaiian scholars routinely translated *ka nalu* as "flood" since their Biblical training provided them with that word. English-speaking scholars continued the practice. Since English has assumed the Japanese word *tsunami* and its definition, "not a tidal wave, but a harbor wave, frequently not noticeable to those at sea," we now have a word to understand what Hawaiians knew from experience and oral tradition. Now we must revisit earlier Hawaiian texts talking about floods or *ka nalu* to see if they were introducing learned Christian concepts, as was commonly assumed, or whether we might have simply overlooked the obvious, that there was no word in English to describe this extreme event.

In *Kanalū*, there are two people of supreme importance for every generation, the governing *ali'i*, whose main function was to help repopulate the land and to increase the sources

of food, while the "Kilokilo Hoku" or *Kaula*," used their knowledge of the universe around them including the stars, to protect the people. "The prophets, observers of the stars, diviners and orators shall be the chief's advisors. (They were called the *hoa kaena* in the ancient language. They had the power to judge life and death over the chiefs and of all.) (p. 3). Malcolm Chun says, "This publication documenting the traditions of *Kanalu* once more opens our eyes to the ancient heavens in the way our ancestors saw them" and "This is extremely important if we are to see what is above us is not as lions, scorpions, a belt or a big and little dipper, but rather in the way our ancestors saw them as a procession of the gods, chiefs, and priests, prophets and commoners across the sky" (*op cit.*, p. ii).

KUMULIPO

In the *Kumulipo*, Beckwith notes there were three seas related to (the flood - or in the Pacific - the tsunami) "Ke kai a Kahinali'i". She uses the literal translation of "Sea that made the chiefs (*ali'i*) fall down (*hina*)" "In myth," she ponders, "it is difficult to say in individual cases whether terms like Kai-a-kahinali'i refer literally to an inundation or tidal wave sweeping the land, a catastrophe which occurs all too often in the South seas, or are to be taken figuratively as an invasion of some sort, the downfall of one leading family and its gods and the rise of another (Beckwith, 1976 p. 314, p.320). She adds that tidal waves on the high islands are not so disastrous as the myth would represent" (*op. cit.*, p. 320) We might want to reconsider that actual catastrophes caused the death of chiefs. She also found in Kepelino's *Traditions of Hawaii*, in "Aloha" newspaper of June 30, 1928 that the sea of Ka-hina-ali'i is said to have washed over the islands four times" in which Kepelino noted one during "the reign of Kahikoluamea (father of W• kea) "the sea rose and covered Mauna-kea." (Kanalu introduction, p. x). In passing, I note that in the *Kumulipo*, the eldest son usually inherits the power whereas in *Kanalu* the youngest son is the next chief.

KILOKILO OR KILO HOKU

Hawaiian astronomy gives us an inkling at how highly skilled the navigators and *kilokilo* or *kilo hoku* were, in their broad knowledge of the physical universe. Their knowledge of the star fields was a highly developed science by any culture's standards - even today. Because the work of the *kilokilo* or *kilo hoku* was to memorize the skies and

natural phenomena around them and to interpret them and predict future events based on star alignments and special sky events, these persons were crucial for planning daily life activities, travels, government and more. Once they had memorized the sky throughout the year and over the years, the *kilokilo* or *kilo hoku* would easily note anything that was different about that field. Hawaiian and Polynesian/Oceanic astronomy involved learning hundreds of star fields with their names and locations. This knowledge was transmitted from one generation to another, by training and oral tradition. In Hawaiian this knowledge of the galaxy has been turned into a magnificent oral epic literature. Special star events, such as supernovae, were considered correlated to events today called "extreme events."

As an aside commentary, a Reverend Robert Evans in Australia has discovered more supernovae in modern times than any observatory even though he does this with a hot water-sized tank portable telescope. He says, "I just seem to have a knack for memorizing star fields" (*A Short History of Nearly Everything*, Bill Bryson, 2003, p. 30). Memorizing star fields is also the way Polynesian navigators mapped their oceanic world.

ANDEAN FARMERS USE THE VISIBILITY OF PLEIADES TO FORECAST THE NEXT YEAR'S CROPS (*Nature*, vol. 403, 6 Jan 2000; pp. 68-71). Dr. John Rayner of the University of Hawaii brought this article to my attention showing how another indigenous people link poor visibility of the Pleiades with forecast of bad weather. For at least the last 473 years, usually between June 15 and June 24 (the festival of San Juan), when the Pleiades rise in the southern hemisphere, the Andean alpine farmers of Bolivia and Peru observe this constellation a few hours before dawn for several days to forecast whether the October-May potato-growing season will produce a good crop. Farmers in twelve alpine villages look all or some of four different attributes: 1) brightness of the cluster; 2) timing of the heliacal rise (date of first appearance in the eastern pre-dawn sky); 3) the apparent size of the Pleiades; and the 4) relative position of the brightest star in the Pleiades. This practice was first documented by Spanish priests in 1532. The practice may even come from an earlier time. As with the brightness, the apparent size of the Pleiades may also be related to atmospheric clarity. On nights when the dimmest stars are visible, the Pleiades will appear to be 25% larger in

diameter than on less clear nights. The interpretation of the relative position of the stars may have to do with an apparent shift in the position of the stars when the dimmest stars are no longer visible.

Three astronomers, Benjamin S. Orlove, John C.H. Chiang & Mark A. Cane (UC Davis, and Lamont-Doherty Earth Observatory at Columbia University New York) recently decided to test out the accuracy of indigenous Andean farmers' predictive ability by correlating the visibility of the Pleiades with 1) harvests in the following year using the International Satellite Cloud Climatology Project (ISCCP) nadir-viewing satellite to get data on high cloud cover over the central Andes; 2) The crop yield for Puno department, located near the center of the region in which forecasts are made and 3) rainfall and 4) El Niño/Southern Oscillation (ENSO). The three astronomers describe ENSO as "the interannual climate fluctuation originating from large-scale dynamical interactions between the ocean and atmosphere of the tropical Pacific, and has the largest effect on short-term global climate variability of any such fluctuation." (p. 69). The Stratospheric Aerosol and Gas Experiment II solar occultation instrument show that tropic cirrus cloud cover increased over the Andes in warm ENSO years relative to cold ENSO years. Change in cloud amount between cold and warm ENSO years thus leads to an estimated optical thickness range between 0.01 and 0.1, yielding a change in Pleiades brightness of around 0.1 to 1 magnitude. This shift is sufficient to visibly reduce the apparent brightness of the Pleiades between cold and warm years. The high-cloud correlation with ENSO implies more moist conditions during warm years and an increased likelihood of thick clouds. Orlov, Chiang and Cane also found that upper-level winds increase in warm ENSO years but they concluded that the significant changes in visibility are attributable to changes in high cloud alone. Although only a small amount of data was used, nevertheless, the test shows high significance (exceeding the 95% level) for the December-February precipitation relationship. Because potatoes are most vulnerable to drought at planting, villagers postpone planting for 4-6 weeks and reduce crop failure by waiting until months of higher rainfall.

MAKALI'I RISING IN THE NORTHERN HEMISPHERE

Makali'i (Pleiades) rises in the northern hemisphere at the end of October, or early November during sunset when chiefs and commoners awaited its appearance to start the Makahiki

Festival, dedicated to the god of rain and agriculture, Lono.

... dawn and sunset of 2005

ASTRONOMICAL EVENTS AND EARTH EVENTS

At present, a highly controversial physicist, Dr. Paul LaViolette, has proposed a theory that supernova and starbursts in our galaxy are perhaps related to the shift of tectonic plates on earth (thesis 1997, and book *Earth Under Fire*, Bear & Company, October 15, 2005). This gravity wave hypothesis may or may not be proved in coming years, but the idea that what happens in the galaxy has some connection to what happens on earth is in tune with the way Hawaiian *kilokilo* and *kilo hoku*, the ancient Greeks and other indigenous people on many continents view the inter-connectivity of the universe.

TRADITION OF HAWAIIAN ASTRONOMY

S.M. Kamakau, J. Waianu, and Kupahu wrote about the stars in 1865 and again in the 1885 newspapers. W.D. Alexander and Thomas Thrum were interested in translating many of these articles. Elsewhere in the newspapers of this time, other great seers are mentioned by name (*i.e.*, Hoapili kane, Kaauwai). The articles do not talk about encoded events, they describe stars' names and locations. Kamakau's is the earliest Hawaiian article I've seen making a connection between celestial events and their encoded cultural knowledge.

EXTREME EVENTS

The National Science Foundation finds that extreme events research focuses on phenomena traditionally defined disparately as "natural hazards," "surprises," and "low probability" in terms of a more unified perspective, focused on society's needs for useful information from scientific research. Extreme weather events include droughts, floods and associated landslides, storms, cyclones and tornadoes, ocean and coastal surges, heat waves and cold snaps (Center for Science and Technology Policy Research, 2005). We now know that *ka nalu* can be translated as tsunami. Andrews translates the word hurricane as "he makani ikaika;" Pukui and Elbert use *Makani pāhili, makani uluulu, makani hele uluulu; Ka-ua- 'ula (Lahaina)*. Andrews translates earthquake as "olei" and "haalulu honua," terms used in the translation of the Bible, while Pukui and Elbert use 'Ōla 'i. Pukui and Elbert list landslide as *Hāne'e ka mauna, hehe 'e, hiolo, holo, 'aholo*.

Tsunami, Megatsunami and Earthquakes,

Tsunamis are primarily due to seismic activity in the earth's crust raising or lowering the sea bed by a few meters over a large area. Waves generated from a tsunami at landfall are generally up to 10 meters high. Megatsunamis, a newly introduced word, are caused by a very large impact or landslide into a body of water when the water cannot disperse in all directions. Waves generated at landfall from a megatsunami can be more than 40 meters high. Megatsunami are typically caused by meteor impacts, explosive volcanic events, or landslide phenomena. Underwater earthquakes do not normally generate such large tsunamis. Evidence of megatsunami landslides lie north of O 'ahu and Maui on the ocean bottom. The Mw 9.5 Chile earthquake of May 22, 1960 created devastation and took 61 lives in Hilo, Hawaii, 10,000 km (6,200 miles) away. This earthquake had begun four centuries earlier, as documented by the Spanish conquistadores in 1575. Two earlier occurrences from the same location are dated 1737 and 1837 (International CNN.com 2005)

Scientific studies, along with archival data from the Japan National Archives, show that on January 26, 1700, at about 9 pm. there was a megathrust earthquake where the Juan de Fuca tectonic plate underthrust the North American continent. The resulting tsunami caused considerable damage along the east coast of Japan (National Resources Canada, 2005) with waves from 10 to 12 feet high. Megathrust tsunami travel down in the ocean depths at about 440 miles per hour. Ships at sea may not even know they have passed over the tsunami. But when the powerful waves come in contact with land repeated long high waves pound the land and destroy whatever is in its path. According to these geologists, this same megathrust occurs approximately every 400-600 years (*Ibid.*). Drs. Dave Burney and William "Pila" Kikuch discovered a tsunami deposit in the Makauwahi Sinkhole in Hanamaulu with Hawaiian artifacts (TenBruggencate 2005, p. A1,12). "It dates to about 350 to 400 years ago" (Ernst 2001, p. 1). The dates mentioned correlate well with the January 26, 1700 tsunami originating along the Northwest coast of North America.

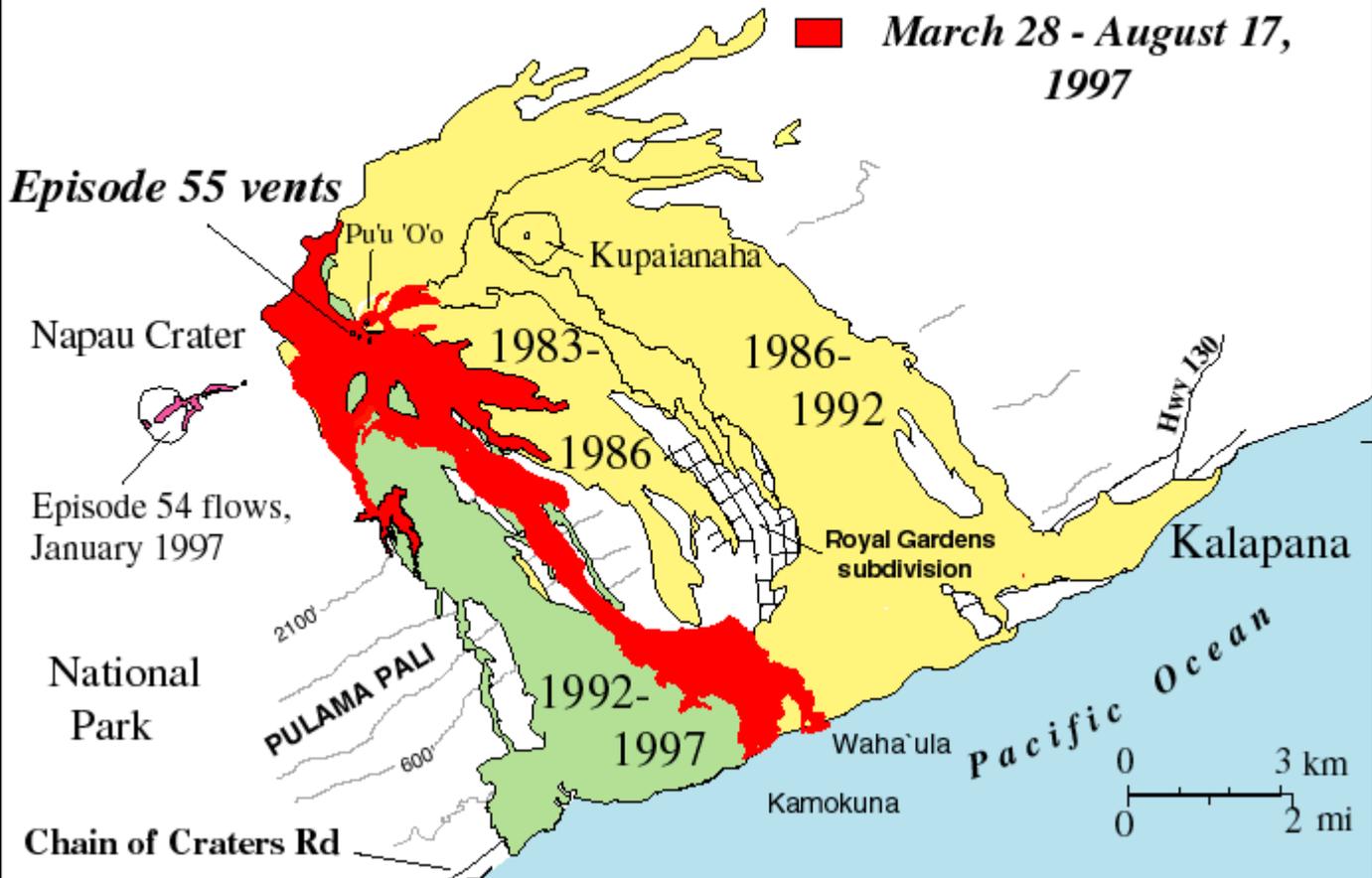
Mauna Loa erupted last in 1984 and today the summit is swelling again. It has erupted 33 times since 1843. Yet, new construction has been growing on its slopes since 1984. Peter Cervelli of the Hawaii Volcano Observatory noted development especially where lava flows from the southwest rift zone will flow.

Map by U.S. Geological Survey, Hawaiian Volcano Observatory

Episode 55 flows

■ March 28 - August 17, 1997

Episode 55 vents



Map from:

http://volcano.und.nodak.edu/vwdocs/current_volcs/kilauea/kilauea.html

Hurricanes

Kaua'i has experienced two extreme events - Hurricanes Iwa (1982) and 'Iniki (1992). In Hurricane Iwa 30% of the homes on Kauai were damaged or destroyed, while 'Iniki destroyed over 14,000 homes (Oahu Civil Defense Agency 2004) "An 1871 hurricane hit the northern part of the Big Island and Maui. In both 1972 and 1993, hurricanes straddled the Hawaiian chain, all four of them a few hundred miles out but traveling past us in pairs" (Smyser, A.A., 1997).

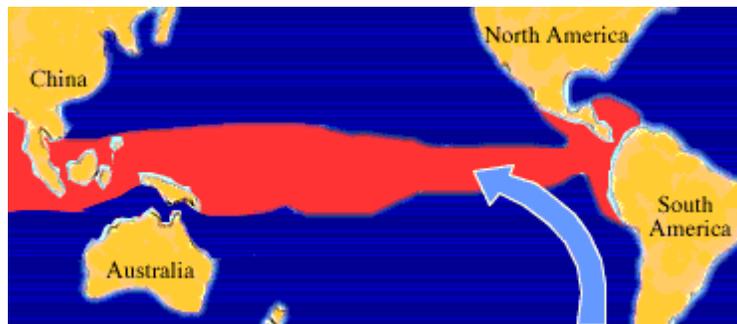
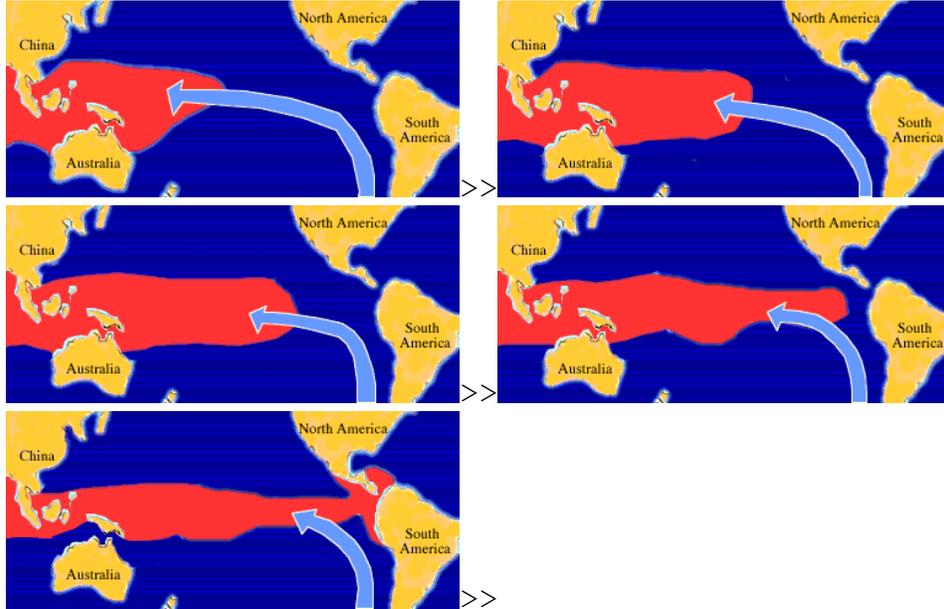


Heat Waves and Drought

Heat waves, too, are now attracting the attention of scientists and are most often associated with El Niño or La Niña, effects discovered under this name by Ecuadoran and Peruvian fishermen. El Niño is observed when the easterly trade winds weaken, from Africa all the way to the coast of the Americas, allowing warmer waters of the western Pacific to migrate eastward and eventually reach the coasts of North, Central and South America. The cool nutrient-rich sea water normally found is replaced by warmer water depleted of nutrients, resulting in a dramatic reduction in marine fish and plant life. La Niña refers to an anomaly of unusually cold sea surface temperatures found in the eastern tropical Pacific. La Niña occurs roughly half as often as El Niño (WW2010, Department of Atmospheric Sciences at the University of Illinois at Urbana-Champaign), Along with rising temperatures comes the rising sea at a rate of seven inches per century (.07 inches annually). "...the EPA predicts much more rapid rises for the rest of this century - an additional two to seven feet by 2100. They predict the effect of this will be complicated by the increased frequency of extreme storms, the kind that can drive the sea much farther inland than it would otherwise go, obliterating 100 feet of beach in a single day, making damage unpredictable" (Conservation Law

Foundation, Spring 2003) Pacific navigators of old used this (El Niño) current to explore the Pacific from South to North certainly had their own name for it.

Earthquakes, tsunami and hurricanes are are not strangers in this land.



"El Nino," WW2010, University of Illinois, Meterology, El Niño

KAMAKAU'S NO KE AO HOKU

While transcribing Hawaiian astronomy texts and translations for Alu Like, I chanced upon an article by S.M. Kamakau in the newspaper *Ko 'oko'a* (8/12/1865, p. 4), "No Ke Ao Hoku." This article does not appear in Thrum's papers on the stars, and I looked at all the Hawaiian Annuals prior to 1900 and couldn't find a translation. But I saw Mauanwili, my home, in the text and kept on searching. Sterling and Summers gave me the reference I needed, and back I went to Margo Morgan's library of the complete Hawaiian Annuals. I found and transcribed the English translation. I knew that Kamakau intended it as

information on astronomy, but it was different from Kamakau's earlier works, because here the astronomy is encoded into stories. Malcolm Chun includes other articles on astronomy in his Appendix to *Kanalu* as does Maly in his Maunakea study and when I found the star "Wailoa" and another star of the Makali'i constellation, I began to see how this encoding worked. I'd like to share it with you, but first some background.

Perhaps, just as I until recently did not understand this literary use of Hawaiian astronomy in the oral tradition, so Alexander did not understand it when he translated Kamakau's article, "No Ke Ao Hoku," for he did not translate the title at all. Moreover, many of us have read the truncated excerpt in Sterling and Summer's "Sites of O'ahu," where only 5 people are left in Maunawili Valley, but with no hint of some great catastrophe (Sterling and Summers 1979, p. 235) and without realizing that the legend is only part of an article on Hawaiian astronomy. W.D. Alexander entitles his translation "Legend of Pupuhuluana" (Alexander, translator, 1926). Kamakau probably learned this story from his grandfather/granduncle, Kaneakaho'owaha, who was a *kilokilo* on Kaua'i (Chun, personal communication, 2005 and).

NO KE AO HOKU¹, explanation of the text:

The article in Hawaiian is on the ulukau.org newspaper site and the translation is from the Hawaiian Annual of 1926. They have both been prepared by Waihona Aina Corp. for eventual publication in the Ho'olina Journal at ulukau.org. The entire text is given in the Appendix to this paper. A handout has been prepared for you to follow along. I have underlined some of the places where the English and the Hawaiian diverge.

No ke Ao Hoku.

Na S.M. KAMAKAU, }

HONOLULU, JULAI 26, 1865. [p. 4, col. 2]

O PUPUHULUANA.

¹ The Pupuhuluana and Pupuhuluena (translated as "Tuft of red feathers") tales are remarkably similar but Pupuhuluena is from Kohala and Pupuhuluana is from Kaua'i.

<http://www.sacred-texts.com/pac/hm/hm32.htm>

1. O ke kanaka makamua loa keia i holo i Kahiki. O ka aina o (Amerika), o Oloimehani ka inoa. Penei hoi ke kumu i holo ai:

[Instruction on Stars]

Hawaiian Annual, 1926, pp. 93-96.

LEGEND OF PUPU-HULU-ANA

Translated from the *Kuokoa* of Aug. 12, 1865

1. PUPU-HULU-ANA was the pioneer voyager to Kahiki (foreign land), the land of America. Olo-lo-i-me-hani was its name, and this was the reason for the journey:

The first paragraph is the literary hook to bring us immediately into the story and to excite our curiosity about the "America" connection. Although it is just mentioned in passing, we need to consider the possibilities it suggests. Dr. Kirch is involved in some of the research going on in California involving Hawaiian connections with language and fishhooks (Cheryl Ernst, 2001).

The next five paragraphs (2-6) describe the encoded stars as characters, locate them both on O'ahu and in encoded form, above us in the sky, and provide the setting with a Hawaiian cultural context.

2. I ka manawa ia Wailoa, e hanai ana o Wailoa (i kana moopuna ia Kapahueleele, i Halawa; e noho ana kekahi kanaka i uka o Kaumana, o Kulauka ka inoa, ua pilikia oia me kona kaikaina me Kulakai.

2. In the time when Wai-loa was rearing his grandchild, Kapahu, at Halawa, Oahu, there dwelt a certain man above Kau-mana, named Kula-uka, who was having trouble with his younger brother, Kula-kai, which led him to a novel plan to end all disagreement.

3. Ua haku iho oia i ke I-e, a like me he manu la ke ano, a ua hala na makahiki elima no kona hana ana ma ia mea; a mawaho aku, haku iho la oia i ka hulu. Ua hana ia na kaula maloko e huki ai, alaila, upai na eheu, a hiki hoi ke [ka?] lele me he manu la.

3. He prepared from the ie vine a form like that of a bird, which took him five years in its construction, into which he wove an outside covering of feathers. On the inside were arranged the guide ropes, then the wings were attached so that it would fly as does a bird.

4. Ua hala no hoi ka makahiki okoa ma kona hoao ana i ka lele, a no kona ike ana no hoi ua makaukau oia no ka lele ana ma kahi loihi, alaila, ko kana mea i hookumakaiia mai ai-Ua pilikia kona kaikaina, nolaila kuko kona naau e loa ka moopuna a Haumea ia ia, nolaila, kii mai la oia i Oahu, ua hele nae ua[?] moopuna la a Haumea i uka o Waipio-Lelepua.

4. He next spent a full year in the practice of flying, and because of his assurance of thorough preparation for long flights he prepared the means of executing his revenge. As said, his younger brother was giving him trouble, therefore he greatly desired to secure to himself Haumea's grandchild, so he came to her Kalihi quarter, but the grandchild had gone above to Lelepua.

5. Loa ua moopuna nei a Haumea ilaila, e hao ae aua ua manu kanaka nei lilo.

5. The child, on being found there, was seized by Kula-uka, the bird-man, and carried off.

6. A ike hoi o Haumea i ka lilo ana o ka moopuna, e hao ae ana hoi ua wahi Haumea nei i kana mau kauna lele a pau, aole no hoi o ku mai ua mea he lele. O ka lele no ia a komo iloko o ke alapolohiwa a Kane, kokoke loa e loa, e hookuu iho ana ua manu kanaka nei i ka pohaku. A ike o Haumea i ka haule ana iho o ka pohaku, kuhi iho la oia o ka moopuna, e huli iho ana o ua o Haumea ilalo alualu i ka pohaku, o ka loa iho no hoi ia, halulu e ana ilalo. Oia ka pohaku Kapapaikawaluna.

6. When Haumea saw her grandchild was taken, she gathered her various flying objects together, but none were capable of distant flight. She therefore leaped and entered the dark-shiny-way of Kane and nearly overtook them, when the bird-man released a stone. When Haumea saw the falling of the stone she mistook it for the grandchild and turned below in search thereof. When about to catch it, the thundering noise from below occurred; it was the Kawa-luna stone.

The names of the characters are for the Makali`i group of stars where we know that one of the seven stars is often known not to be visible to the naked eye. The

seven stars in this epic are be Wailoa, Kapahueleele, Kula-uka and Kula-kai, Haumea, the missing grandchild and Kaumana, the place². Dr. Malcolm Chun cites in his Appendix to Kanalu a Figure 7; the seven stars of Makalii: Wailoa, Pupule, Manaku, Paa0 and Makuakaumana; then Waia and Kekaihili (Nanakehili³) (taken from "The Hawaiian Astronomy," *Ka Nupepe Kuokoa Home Rula*, April 2-June 4, 1909). Lelepua in our epic would represent another nearby star. I suggest that Makali'i is one of Haumea's homes.



Image of Makali'i

² Makemson also discusses Makali'i as "*Na Huihui*, the Cluster, usually stands for the Pleiades in the Hawaiian, the full name being *Na Huihui-a-Makalii*. Kalama and Kamohoula also give *Ka Huihui-pa-ipu-a-Makalii* as a variant, referring to the calabash *ipu* in which Makalii stored the food supply, according to one story. (Makemson, Maud, pp. 210-211 in Maly, 2005).

³ "Paa0 was the Samoan chief and kahuna who arrived at Hawaii nei about the thirteenth century. Makuakaumana was a prophet, that came with Paa0." *Ka Nupepe Kuokoa Home Rula, Kanalu, Appendices*, pps [8-9].

Paragraphs 5 & 6 describes the disappearance of the child/star and Paragraph 6 locates the star event of a comet or star burst of some kind (Kula-uka released a stone) in *ke Ala polohiwa a Kane* (northern boundary of Tropic of Cancer at about 23° latitude⁴), followed by falling debris which lands in 'Ewa in Kahauiki near the upper road (now Schofield Barracks see Kahahana legend⁵). Could this have been some kind of rock noted by the Hawaiians as different from normal our basalt rock?

7. A ike iho la o Haumea ua puni oia ma ka hoopunipuniia mai, nolaila, hookahi hana i koe ia la, o ka lawe i na mea a pau. E hao ae ana o Haumea i ka ai a pau loa mai Hawaii a Kauai. Kuu iho ana no keia i ka papaala, owela ke kuahiwi, a maloo hoi ka aina. O ka ohana hoi a pau o ua Haumea nei, pau loa i ka hoihoiia i Nuumehalani.

7. When Haumea realized she had been duped, there remained but one thing for her to do, and that was, to take away all food. So she seized all the food, from Hawaii to Kauai, and removing all her family and retainers to *Nuu-mea-lani*, she released the hot season, shriveling the mountain tops and parching the land.

8. A hala aku la ka ohana a pau o Haumea i Nuumehalani, a ma ia hope iho, uu mai ana ka wi maluna o ka aina, o ka hele hoi ia a hahana ua mea he wi; koehana ka po me ke ao. Ua like no hoi ka wela e ka po me ke ao. Aole kilokilo, aole kahuna, aole kaula e hiki ke hana a ke hoomaalili. Ai ka manu i kana mau hua, ai ke kanaka i kona ohana iho. "Piliwale ka i-a o Piliwale, ua hele ke kai ka makamaka."

8. Upon Haumea's family and attendants being moved to that famed cloud-land, the distress of famine immediately spread over this land, enhanced by the extraordinary heat; the

⁴Kamakau, S.M. "No ke Aohoku ana", Translation of Kamakau - August 5, 1865 (based on Alexander, 1891:142-143), updated by Kepa Maly (work in progress).

⁵ Kapapaikawaluna, ka pohaku (stone) in Kahuiki - between Moanalua and Kalihi -
"At the stone called Kapapaikawaluna that stood on the upper road of Kahauiki, Pinao turned and stabbed two men, Puakea stabbed two, and the men who obstructed the way scattered." ("Ka Mo'olelo o Kahahana" *Ka Ho'oilina: Journal of Hawaiian Language Sources*, September 2002, p. 330-331)

night being as warm as the day. Indeed the heat of the night and the day were alike. Neither astrologer, priest nor prophet were able to abate the distress. The birds ate their eggs; the people ate their immediate attendants. "Silenced are the fish of the friendless; our friend the sea has gone."

Paragraphs 7-8 provide a Hawaiian context for the result of Haumea's anger: A heat wave (anger) where plants, fish and people have died. This is the aftermath of a catastrophe, probably either a tsunami, a large El Nino event, or both.

9. He kanaka o Pupuhuluana, a me Kapalakakio no Kauai, he mau koena laua na ka wi; a he mau kanaka ikaika no laua.

9. Pupuhuluana and Kapala were men of Kauai, survivors of the famine, and they were both strong men.

10. E noho ana ma Kailua elima kanaka, ekolu kane a elua wahine. O Olomana, o Ahiki, a me Pakui na kane; o Makawao hoi a me Hauli na wahine. O keia poe nae, he poe kahu pono lakou no Haumea—Ua waiho no hoi o Haumea i mau wahi kamau ea no lakou, oia hoi he ki a he popolo ma ko lakou aina o Maunawili. He wahi kanaka mama o Pakui i ke kukini—Eono puni o Oahu i ka la hookahi.

10. There were five persons living at Kailua, Oahu, three men and two women. Olomana, Ahiki, and Pakui were the men, and Makawao and Hauli the women. Furthermore, these people were special guardian attendants of Haumea. She had left them some small means of sustenance, such as the *ti* and *popolo*, on their land of Mauna-wili. Pakui, moreover, was so swift a runner that he could encircle Oahu six times in one day.

11. He mau kanaka mama o Pupuhuluana a me Kapalakapakio. I ka holo ana mai hoi o laua nei a pae ma Waianae, aole nae he wahi o olaua—o laua wale no hoi koe o Kauai, no ka mea, ua pau loa i ka make. Ia laua nei hoi ma ke one o Waianae, ku ana o Pakui. Ike aku la laua nei ia Pakui, olelo wale iho la no laua nei ia laua iho, "He kanaka no ka hoi koe o Oahu nei."

11. Swift men also were Pupuhuluana and Kapala. On their arrival on Oahu and landing at Waianae, they had no food with them; they only were left of Kauai; all the rest were

dead. As these two went to the sand of Waianae, there stood Pakui. On seeing him they said one to the other, "Then there are men left on Oahu here."

12. Ia Pakui nae i hiki mai ai ma ko laua nei wahi e noho ana, a haawi aku la i kona aloha ia laua, a pela mai no hoi laua ia ia nei. Ninau aku la nae laua nei. He kanaka no ka hoi koe o Oahu nei? Hoole aku la keia me ka i aku, Aohe kanaka, owau wale iho la no koe. O kona manao nae i hana aku ai pela, e huna ana keia, me ka manao hoi o pau e auanei kahi kamau ea o lakou.

12. When Pakui reached the place where they were sitting and gave them his greetings, which they duly returned, they asked him, "Are there men then left on Oahu here?" "No," was his reply, with the further remark, "there are no men; I am the only one left." His reason for giving such a reply of hidden purpose, was because he thought they might use what little food was left them to live on.

13. Ninau hou aku la no ua mau kanaka nei, Pehea Oahu nei i ka ai? Olelo aku la no hoi o Pakui, aohe ai o Oahu nei, ua lawe no o Haumea i ka ai, i na mea ulu, i na hua ai, a me na mea no a pau, ua pau loa i ka laweia i Nuumehalani, a ua lawe no hoi kela i kona ohana, a owau wale no hoi koe la, ua hoonoho ia iho nei au i kiai no ka aina nei, a loa wale mai la ia olua.

13. They again asked him: "How about food on Oahu here?" Pakui replied: "There is no food here on Oahu; Haumea has taken it; things of growth, edible fruits, and all other things, they are all taken to Nuumealani for her attendants, and I am the only one left. I have been placed here as a watcher over the land until found by you two."

Paragraphs 9-13. The literary conventional pattern of seven is continued in the subsequent and connected tale. There are two men from Kaua'i and the five: three men and two women on O'ahu. Is this perhaps the meaning of Pupuhuluana (about the tying together of feathers or chiefs - the Kaua'i/O'ahu connection)? In story-telling terms, the Kaua'i team have to prove themselves worthy of the knowledge retained by Maunawili group of where to go for replenishment of food and so they negotiate.

14. Ninau hou aku la no ua mau kanaka nei, Pehea la hoi o

Maui a me Hawaii, he ai no paha ko laila, a he kanaka no hoi paha e ola ana? Olelo aku la o Pakui, Aohe aku la no he ai, loa ae nei ka hoi ka wi e kuu aina, o ke one lauana keia, he liu malalo ae. Aole no hoi he kanaka o ka Hikina i koe, no ka mea, he liu iho ko laila maluna—Ua lawe o Haumea i ka ua, a koe i ka lihilihi o ka lehua. Pane hou aku la no keia, Ma kai no hoi ha olua, ma kahi pahi o elua? Aole mauka nei no maua, i ikeia aku hoi keia wahi aku. Makau iho la nae keia o loa kahi o o[?] lakou nei.

14. Then men again asked: "How about Maui and Hawaii, perhaps there is food there and probably men alive?" Pakui said, "No, there is no food; the famine has spread over all the land; this is the moving sand of Waianae; it is leaky beneath. Nor are there any people in the East left, because their surface leaks. Haumea has taken the rain, leaving but the petals of the lehua." He further said: "Perhaps you two are going below by way of the ridge?" "No," was the reply, "we will go by the way of the upland, to observe the adjoining places." He was afraid they would discover their little food.

Paragraph 14. The "leaky" surface of Wai'anae and the lands to the East is an interesting detail of the catastrophe. In 1755, three earthquakes hit Lisbon, followed by three tsunami. Documented sources all over Europe and Africa and as far away as Finland noted falling water levels from springs and wells and rivers (among others). If we accept the premise that the Juan de Fuca tectonic plate underthrust the North American continent at 400-600 year intervals prior to January 1700, we would have another between 1100 and 1300 and perhaps another megathrust perhaps between 500 and 600 A.D. and might explain the events of our events in this story. Such a leaching of the watertables might also explain why Maunawili was spared the "Leaky water" analogy, since Maunawili has perched water from the dike system and not part of the water table. (*Maunawili Valley - Kawainui Marsh System...1994*, John Mink, George A. L. Yuen & Assoc., Inc. for Commission on Water Resource Management, DLNR, HI).

15. Holo aku ana o Pakui, e holo aku ana no hoi laua nei, haulehaele ua mea he mama o lakou nei. A hiki lakou nei ma Ewa, o ka waiho no o ka aina, o ke ku no o kauhale, o ka hele no a ka puua a me ka moa, aole nae he kanaka, ua pau i Mana, ua haohia e Kaiaki[?] ua[?] pau.

15. Pakui then ran forward, so also these two men ran; very rapid was their swift flight. On their reaching Ewa, there lay the land; the dwelling houses were standing, as also the pig pens and chicken sheds, but no people; all were at Mana. "The small fish had all been gathered."

16. O ko lakou nei holo mai la no ia a Leilono, holo mai ana ke ala o ka popolo, a iho i Waikoae, a Kalaepohaku. Olelo mai la ua wahi kanaka nei, Eia ke alanui la makai o Makaaho, a hiki aku ma Makapuu.

16. They then moved onward to Lei-o-lono, where the sweet fumes of the popolo reached them, as they were going down to Waikoae and stony cape. Pakui said, "This is the seaward road of Maka-aho till you reach Makapuu."

17. Hoole aku la no laua nei me ka i aku no hoi, E aho maua mauka o Nuuanu, akahi no ka hoi ka holo mai nei o ke ala o ka hakai popolo. Pane aku la no ua wahi kanaka nei ma ke ano hunahuna, Aole ai o Koolau, aohe no hoi he kanaka, a o ke ala hakai popolo a olua e honi la, he pua kamakahala ia no Nuuanu, pa ia ae la e ka ahihi, pohole ka pua i ka makani, i ka hooluliia e ke Kiowao, kuhihewa ai ka malihini he ala no ka hakai popolo.

17. This they refused, with the answer indeed: "Better the upper road of Nuuanu," for the fragrance of the cooking popolo had reached them. Pakui, by way of hidden meaning, said: "Koolau has no food, nor indeed any people, and the fragrance of the cooking popolo you two fancy is in the Kamakahala blossom of Nuuanu, which, chafed by the ahihi vine, bruises the flower in the wind vibrated by the cool misty air; strangers mistake it for the fragrance of the cooking popolo."

18. Olelo aku la no hoi laua nei, Ma Koolau no kakou. Ku ana lakou nei i ka nuku o Nuuanu, honi ana no laua nei i ke ala o ka popolo.

18. They then said: "We will go to Koolau," and standing at the Nuuanu pali gap they drank in the popolo fragrance.

19. Olelo mai la o Pakui, Auhea olua, e kala mai olua i ko'u hewa, no ka mea, ua kauoha ia au e kiai i ka aina, ua haawi mai hoi o Haumea i wahi kamau ea no makou, aohe

kanaka e maalo i ko makou wahi, aka, na ke Akua mai nei hoi ko olua ola ana. A hoomaikai aku laua nei me ka i aku, E ola hoi ha oe i ke Akua.

19. Pakui then said: "Where are you two: Pardon my wrong, because I was charged to watch over the land. Haumea gave us a portion of food only. No one was to pass over our place, but through the god from here is your preservation." These two were thankful, and said, "Be you preserved by the god."

Paragraphs 15-19. The Kaua'i observers see the remains of settlement on their way through 'Ewa, but the people did not survive. The smell of food cooking across the mountains directs their path to Mauanwili. P. kui admits the Kaua'i men have the power of the god on their side and he takes them to the settlement and they are fed. In other words, the cultural context would have the Kaua'i mens' persistence gaining them reception to the inner sanctum of information.

20. I ka hiki ana o lakou nei ma kauhale; ua moa ae ka hakai popolo, e kowi mai ana, e haawiia mai la ia laua nei eono popo, a eha pauku ki, e hao ao ana no laua nei pau, a haaawi hou mai la no, e hao ae ana no laua nei pau no a haaawi hou mai la no, e hao ae ana no laua nei pau no.

20. When they reached the village the popolo greens were cooked and being squeezed out. They were given six balls of it, and four joints of ti, which they swallowed; and given another supply, it also was swallowed ravenously.

21. Olelo mai la hoi o Olomana, O na ikaika o olua a, e kii ia i ai na kakou i Olo-lo-i-me-hani, i ka aina o Makalii, loa ka ai a kakou, a ola kakou. He loa no wahi a Pupuhuluana, ke kuhikuhiia no hoi paha a maopopo, a nawai hoi e ole ka loa.

21. Olomana then said: "By the strength of you two, go for a food supply for us at Olo-lo-i-me-hani, in the land of Makalii, on receipt of which we will be preserved." "It will be had," said Pupuhuluana, "if being shown perhaps of its certainty, and who will object if found?"

22. Olelo hou mai no hoi o Olomana, E moa no ke ki na kakou i keia la? He moa no hoi paha, wahi a ka malihini. O kahi ki hoi ha mamua, wahi a kamaaina. O ka umu paha mamua, he mea loihi auanei ke ki ke maopopo no hoi kahi i ulu ai. Pela aku o Pupuhuluana. He hopohopo nae ko ka poe kamaaina, o enaena e ka imu aole hoi e loa koke ke ki.

22. Olomana again said: "Will our ti root be cooked today?" "Probably," said the stranger, "A piece of ti root then first," said the resident. "The oven likely first, as the ti root takes time to gather, even if its place of growth is known." Thus spake Pupuhuluana. The residents, however, feared the oven would be overheated before the ti root was obtained.

23. A pau ka lakou kamaio ana, e hao aku ana o Pupuhuluana, a ka imu, e hao aku ana no hoi keia i ka uhuki i ke ki, ku ke ahua o ua mea he ki. Ike aku la ka poe kamaaina, hooho ae la lakou me na leo nui, e i ana, Auwe! Auwe!! Auwe ka make e!!! Kai no paha o kahi ki mai nei o ka pono. Eia ka he hana hoohuakee loa no. Pane hou mai la no hoi o Olomana, e hiki auanei ia oe o Kumakalehua, he ohia nui loa i ka nuku o Nuuanu kahi i ku ai. E hao mai ana o Pupuhuluana, o kumu o ka lau ku i Kailua.

23. At the end of their conversation Pupuhuluana made the oven ready and then proceeded to pull the ti root, making virtually a pile of it. When the residents saw this they shouted forth with strong voice, crying "Alas! Alas! Alas!, the death! One would think you would get the ti root with reason, but lo, it is gathered recklessly." Olomana again said: "Are you two equal to Ku-maka-lehua, the very large ohia tree that stands at the cleft of Nuuanu?" In response Pupuhuluana seized and uprooted it, though its branches reached to Kailua.

Paragraphs 20-23. The chief, Olomana, offers to share the "sacred" information of the place where Pupuhuluana and Kapalakakio might find Haumea's "nursery of" foods. The Kaua 'i men respond in a culturally appropriate manner, by asking assurance that no one will object and then by helping the Maunawili chiefs to gather food plants, which even though seemingly in an excessive manner, further proves their strength, speed and endurance. Olomana then sets a second challenge of the mammoth Kumakalehua at the Pali, to which Pupuhuluana alone responds, by pulling it out of the ground and creating from its wood the symbolic forms of the gods of the fishermen of Makali 'i. Olomana responds by granting the needed information to find the food and bring it back to Hawai 'i. In the Pupuhuluana version of the story P• kui accompanies them.

24. E kalai keia laau i kii, e hoohalike me na lawaia a Makalii-O Ieiea o Poopalu, ua hanaia a kuapuu e like me ke kanaka lawaia-kaka-uhu-kui i ka lauoho, paa i ka ma-ka pipi, makaukau na mea a pau.

24. He then hewed the tree into images resembling Ie-iea, and Poo-palu, fishermen of Makalii. They were carved into hunchbacks like the uhu fishermen, and furnished with hair and fitted with eyes of oyster-shell, everything complete.

Paragraph 24 is a description of the images of the Makalii fishing gods Pupuhuluana carved from the lehua tree, a proper offering for the expedition.

25. Olelo ao kau o Olomana ia Pupuhuluana, Pakui, a me Kapalapakapio. O oukou ke holo i Oloimehani i ka ai i kumu hoolaha; i uwala, i kalo, maia, ko, ape, ki, uhi, pia, pi-a, hoi, pala, hapuu, amau, kupala, niu, ohia, ulu, a me na mea ai a pau, me na mea hua a pau. I ko oukou holo ana a loa a o leiea a me Poopalu, e kamailio pu oukou ma ka'u kauoha, a e hai aku hoi ma kuu inoa.

25. Olomana then ordered Pupuhuluana, Pakui and Kapala, to proceed to Olo-lo-i-me-hani with the food proclamation, "for potatoes, taro, bananas, sugar cane, ape, ti, yams, hoi, pi-a, breadfruit, starch, apples, coconuts, edible ferns, and all kinds of food and of fruit and seed. On your going and finding Ie-iea and Poo-palu, then tell them it is my command, and to furnish all these things in my name."

Paragraph 25 the people of Haumea grant the vital information and give the proper wording to be used upon arrival.

The ending differs in the English, just summarizing the replenishment of resources. The Hawaiian Some of the things not translated by Alexander are pala; an edible fern used in famine (*Marattia douglassi*), and/or a variety of sweet potato or taro. Pia is arrowroot used as a starch, pi-a (pi`a) is a yam. Hapu`u may be a fern used for many purposes other than eating, or could be a variety of taro. `ama`u is a specie of fern also used as famine food that's sacred to Kamapua`a. Kupala was an endemic gourd. Some things are edible, others are useful in other ways. I see no listing of "Ohia`ai, so I fail to understand the "apples" in the English!

Paragraphs 26 & 27

Suggested translation by a colleague, Loko'olu Quintero:

26. HOLO ANA I KAHIKI.

27. (No ka Moolelo Hawaii keia Moolelo, e pili ana i ke akamai a me ka naauao o ko kakou poe kupuna i ka holo moana, i ka nana hoku. Na kakou iho e hookaawale i kahi o ke akamai a me kahi o ka wahahee, no ka mea, ua oi ko oukou ike ko ka poe hou.)

26. About the Voyage to Kahiki

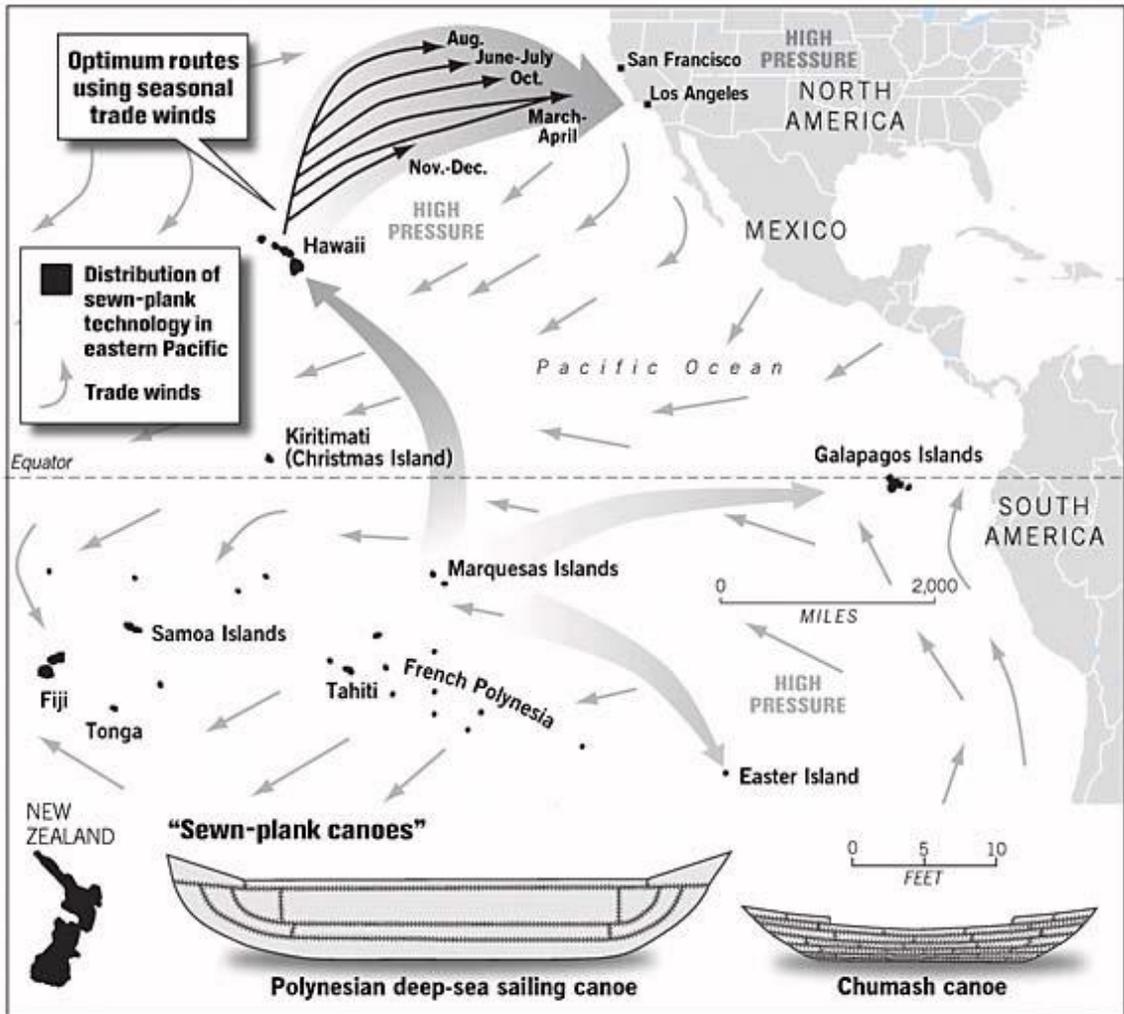
27. (This article is for the Hawaiian Journal, about the expertise and Science of our Ancestors in Oceanography and Astronomy. For we must differentiate between wisdom and deceit, because the new people's knowledge has become more prominent than ours.)

CONCLUSION

The stories of Pupuhuluena and Pupuhuluana are the same in their events and many of the descriptions. It is only in the Pupuhuluana version where Kamakau makes explicit the connection to star events in his title that we have the galaxy event from which the other event ensues. In fact, Kamakau's version of the story is a carefully woven literary masterpiece as well.

I surmise from this study, with all its connections to Haumea and Makali 'i, that the Makali 'i constellation is seen traditionally as belonging to Haumea by navigators and *kilokilo* or *kilo hoku*. This connection might make it easier to find dates for astronomical events occurring in that area. This suggests that the oral traditions support Jeffery T. Clark's Kawai Nui Marsh archaeological radio carbon evidence of settlers in the Hawaiian islands around 500 A.D (*Kawainui Marsh, O'ahu: Historical and Archaeological Studies*, (1980, Marion Kelly and Jeffery T. Clark, report 80-3, BPBM). I also suggest that the *Kanalu* genealogy is based upon the understanding that early populations were decimated numerous times and in early times re-population and food production were the chief concerns of the priests and chiefs.

Kamakau makes explicit in his article title "No ke Ao Hoku" that Hawaiians encoded astronomical events in their literature. He also describes one of the many "extreme events" of Hawaiian history. This is a story of a spectacular star event along the Northern limit of the Tropic of Cancer, in the Makali'i, with ensuing catastrophe, and a Hawaiian connection with the American continent as one of many nurseries existing for possible replenishment after such an event. All of these ideas need to be tested against the archaeological record.



Sources: Chronicle research, Archaeology

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REFERENCES

- Alexander, W.D., "The Legend of Pupuhuluana," *Hawaiian Annual* 1926, pp. 93-96
- Andrews: Lorrin, *A Dictionary of the Hawaiian Language*, Charles E. Tuttle, 2000.
- kilo, s. A star-gazer; 2. A predictor of future events from the observation of the stars, 3. An astrologer, a magician p. 277
- kilokilo, v. To act the kilo, i.e. to tell fortunes by magic; to act the sorcerer. 2, to observe carefully. 3. To guess concerning future events; to predict; to tell before hand what the weather will be. P. 278
- kilokilo, s. A guessing at the future; a predicting; a watching the singular appearance of clouds. 2. An enchantment., p. 278
- kilokilo, adj. Practicing enchantment; divining; fortune telling., p. 278
- kilokilohoku, s. See Kilokilo and Hoku; a star. An astrologer, a star-gazer., p. 278
- Beckwith, Martha W., *The Kumulipo: A Hawaiian Creation Chant*, University of Hawaii Press, Honolulu, 1972.
- Hawaiian Mythology* University of Hawaii Press, 1970.
- Bryson, Bill. *A Short History of Nearly Everything*, Broadway Books, 2003.
- Chun, Malcolm N. ea, *Na Kukui Pio 'Ole: The Inextinguishable Torches: the Biographies of Three Early Native Hawaiian Scholars; Davida Malo, S. N. Hale'ole and S. M. Kamakau*, First People's Productions, 1993
- Conservation Law Foundation, "The Ultimate Bad Weather Forecast," *Conservation Matters*, Spring 2003. Retrieved September 9, 2005.
<http://www.clf.org>
- Davidson, Kay, "Did ancient Polynesians visit California? Maybe so. Scholars revive idea using linguistic ties, Indian headdress," *San Francisco Chronicle*, June 20, 2005
sfgate.com
- Re- Chumash tribes inhabited the coastline of present-day Santa Barbara and Ventura counties and the Channel Islands. Theory: "Polynesians not only traveled

thousands of miles to the central California coastline near Santa Barbara, but shared their canoe-building talents with Chumash and Gabrielino Indians somewhere around 600 A.D." Dr. Kirch "determined that a type of Polynesian fish hook looked stunningly similar to one used by the Chumash"

"Earthquakes and Tsunamis are triggered by Star-quakes - the invisible interconnection between different parts of the Universe" *India Daily*, March 7, 2005. Retrieved from *India Daily* on September 9, 2005.

<http://www.indiadaily.com/editorial/a8184.asp>

"Earthquake Chile" 2005, "Study: Pent up stress caused Chilean quake," International CNN.com Science & Space, September 15, 2005, Retrieved from International CNN.com October 5, 2005.

<http://edition.cnn.com/2005/TECH/science/09/15/big.chile.quake.reut/>

"El Nino," WW2010, University of Illinois, Meteorology, el nino, definition., retrieved September 15, 2005.

[http://ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/elndef.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/elndef.rxml)

Ernst, Cheryl (2002), "Discovering Kaua'i's Real 'Lost World'," *Malamalama*, Retrieved October 1, 2005 from *Malamalama*

<http://www.hawaii.edu/malamalama/2002/01/LostWorld.html>

"Extreme Events," Center for Science and Technology Policy Research, University of Colorado at Boulder, Retrieved September 9, 2005.

http://sciencepolicy.colorado.edu/about_us/meet_us/roger_pielke/vitae/research.html

"Hurricane Iwa" 2004, Oahu Civil Defense Agency, "Hurricanes in Hawaii", December 9, 2004, retrieved October 5, 2005. <http://www.co.honolulu.hi.us/ocda/hurric2.htm>

Johnson, Rubellite Kawena, *Kumulipo: Hawaiian Hymn of Creation, Vol. 1*, Topgallant Publishing Co., Ltd., Honolulu, HI 1981.

Narration, "Chanting How We Came To Be" A Presentation on the *Kumulipo*, a Hawaiian creation chant. With Kamuela Chun, Kaleikoa Ka'eo, Nikita Lenchanko, Ku'ulei Ching, and Konia Freitas, 2003, Old Archives.

8th Age: "Born the storms In the season Moanaliha"
(dire ocean), p. 9.

11th Age: "Born the Pola'a, sacred night, Born the
storm, born the current, Born the thundering wave, the
shattering night, Born devastation, destruction,
rumbling, the earthquake: The sea churned inside out,
climbing the ridges, The sea silenced everything,
backing over houses, Resonating, vibrating, climbing
the posts of Kanikawa ..." (seismic event with deluge),
p. 11 .

14th and 15th Ages: Astronomical information, pp. 13-
15.

Kamakau, S.M., "No Ke Ao Hoku," *Kuokoa* 08/12/1865;
translated by W.D. Alexander, *The Hawaiian Annual*, 1926.

Kelly, Marion and Jeffery T. Clark, *Kawainui Marsh, O'ahu:
Historical and Archaeological Studies, report 80-3*,
Department of Anthropology, Bernice Pauahi Bishop Museum.
Honolulu, 1980.

Kikuchi , William K., "The archaeological excavations of
the Makauwahi Sinkhole site: Site 50-30-10-3097, ahupua'a
of Pa'a and M. ha'ulep. , district of Kona, island of
Kaua'i" 19???

Kirch, Patrick Vinton and Roger C. Green, *Hawaiki,
Ancestral Polynesia: An Essay in Historical Anthropology*,
Cambridge University Press, 2001),"

LaViolette, Paul A. *The Talk of the Galaxy*, Starlane
Publications, Niskayuna, NY, 2000
*Earth Under Fire, Genesis of the Cosmos (Beyond the Big
Bang), Subquantum Kinetics*, Background Information on Paul
LaViolette,
<http://www.etheric.com/LaViolette/LaViolette.html>

"Lisbon Earthquake" (2005), "Historical Depictions of the
1755 Lisbon Earthquake," (work in progress), National
Information Service for Earthquake Engineering (nisee),
University of California, Berkeley, Retrieved from nisee
September 22, 2005.

<http://nisee.berkeley.edu/lisbon>

Masse, W. B., "The Celestial Basis of Civilization," *Vistas in Astronomy*, Vol. 39, pp. 463-477, 1995, and Elsevier Science Ltd., 1997.

Masse, W. Bruce Masse, Rubellite Kawena Johnson, and H. David Tuggle. *Islands in the Sky: Astronomy and the Role of the Celestial Phenomena in Hawaiian Mythology, Language, Religion, and Chiefly Power*. University of Hawaii Press, Honolulu. [In preparation].

Maly, Kepa, Chapter II. "Ka 'Oihana Kilokilo Hökü (The Practices Associated With Observing Stars), from *Ao Hoku (Hawaiian Astronomy and Star Lore)*, Kumupono, 2005

Namakaokeahi, Benjamin K., transcriber, *The History of Kanalu: Mo'oku'auhau 'elua*, Translated and edited by Malcolm Naea Chun, A Genealogical History of the Priesthood of Kanalu, First People's Productions, Honolulu, HI, 2004.

Pukui, Mary Kawena and Samuel H. Elbert, *Hawaiian Dictionary*, University of Hawaii Press, Honolulu, 1976.

Sample, Herbert, "Theory links Polynesians with coastal indians," *Honolulu Star-Bulletin* (from the Sacramento Bee), August 21, 2005, A11.

Sterling, Elspeth P. and Catherine C. Summers, "Pupuhuluana," *Sites of Oahu*, Bernice P. Bishop Museum, Honolulu, HI, 1978. p. 235).

Emerson in HEN: Vol. 1, p.168: "Nov. 3, R.H. Parker tells of a headland near the Pali in Nuuanu called Namaka o Kana. Kanalu the first priest of Ku. Na Kahuna o Kanalu served in the heiau." P. 220.

Smyser, A.A. (1997), "Hawaii's vulnerability to hurricanes," *Honolulu Star-Bulletin*, Oct. 21, 1997, Retrieved from Honolulu Star-Bulletin September 20, 2005. <http://starbulletin.com/97/10/22/editorial/smyser.html>

TenBruggencate, Jan, "Kaua'i cave tells 10,000-year tale," *The Honolulu Advertiser*, September 28, 2005, p. A1,12

"Tsunami - January 26, 1700" "Giant Megathrust Earthquakes," National Resources Canada, Retrieved September 13, 2005.

<http://www.pgc.nrcan.gc.ca/seismo/hist/mega.htm>

Other interesting references

“Tsunamis have killed more people in Hawaii than any other natural disaster”

<http://www.pbs.org/wnet/nature/hawaii/tsunami2.html#>

Another web site notes that a submarine landslide triggered a tsunami at least 375 meters high on the Island of Lana'i 105,000 years ago (<http://www.buzzle.com/editorials/12-31/2004-63617.asp>) .

Read the website from the University of Washington, [Department of Earth and Space Sciences](#), “Welcome to tsunami” for what to do during a tsunami.

Note from W. Bruce Masse (personal communication (10/05/2005)

Dave Tuggle and I touched on the possibility of an early largely unsuccessful colonization of Hawaii in the late second century A.D. (...these dates have since been revised to the early 4th century A.D.) in our paper on the colonization of Hawaii. [see Masse & Tuggle 1998 in the attached c.v.]. The actual ultimate successful colonization of Hawaii in the 8th or 9th century AD comes on the years of the largest cluster of Pacific El Nino events during the past 10,000 years during the period of around 400 through 700 AD, as I and co-authors discovered in recently writing a paper (for the journal *Quaternary International*) on the impact of the Little Ice Age and the Medieval Warm Period in the Palau Islands.