

# Determining the Birth Date of Kauikeaouli, Kamehameha III

RALPH THOMAS KAM

ASHLIE DUARTE-SMITH

“Though their system was thus broken and imperfect, still, as their chronologists could tell the name of the day and the name of the month on which any great event occurred, it was generally easy to reduce their time to ours by a reference to the phase of the moon at the time.”<sup>1</sup>

—William Richards to Capt. Charles Wilkes, March 15, 1841

“Kauikeaouli was born on the 11th. day of the month of Hinaiaeleele, that day was Huna.”<sup>2</sup>

—Emilia Keaweamahi via Lohepono in *Ka Eleele Hawaii*,  
August 18, 1847

THE DATES of some of the most prominent events in Hawaiian history are shrouded in what Native Hawaiian historian Davida Malo called “obscurity and vagueness.”<sup>3</sup> Such was the case of the birth of Kauikeaouli.

*Ralph Kam holds an M.A. and a Ph.D. in American Studies from the University of Hawai‘i at Mānoa and a M.A. in Public Relations from the University of Southern California. He is author of Death Rites and Hawaiian Royalty: Funerary Practices in the Kamehameha and Kalākaua Dynasties, 1819–1953, (McFarland & Company, Inc., Publishers, 2017). He has contributed eight articles to The Hawaiian Journal of History.*

*Ashlie Duarte-Smith is a history Master’s degree candidate at the University of Massachusetts Boston and an alumna of the University of Hawai‘i at Mānoa. Her research specializes in Hawaiian representation through film and modern media.*

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keaouli, King Kamehameha III, preserved by oral tradition but later recorded by several authoritative sources as taking place on different dates: March 17, 1813 (Privy Council); August 11, 1813 (George Luther Kapeau, governor); August 17, 1813 (Samuel Manaiakalani Kamakau, historian); and March 17, 1814 (James Jackson Jarves, historian). Though the birthday anniversary of King Kamehameha III was officially set as March 17, and observed as a national holiday of the Kingdom of Hawai'i during his reign, the actual date of his birth remained open to debate during his lifetime, a discussion that continues to the present. The use of the Hawaiian lunar calendar by an eyewitness to express the day and month of the king's birth complicates efforts to calculate when the event occurred, but also provides the only means to ascertain his actual birth date.

#### FIRST OFFICIAL DATE

The first recorded official action regarding the king's birthday occurred at the Privy Council meeting of March 16, 1846, using a decidedly Gregorian date:

It was resolved that a celebration be had on the King's birthday, the 17th of March coming, that the national flag be hoisted on all the forts, from morning to sundown, and that a salute be fired by the fort in Honolulu and by all forts in the Hawaiian Islands, and that the Hawaiian flag be hoisted on all the vessels belonging to these, and we believe it proper that the Governors give a feast as well as all of the other people according to their wishes in a way befitting the honor and dignity of the King of an independent nation.<sup>4</sup>

The action makes no reference to the year of his birth. So, too, a notice in the "By Authority" column of the *Polynesian*, the following year, dated March 13, 1847, announced without reference to the year of his birth nor his age: "The King's Birth-day will celebrated as usual on the 17th inst."<sup>5</sup> A week later the *Polynesian* reported: "17th of March.—The King's birthday passed off pleasantly, though quietly in Honolulu, Majesty and chiefs being at Maui."<sup>6</sup>

While the English-language newspapers accepted as official the celebration on March 17, the observance generated an extended discussion in the Hawaiian-language newspaper, *Ka Elele Hawaii*, concerning the actual birth date of the king.

## LETTER BY LOHEPONO

The strongest evidence that points to the actual birth date of Kauikeaouli comes in the account of his birth by an eyewitness who used the traditional Hawaiian lunar calendar date names for the event. The tale concerning his birth by Emilia Keaweamahi, wife of High Chief Kaikio‘ewa, who served as guardian of Kamehameha III (Figure 1), appeared in the August 18, 1848, edition of the newspaper *Ka Elele Hawaii* in a letter by Lohepono dated July 26, 1847, (Keaweamahi died November 24, 1848):

I desire to inform you of the tale I have heard from Emilia Keaweamahi, concerning the year the King, Kamehameha III, was born; her version is as follows.



FIGURE 1. Kauikeaouli in 1825, when the body of his brother, Liholiho, returned to Hawai‘i. Courtesy Hawai‘i State Archives. [PP-98-16-002]

Kauikeaouli was born on the 11th. day of the month of Hinaiaieleele, that day was Huna. After the child had lived at Keauhou 17 days from the date of his birth, & on the day of Maui, Kaikioewa took the child to Kailua, to be taken to Ooma. Emilia Keaweamahi was also with the child, & after the child had been two nights in Kailua, on the day of Hilo, Kamahoemua being the month, the child was taken to Ooma, the same being the year of the Lord 1813, so she says.

Greeting unto you my friend

By Lohepono

To all persons of learning, how about the above version? Is it correct?

Honolulu, July 26, 1847.<sup>7</sup>

Despite having the names of the day, Huna, and month, Hinaia'ele'ele, difficulties remain in the interpretation of the date. The names of the lunar months differed on each of the Hawaiian islands, and even when the names were the same, the same name might refer to a different time period. According to S.H.P. [Petero] Kalawai'aopuna, writing from Kalaupapa, Moloka'i, on October 3, 1895, the equivalent Western month for Hinaia'ele'ele on the island of Hawai'i (the island where Kamehameha III was born) was July, or April by the reckoning of Hawai'i Island fishermen, or March on Maui and Kauai, or May on O'ahu.<sup>8</sup> S.M. Poepoe, in a chart published in *Ka Na'i Aupuni* on October 18, 1906, mostly gives the same assignments as Kalawai'aopuna for equivalent "Haole" months (Figure 2).<sup>9</sup> Davida Malo lists the months for the year, with "Hina-ia-eleele" linked with July.<sup>10</sup>

Although Kalawai'aopuna, Poepoe, and Malo give the same Western month, July, as the equivalent for Hinaia'ele'ele, lunar months do not correspond exactly with the beginning and end of the Western months. Abraham Fornander, in comparing Hawaiian and Tahitian dates in his "Notes on the Polynesian Calendar," for instance, gave the equivalent range spanning parts of two Western months for Hinaia'ele'ele as "from 20 July to 20 August."<sup>11</sup> In actuality the month of Hinaia'ele'ele is mostly July; it ran from July 9 to August 6, 1812; June 28 to July 27, 1813; June 18 to July 16, 1814; and July 7 to August 5, 1815.

The days, too, did not exactly match the Gregorian calendar day that ran from midnight to midnight. The lā would have consisted of the pō or evening of Huna, with the ao or daylight portion preceding it. Starting at 5:52 a.m. at sunrise on July 8, 1813, the eleventh day of

PAPA MANAWA  
 — NO KA —  
 HELU MALAMA O HAWAII NEI

	Hawaii	Maui	Molokai	Oahu	Kauai	Haole
1	Kaelo	Ikuwa	Ikuwa	Hilina	Ikuwa	Ianuari
2	Kaulua	Makalii	Hinaialeele	Ikiiki	Welehu	Feberuari
3	Nana	Hinaialeele	Welo	Kaona	Kaelo	Maraki
4	Welo	Kaelo	Makalii	Makalii	Kaulua	Aperila
5	Ikiiki	Ka'ulua	Kaelo	Hinaialeele	Kaona	Mei
6	Kaona	Kaona	Kaulua	Mahoe-mua	Nana	Iune
7	Hinaialeele	Ikiiki	Nana	Mahoe-hope	Mahoe-mua	Iulai
8	Mahoe-mua	Nana	Ikiiki	Welehu	Mahoe-hope	Augate
9	Mahoe-hope	Hilina	Kaona	Hilinehu	Welehu	Sepatemaba
10	Ikuwa	Hilimama	Hilinaehu	Ka'ulua	Makalii	Okatoba
11	Welehu	Hilinehu	Hilimama	Kaelo	Hilinama	Novemaba
12	Makalii	Welehu	Welehu	Hilinama	Hilinehu	Dekemaba

FIGURE 2. A chart from the October 18, 1906, issue of *Ka Na'i Aupuni* by S.M. Poepoe shows how the names of the months differed by island.

the month, called Huna, would have been named for the moon phase at night. The waxing gibbous moon rose on 3:29 p.m. before the sun set at 7:07 p.m. The Gregorian calendar day, July 8, ended at midnight while the lunar calendar day of Huna continued past the setting of moon at 3:04 a.m., July 9, and continued until the sunrise at 5:52 a.m., July 9, started the following day of Mōhalu (Figure 3).

The names of the months were often based on local observations, which would have differed from island to island. Samuel Manaiakalani Kamakau provided the meaning of the month name: “Hinaia‘ele‘ele [...] was called Hinaia or Hinaia‘ele‘ele because of the rains and winds combined that continued to blow from the month of Ka‘aona. Bad winds blew into this month, and there were heavy black clouds that darkened the sky, and so this month was called Hanaia‘ele‘ele [Hinaia‘ele‘ele] (Made dark).”<sup>12</sup>

The names of the days, too, were determined by observation. Kamakau wrote of the day called Huna: “When the moon filled out

HAWAIIAN LUNAR CALENDAR DAY COMPARED TO A GREGORIAN CALENDAR DAY

Time	Event	Day Name	Date
11:59 p.m.	July 7, 1813, ends.	‘Ole	July 7
Midnight	Gregorian calendar day, July 8, 1813, begins.	Kū	
2:24 a.m.	Moonset.	Pau	
5:52 a.m.	Sunrise. The ao (daylight) of the lā (day) of Huna begins.		July 8
3:00 p.m.	Time Kauikeaouli was born according to Davida Malo.		
3:29 p.m.	Moonrise	Huna	
7:07 p.m.	Sunset. Pō (night) of Huna begins.		July 9
Midnight	Gregorian calendar day, July 9, 1813, begins.		
3:04 a.m.	Moonset.		
5:52 a.m.	Sunrise. Mohalu begins.	Mohalu	

FIGURE 3. The traditional Hawaiian lunar day lasts from sunrise to sunrise, unlike the Gregorian calendar day that goes from midnight to midnight. Times and dates for Keauhou (Longitude W155° 57', Latitude N19° 34'). Courtesy U.S. Naval Observatory Astronomical Applications Department.

so that the tips of the crescent were almost gone, that was the night of Huna.”<sup>13</sup> [17]

One of the earliest mentions of the eleventh day came in the report of Yurii Fedorovich Lisianskii [also spelled Lisianski], written in June 1804: “there are four taboos in every month, the eleventh excepted, which has no established taboo.”<sup>14</sup> He later gave the name of the “eleventh day, Hoonā”<sup>15</sup> when he listed the names of the days of the month.

Abraham Fornander, recorded the folklore related to the month of Hinaia‘ele‘ele, somewhat akin to the traits associated with signs of the Zodiac in the West: “If a child is born in Hinaiaelele [footnote in the original: “July–August”] he would be a lazy person, greatly desiring pleasure, and an ignoramus. As the month was something of a shady hue, so were all the acts of this man.”<sup>16</sup>

Kepelino Keauokalani wrote of the characteristics of a person born on day of Huna: “A man born on that night or on that day is modest, kind, hospitable, a man of wisdom. He will have many enemies who plot against him, many who speak against him because of his good name, a man despised causelessly, a man troubled by others causelessly.”<sup>17</sup>

#### NEED FOR A THIRTEENTH MONTH

The calculation of when Hinaia‘ele‘ele started and ended is further complicated by a lunar calendar with 354 days needing an extra eleven days a year to keep synchronized with the solar year.

The notes by Nathaniel Bright Emerson attached to his translation of Malo’s *Hawaiian Antiquities* mention the adjustment in the lunar calendar: “The fact that they did intercalate a month about every third year, is well established, but we are still in the dark as to what rule was followed by their astronomers (*Kilo-hoku*) and priests, and what name was given to the intercalary month.”<sup>18</sup> The lack of a name for a thirteenth month presented no problem for others. Both the Chinese and Jewish lunar calendars simply used the name of the preceding month as the name for the extra month. The notes to Malo also reported the link between the beginning of the lunar year and the rising of the Pleiades: “The Polynesian year [. . .] was regulated by the rising of the Pleiades, as the month began when the constellation rose at sunset, *i.e.* about Nov. 20th.”<sup>19</sup> Bishop Museum Planetarium

gave the timing for the new year: Makahiki “is determined by the first visible sliver of a moon after the new moon after the rising of the Pleiades at sunset (which occurs on November 17 each year).”<sup>20</sup>

William Richards, too, in his letter answering a query about Hawaiian astronomy by Capt. Charles Wilkes of the U.S.S. *Vincennes*, commented generally on the correction to the calendar: “In practice therefore the year varied, having sometimes twelve, and sometimes thirteen lunar months. So they also numbered twenty-nine and sometimes thirty days in a month.”<sup>21</sup> Richards drew from his conversations with Hoapili for his information.

In *Kingship and Sacrifice*, Valerio Valeri logically proposed that the intercalation or insertion of the thirteenth month into the lunar calendar took place between Māhoe Hope and ‘Ikuwā: “In practice, a thirteenth month was probably intercalated between the last month (called Māhoe Hope) of the season during which the temples were open and the first month (called ‘Ikuwā) of the New Year’s festival season.”<sup>22</sup>

Determining when the Hawaiian lunar months took place during the time of the birth of Kauikeaouli and when intercalating a thirteenth month occurred can be calculated using written records of

#### NEW YEAR’S DAY

Year	Date in Marin’s Journal	First Day of Makali’i
1811	Dec. 10	Dec. 16
1812	Nov. 27	Dec. 4
1813	Gap in Journal	Nov. 23
1814 (13 months)	Nov. 27	Dec. 12
1815	No mention	Dec. 1
1816 (13 months)	Gap in Journal	Dec. 19
1817	Dec. 3	Dec. 9
1818	Nov. 21	Nov. 28
1819 (13 months)	Dec. 13	Dec. 18

FIGURE 4. The New Year’s days recorded by Marin consistently occur before the first day of Makali’i. The dates in Marin’s journal either refer to “New Year” or “arrival of the god.” The first day of Makali’i takes place with the first crescent moon after the new moon following the acronychal rising of the Pleiades.

individuals who lived in Hawaii at the time. Fortunately, Don Francisco de Paula Marin kept a journal and mentions the New Year's Day on December 10, 1811; November 27, 1812; and December 3, 1817; and the "arrival of the god," that was usually connected with the start of the new year, on November 27, 1814 and November 21, 1818.

The U.S. Naval Observatory Astronomical Applications Department provides a Web-based form that generates moon phases, moonrises, and moonsets for Hawai'i for nineteenth century dates. The moon phases included here were developed for Keauhou on the island of Hawai'i (Longitude W155° 57', Latitude N19° 34'), the birthplace of Kauikeaouli.

The date of the death of Kamehameha I, the day of Hoku in month of Ikiiki, also aids in determining when the thirteenth month was added. Since the Gregorian calendar date—May 8, 1819—is known, the lunar month, Ikiiki, would need to contain the date within it. Without the intercalation of the two extra months, one in 1814 and one in 1816, the month of Kamehameha's death would have not have fallen in the correct month. Having no historical model for inserting a thirteenth month into the lunar year, for this study the intercalated months take place between Māhoe Hope and 'Ikuwā as theorized by Valerio Valeri in *Kingship and Sacrifice*, resulting in 2 Māhoe Hope (named in a similar manner to the Jewish calendar's use of 1 Adar and 2 Adar) from September 14, 1814, to October 13, 1814, and from September 22, 1816 to October 20, 1816.

Using the Marin journal dates to establish the new year, for 1811 and 1812, the start of Hinaia'ele'ele in 1813 can be determined. The appearance of the first new moon after the acronychal rising of the Pleiades helps mark the beginning of Makali'i, with each subsequent month starting a day after the previous new moon and ending with a new moon. The first new moon after November 17, 1812, was on December 3, 1812, so the first month of the year, Makali'i, would have started the next day, December 4, 1812 (Figure 5). New moons appeared on June 27, 1813, and July 27, 1813, therefore, Hinaia'ele'ele in 1813, according to the Hawaii island lunar calendar, ran from June 28, 1813, through July 27, 1813. The first night, Hilo, took place on June 28, 1813, with the eleventh night, Huna, on July 8, 1813 (Figure 6). So, the lunar calendar month and day reported by Keaweamahi are equivalent to Thursday, July 8, 1813, on the Gregorian calendar.

The question by the editor asking for readers of *Ka Elele Hawaii* to verify the account by Keaweamahi resulted in several responses printed in the newspaper during the fall of 1847.

#### LETTER FROM G.S. KELIUMIUMI

The first response, published in *Ka Elele Hawaii* on October 6, 1847, came from G.S. Keliumiumi in a letter dated August 21, 1847, that was titled, “Ka La Hanau o Kamehameha III.” The following is an English language translation done by the Hawai‘i State Archives:

The Birthday of Kamehameha III.  
To be published in the Elele Hawaii,  
Greetings to you: -

You have made inquiry as to the day, the month, the year, in which the King, Kamehameha III was born. Know then by this document the correct and the truth of King Kamehameha III being born on the

#### LUNAR YEAR 1813

Pleiades first rising after sunset	Nov. 17, 1812	
First new moon after Pleiades rising	Dec. 3, 1812	
Makali‘i	Dec. 4, 1812	Jan. 2, 1813
Kā‘elo	Jan. 3, 1813	Jan. 31, 1813
Kaulua	Feb. 1, 1813	Mar. 2, 1813
Nana	Mar. 3, 1813	Mar. 31, 1813
Welo	Apr. 1, 1813	Apr. 30, 1813
Ikiiki	May 1, 1813	May 29, 1813
Ka‘aona	May 30, 1813	June 27, 1813
Hinaia‘ele‘ele	June 28, 1813	July 27, 1813
Māhoe Mua	July 28, 1813	Aug. 25, 1813
Māhoe Hope	Aug. 26, 1813	Sept. 24, 1813
‘Ikuwā	Sept. 25, 1813	Oct. 23, 1813
Welehu	Oct. 24, 1813	Nov. 22, 1813

FIGURE 5. According to Poepoe the lunar year on the island of Hawai‘i began with Makali‘i. Makali‘i started after the first new moon following the rising of the Pleiades after sunset. Lunar month names taken from the entry for “month” in Mary Kawena Pukui and Samuel H. Elbert, *Hawaiian Dictionary* (Honolulu: University of Hawaii Press, 1986) 484.




































Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
June 27 	1 - June 28  Hilo	2 - June 29  Hoaka	3 - June 30  Kū Kahi	4 - July 1  Kū Lua	5 - July 2  Kū Kolu	6 - July 3  Kū Pau
7 - July 4  ‘Ole Kū Kahi	8 - July 5  ‘Ole Kū Lua	9 - July 6  ‘Ole Kū Kolu	10 - July 7  ‘Ole Kū Pau	11 - July 8  Huna	12 - July 9  Mohalu	13 - July 10  Hua
14 - July 11  Akua	15 - July 12  Hoku	16 - July 13  Māhealani	17 - July 14  Kū Lua	18 - July 15  Lā‘au Kū Kahi	19 - July 16  Lā‘au Kū Lua	20 - July 17  Lā‘au Pau
21 - July 18  ‘Ole Kū Kahi	22 - July 19  ‘Ole Kū Lua	23 - July 20  ‘Ole Pau	24 - July 21  Kāloa Kū Kahi	25 - July 22  Kāloa Kū Lua	26 - July 23  Kāloa Pau	27 - July 24  Kāne
28 - July 25  Lono	29 - July 26  Maui	30 - July 27  Muku	July 28 	July 29 	July 30 	July 31 

FIGURE 6. Hinaia‘ele‘ele ran from June 28, 1813 to July 27, 1813. Huna, the eleventh day, fell on July 8, 1813. Lunar day names are taken from the entry for “month” in the English-Hawaiian section of Mary Kawena Pukui and Samuel H. Elbert, *Hawaiian Dictionary* (Honolulu: University of Hawai‘i Press, 1986) 484.

11th. day of the month of Hinaiaaleele, which is August. The King was born on the day of Huna, and on the day of Maui the child was taken to Kailua, and on the day of Hilo, arrived at Ooma, Kamahoemua [Māhoe Mua] being the month.

The following will explain that August was the month in which the birth took place.

According to the Hawaiian calculation, Welehu was the month of the full year, and at the Ku of Makalii, the new year commences, therefore it is plain, Makalii is the first month of the year, called January.

The first month according to the following calculation is

Kaelo,	which is	February.
Kaulua,	“ “	March.
Nana,	“ “	April.
Welo,	“ “	May.
Ikiki,	“ “	June.
Kaaona,	“ “	July.

Hinaiaaleele, which is August. That being really the month in which the King, Kamehameha III was born. Not in Ikiki, nor at any other month, but, Hinaiaaleele. Such being the information I received.

Here is another version, the King was born in Ikiki, Kaaona, Hanaia and Hinaiaaleele, in the year 1813.

But when I heard that the King was born in the month of March, I was much surprised and secretly denied it within my heart, then expressed the following opinion.

Oh! The month in which the King was born has been changed, why has it been changed? Probably on account of mere guesswork and not as a matter of record, but the date of birth cannot be forgotten, not by some of those who are now alive, because the birth of a chief is a matter of great importance, which cannot be forgotten within a short space of time, it being committed to memory and memorized. But, the correct information held by some of those now alive is being withheld, for fear harm may come to them for divulging what they have seen; I shall therefore try to make the attempt and let them escape, it being my desire however to arrive at the correct date of birth, and bearing in mind, that Lohelohe was not punished when he divulged that Kaahu-manu and Kanihonui had sinned, likewise, the Hawaiian Government was not reproached for informing the Queen of Great Britain, relative to the great disaster which befell Hawaii.

As to this matter, I deem it proper to say, while the growth of this subject is still young, (the 17th day of March), that in my opinion, the

person had erred when he issued the statement that the King was born on the 17th. day of March, and should my argument be upheld, the person who made such birth statement need not feel grieved, because, it being merely from memory.

But, from the one whom I got my information, it is almost like the one that is recorded, that being his special work before and after birth. The name of the King was much loathed by the men, women and the chiefs, having to work night and day, and from month to month and year to year. From the time of the tabu eating to the time of the free eating, up to the arrival of the Missionaries, and at the present time, some have forgotten, and some are remembered by heart by some people. All of the months in which the King was born, and the month in which the birth took place, have been composed, which I have given above.

Here is one of them.

The day, the month, the reddish rain comes,  
 The day of Hinaialeele appears,  
 Hinaialeele the month,  
 The month which the rain darkens,  
 The thunder which rents the sky, crashes,  
 Enwrapping the sky in displeasure  
 The wind rage fiercely above  
 Disturbing at times with uncertainty  
 Disposing at times to be angry  
 Greatly angered at the worthless affinity (not finished)

There are a great many things which concern to pregnancy and birth, which cannot be renumerated herewith.

Where are you Elele Hawaii, you have seen I have fed you with a sweet morsel of food, which will fill an empty portion of your stomach, and which will let by another hungry day. This is mine to you, do not hit the hill which does not contain the puzzle, (the 17th. day of March), for the puzzle might pass into the hill I have just explained to you, do not be dubious, because the correctness is here, says Keaweamahi and other persons.

But if others think an error has occurred by the changing of the Hawaiian months, and the new months we are now counting, then a slight error may or may not lie there.

That is mine to you, love to you and Hœu.  
 I am your friend giving full detail

G.S. Keliumiumi

Honolulu, August 21, 1847.<sup>23</sup>

The letter from Keliumiumi repeats the Hawaiian lunar month name, Hinaia'ele'ele, the lunar day name, Huna, and the year, 1813, that were given by Lohepono as the birth date of Kauikeaouli. The letter also cites "Keaweamahi and others" as the sources of the date. The Western months linked with the Hawaiian months in Keliumiumi letter differ from those in Poepoe's chart. The months are one month later, with Kaelo associated with February rather than January and Hinaiaelelele with August rather than July. Keliumiumi used a straightforward comparison, making the first month of the Hawaiian lunar calendar equivalent to the first month of the Gregorian calendar.

Keliumiumi wrote that "at the Ku of Makalii, the new year commences." The start of the new year can be related to a specific day in 1812 because of a reference in the journal of Don Francisco de Paula Marin. He wrote in his entry for the November 27, 1812: "Today began the New Year and the god arrived last night. The ship Ysabela [Isabella] and the brig *Lede* and the ship *Catherine* fired guns at 8 o'clock at night."<sup>24</sup> The day recorded by Marin, however, is six days prior to the first day of Makali'i. In each of the cases that Marin terms the day "New Year" the day lands on the kapu day six days before the Hilo of Makali'i: Kāloa Kū Lua in 1811, Kāloa Kū Kahi in 1812, and Kāloa Kū Lua in 1817.

#### LETTER FROM DAVIDA MALO

A second letter that responded to Lohepono came from noted Hawaiian historian, Davida Malo. He contributed to the discussion in a letter from Lahaina dated October 31, 1847, which was published in the December 3, 1847, issue of *Ka Elele Hawaii*. The English translation done by the Hawai'i State Archives reads:

The Elele Hawaii:

You have informed me of your personally seeing the birth of Kamehameha III. I was another one who personally saw his birth at Keauhou in Kona, Hawaii. He was born about 3 o'clock in the afternoon. At the time Kuakini went after the said King, for him to bring up, I went along with him, and when Kuakini saw the child was dead, he left and we returned to our place. It was then I personally saw the birth of the King.

But this was my misfortune, I did not know how to reckon the months at that time, to be enabled to know the month in which the King was born, but this is what I know, it was the month which ended the Malolo season, that was the month Kamehameha I returned from Kohala, and after that the King was born. What month is that according to the fishermen?

Here is another thing I saw at that time, a man-of-war from Great Britain, she came and anchored off Hiiakanoholae in Kailua, and seized an American merchant vessel, Mr. Moore was the name of the captain of Merchant vessel, after that the King was born. Who is the foreigner in Honolulu, in possession of a document pertaining to that man-of-war, so that the month be known. I believe Hoaii was one of the foreigners living with Kamehameha I at the time.

These three things will be the means of identifying the month in which the king was born.

Hehena was a composer of mele, he composed a certain mele for the King, Hanauaha was the name of said mele, and that said mele reads as follows. At the ku of Hinaiaelele was the birthday, the birth took place on the day of *kukahi*, [the third day of the month] according to his mele, not in Huna [the eleventh day of the month].

In the year 1844, Kekauluohi wrote to me from Oahu, that I enquire of Mr. Pakala relating to the birth of the King. I asked Mr. Pakala and he told me, it was in the month of December that he heard that Keopuolani had given birth. Mr. Pakala was at that time in Lahaina, therefore, (it is my belief that the birth of the King had occurred [*sic*] previously, and he had heard of it later), I informed Kekauluohi of Mr. Pakala's statement, after that I heard the king was born in March, but my mind refused to believe it, I therefore inquired of Kanae, a woman of Keopuolani's, she said not in Hinaiaelele, but said, the King was born in Kamahoemua [month after Hinaia'ele'ele]. Some people say Ikuwa [tenth lunar month], how about this, rumors are conflicting.

This however is my objection to you the Elele, your comparing Makalii with January; because the foreign months were compared with the Hawaiian months, on the death of Kamehameha. Kamehameha died in Ikiki, and May is its mate says the foreigner. It is written by the hand of man said month of May and the days Kamehameha died.

Kaona, is June,  
Hinaiaelele is July.

Welehu is not the only month which ends the year, Makalii also is another. Welehu has only 6 days which enters to make up the year but

Makalii has 16 days, the same being the days the year god made a tour of the Island, and at the Ku of Kaelo, the new year commences to count, so Hoapili-kane told me.

D. Malo<sup>25</sup>

Malo identified himself as an eyewitness and gave an account of why he was there. That he and Kuakini saw a dead child is one of the aspects of the birth of Kauikeaouli, who was delivered stillborn and revived by a kahuna after Malo left. Although an eyewitness Malo admitted he did not yet know how to calculate months. Malo, however, also gave corroborating evidence to help determine the month of the king's birth. The first was that the month was the end of the Malolo season. The name of the season refers to malolo or flying fish. That is why Malo addresses his query to the fishermen. The modern Hawaiian Moon Phases poster identifies Ikiiki, two months prior to Hinaia'ele'ele, as the month when the "malolo are fat and delicious."<sup>26</sup> *Hawaiian Fishing Traditions* states that malolo are "abundant from March to June," supporting a late June or early July date for the end of the fishing season for flying fish. A March date would be at the beginning of the Malolo season.

Another related event given by Malo concerned the capture of an unnamed American trading ship by an unnamed British war ship off the Kona coast. The seizure would have taken place during the War of 1812 (June 18, 1812, to February 18, 1815). A determination of the names of the ships would help establish the month of the king's birth. Unfortunately, if the records could not be retrieved by Malo in 1847, access to shipping reports has only become more difficult in the intervening century and a half. The British Admiralty Archives even warns of the unavailability of source documents included in their index of records. Unfortunately a gap also occurs in the *Marin Journal* from June 29, 1812, to June 24, 1814.<sup>27</sup>

#### LETTER FROM GEORGE LUTHER KAPEAU

The final commentary on the topic appeared in a letter from G.L. Kapeau, dated November 1847, which was printed in the December 15, 1847, issue of *Ka Elele Hawaii*. George Luther Kapeau was

governor of the island of Hawai'i when he wrote the letter; he served in the position from 1846 to 1855. He wrote:

Ka Elele Hawaii, perhaps you would publish these names I am providing. These are the days of the month according to the Hawaiian enumeration.

The enumeration of the days begins at the first sighting of the moon's rising in the west until it sets in the east in the early morning hours around 5 or 6 a.m. 1 Hilo, 2 Hoaka, 3 Kukahi, 4 Kulua, 5 Kukolu, 6 Kuha [Kū Pau], 7 Olekukahi, 8 Olekulua, 9 Olekukolu, 10 Olekuha ['Ole Kū Pau], 11 Huna, 12 Mohalu, 13 Hua, 14 Akua, 15 Hoku, 16 Malani [Māhealani], 17 Kulu [Kū Lua], 18 Laaukukahi, 19 Laaukulua, 20 Laaukukolu [Lā'au Pau], 21 Olekukahi, 22 Olekulua, 23 Olekukolu ['Ole Pau], 24 Kaloakukahi, 25 Kaloakulua, 26 Kaloakukolu [Kāloa Kū Pau], 27 Kane, 28 Lono, 29 Maui, 30 Muku.

However, these days also have other names according to our Hawaiian enumeration, but I will not elaborate on every detail because that is not my intent.

I ask you, is anyone able to tell me the calendar or the year 1814, 1815, 1816.

I believe there is a slight discrepancy in Keliumiumi's way of thinking as correlating the birth date of the King by equating the days of the Western calendar with the Hawaiian.

If you have not a qualified person to be found I would be obliged to do it. However it is such a major task it boggles my mind. I think March 17th is correct, and maybe August 11 is correct according to what Keliumiumi heard from Keaweamahi.

With regards,

G.L. Kapeau

Honolulu, November 1847.<sup>28</sup>

The letter from Kapeau bring little new information to the discussion of the birth date of Kamehameha III. Kapeau endorsed the March 17 date, but also left open the possibility of August 11 being the true date. Why he asked for the calendars for 1814 through 1816 is not clear, though he may have been trying to determine which years had thirteen months; intercalations took place in 1814 and 1816.

Kamehameha III, himself, did not enter into the discussion of his birth date, but expressed a preference the March 17 date. Thomas

Thrum attributes the March 17 date to the desire of the king to celebrate St. Patrick's Day: "It is said that in his youthful, roistering day, he had as a boon companion an Irishman who held that March 17th was the only day worthy of celebration, so the king chose that as the one to be observed as his birthday."<sup>29</sup>

The death of Kamehameha III prompted another attempt to establish the date of his birth. Tasked at the December 16, 1854 meeting of the Privy Council with writing the king's obituary for publication, a committee composed of Robert Crichton Wyllie, John 'Ī'i and Richard Armstrong,<sup>30</sup> determined the date to be March 17, 1813. The *Polynesian* published the obituary of the king in its January 6, 1855, edition. The announcement began: "His late Majesty, Kauikeaouli Kaleiopapa Kuakamanolani, Mahinalani, Kalaninuiwaiakua, Keaweawealaokalani, whose royal style was KAMEHAMEHA III, was born on the 17th March, 1813, in Keauhou, District of Kona, Hawaii."<sup>31</sup>

As the official date, March 17, 1813, appeared often in memorials honoring Kamehameha III after his death. In addition to the published obituary, an 1854 broadside circular that announced the king's death used March 17, 1813, as the date of his birth. The silver plate on his coffin, too, lists the March 17, 1813, date for his birth. It reads in Hawaiian: "Hanauia 17 Maraki 1813."<sup>32</sup>

One of the earliest challenges to the official date in English language publications came more than four decades after the extended discussion in *Ka Elele Hawaii*. Abraham Fornander, in his "Chronological Table of Events in Hawaiian History," appended to H.R. Hitchcock's *English-Hawaiian Dictionary*, published in 1887, noted: "1813—*Kauikeaouli*, afterwards *Kamehameha III*, was born on *August 11th*, to *Kamehameha I* and *Keopuolani*. The day of his birth, however, was in after years conventionally fixed for *March 17th*, but the above date is the testimony of his nurse *Emilia Keaweamahi*, wife of *Kaikeoewa*, Governor of Kauai. *Kauikeaouli* was born at Keauhou, N. Kona, Hawaii."<sup>33</sup> In his *History of the Hawaiian People*, published in 1891, Alexander used "August 11, 1813, at Keauhou"<sup>34</sup> as the date and place for the king's birth. In 1905, *Ka Nupēpa Kuokoa* also used the August 11, 1813, date: "I ka makahiki 1813, la 11 o Augate, hanau iho la ka lua o kana keiki, oia o Kauikeaouli, Kamehameha III [...]."<sup>35</sup>

The 1906 *Pacific Commercial Advertiser* let readers choose between two dates for the king's birth, both in 1813, with the King's name misspelled twice:

1813—Birth of Kaulikeaouli [*sic*], Kamehameha III. March 17th.  
 1813—Aug. 11. Birth of Keauikeaouli [*sic*] (according to Alexander).<sup>36</sup>

The use of the August 11, 1813, date, may have been the result of a misinterpretation of what the eleventh day of Hinaia'ele'ele meant. By simply replacing the Hawaiian (Hinaia'ele'ele) with its supposed English equivalent (August), the interpreter could have arrived at the eleventh day of August.

Despite the oft-cited August 11, 1813, date, however, Thrum continued his support for March 17, 1813, as the correct birth date, based mostly on the work of the committee charged by the Privy Council to publish the king's obituary. In an article titled "Verifying a Royal Birthday," he concluded in 1913:

"From the well-known intimacy of each member of this committee with the subject of their memoir and their reputed care in matters submitted to them, we see no reason to doubt the reliability or result of their finding. Had there been a "conventional change" in the date of his birth they were in a position to have become well aware of it and would have mentioned the fact, with reasons therefor, as it was no means a custom of the people so far as we can learn."<sup>37</sup>

Seven years later, however, Thrum, in a piece titled "Birthday of Kamehameha III," retracted his support for the March 17, 1813, date in the *Hawaiian Almanac and Almanac for 1921*:

New light is thrown on the subject recently which confirms this, and renders the work of the committee appointed by the Privy Council following the death of the king to prepare a biographic notice for publication, as quite erroneous in its finding "that he was born on March 17th, 1813." It now appears that this was a conventional change made by the king himself, to suit his royal whim, the cause of which, however, was not blazoned forth by "royal decree", though known to a number in official and court circles.<sup>38</sup>

## THE 1814 VARIANT

Besides the August 11, 1813, alternative birth date, a variant of the March 17 date, this one during the year, 1814, has also experienced wide circulation. One of the earliest mentions of the March 17, 1814, date came while Kamehameha III was still alive. James Jackson Jarves, in 1847 edition of his *History of the Hawaiian Islands*, wrote: "On March 17, 1814, Kauikeaouli, the present king was born."<sup>39</sup> The alternative year was also found in the April 7, 1858, issue of *Ka Hae Hawaii*, which listed: "Hanau ka Moi Kamehameha III., Maraki 17, 1814."<sup>40</sup> Another Hawaiian language publication, the 1861 *Almanaka Keristiano* included in its entry for Maraki [March] 17: "Hanau ka Moi Kam. III. 1814."<sup>41</sup>

The November 1865 edition of *The Friend*, in an article titled "Removal of the Kings to the Royal Mausoleum," also repeated the 1814 date.<sup>42</sup> In 1868 Kamakau used the same date for the birth of Kauikeaouli in *Nupepa Kuokoa*, a date later integrated into *Ruling Chiefs of Hawaii*. Reference works, too adopted the 1814 date. The 1869 *Honolulu Directory*, by Chauncey C. Bennett, lists March 17, 1814, as the birthdate of the king. The 1886 *Alemanaka* lists for Maraki [March] 17: "Hanau ia o Kauikeaouli, Kamehamea III, 1814."<sup>43</sup>

The date also wound up on more permanent memorials. Kawaiaha'ō Church mounted a plaque, dedicated in October 1894, that reads: "He was born March 17, 1814. He reigned from March 17, 1833, until his death, December 15, 1854."

## THE 1914 CENTENARY

It is not surprising, then, given that the date was used by one of the foremost Hawaiian historians, Kamakau, and one of the leading publishers, Jarves, that the Daughters of Hawai'i chose March 17, 1914, as the date for the centennial observance of the birth of King Kamehameha III, and installed a plaque at Keauhou with the date of March 17, 1814, for his birth. Despite the quite obvious difference, the article in the *Honolulu Star-Bulletin*, nevertheless, used the official date: "Kauikeaouli was born on March 17, 1813, at Keauhou, district of Kona, island of Hawaii."<sup>44</sup> Interestingly, the form used to nominate

the birthplace site at Keauhou to National Register of Historic Places and prepared by the State Historic Preservation Office in 1973 reintroduced a spurious source. The form quoted from the “unpublished” John Young journal, the existence of which “cannot be verified.”<sup>45</sup>

Although the plaque bore a March 17, 1814, inscription, the oft-cited August date may have influenced the timing of the installation of the marker. The *Honolulu Star-Bulletin* reported a delegation of the Daughters of Hawai‘i “headed by Queen Liliuokalani [. . .] this morning [August 14, 1914] left for the Big Island [. . .], where at Keauhou, North Kona, a handsome granite tablet will be erected to mark the birthplace of Kauikeaouli, better known as Kamehameha III.”<sup>46</sup> The newspaper further noted: “The setting of the memorial brings to a culmination a plan inaugurated by the Daughters of Hawaii some months ago.”<sup>47</sup> The centenary celebrates thereby covered both commonly used dates.

#### CONTINUED USAGE

P. Christiaan Klieger, in *Kamehameha III*, published in 2015, defaulted to a March birth, going so far as to claim in his footnote: “the 11th day of Hinaia‘ele‘ele on Maui is 17 March, the land where he ruled from and was hereditary king of.”<sup>48</sup> Unfortunately, Klieger does not give the source for his claim, nor the year that the 11th day of Hinaia‘ele‘ele (Huna) fell on March 17. In a subsequent footnote, he cautiously suggests 1814 as the year of the birth of Kauikeaouli: “1813 was perhaps invented as a birthyear by Kamehameha III. He was probably born in 1814.”<sup>49</sup> Klieger had used the March 17, 1814, date for the birth of Kauikeaouli in his earlier book, *Moku‘ula: Maui’s Sacred Island*.<sup>50</sup> Neither year, though, results in March 17 falling on Huna, the eleventh lunar day: March 17, 1814, fell on the twenty-sixth day of Maui’s Hinaia‘ele‘ele, called Kāloa Pau; March 17, 1813, fell on the day of Hoku, the fifteenth lunar day of Hinaia‘ele‘ele on Maui.

While the closest thing to an official birth date of Kamehameha III remains as March 17, 1813, a strong case may be made that his birth actually took place on July 8, 1813, based on the acronychal rising of the constellation Pleiades in 1812, the new moons of 1813, and accounts by contemporaneous eyewitnesses, Emilia Keaweamahi and

Davida Malo. Even when they agreed on the same Hawaiian lunar month and day, however, individuals provided different Western dates for Huna in Hinaia‘ele‘ele in 1813: Kamakau equated the lunar calendar date with August 17, 1813; Kapeau calculated it as August 11, 1813. August 17, 1813, however, was the twenty-first day of the lunar month named ‘Ole Kū Kahi; August 11, 1813, was the fifteenth day of the lunar month called Hoku. Even with the tools today to identify nineteenth century moon phases, the precise day still may be off by a day. As William Richards wrote to Capt. Charles Wilkes: “We are also liable to another mistake of a single day from the uncertainty of the day that the [new] moon was discovered in the west.”<sup>51</sup> This was certainly true for the determination of the first day of Ikiiki in 1819, when the waxing gibbous moon on April 23, 1819, had zero percent illumination and could easily be mistaken for a new moon. As a result, the death of Kamehameha I on May 8, 1819, occurred on Hoku rather than Akua.

Ultimately, the equivalent Gregorian calendar date for the birth of Kauikeaouli, Kamehameha III, may remain out of grasp of modern historians. Although Sheldon Dibble optimistically believed “their [Hawaiian] time could be reduced to ours [Gregorian] by a reference to the phase of the moon at the time,”<sup>52</sup> another observer of the Hawaiian skies, E.H. Bryan, concluded: “It is not possible exactly to relate these [Hawaiian names of the months] with our calendar.”<sup>53</sup>

#### TRADITIONAL CELEBRATION

Instead of using July 8 from the Western calendar, perhaps the celebration of the birth of Kauikeaouli could take place in a manner similar to the commemoration of the death of Kamehameha the Great. Marin recorded in his journal: “Today they fired a gun on account of its being the day of the moon the king died.”<sup>54</sup> The commemorative salute took place not on May 8, the anniversary of his death, but on August 23, 1820, on the day of Hoku. Much like Easter or Chinese New Year’s Day, the movable feast to celebrate the birth of Kamehameha III could be determined the traditional Hawaiian way—by the phase of the moon—and take place on Huna, the eleventh day of Hinaiaele‘ele—June 24, 2018, July 13, 2019, and July 1, 2020 (Figure 7).

Year	Hilo (first day)	Huna (eleventh day)
2018	June 14	June 24
2019	July 3	July 13
2020	June 21	July 1

FIGURE 7. Future dates of Huna in Hinaia'ele'ele. Calculations for Hilo, the first day of the month, are taken from the HM Nautical Almanac Office's "Visibility Predictions for the New Crescent Moon." Huna is the eleventh day of the Hawaiian lunar calendar.

## NOTES

- <sup>1</sup> Letter from William Richards to Charles Wilkes, Mar. 15, 1841, M-126, Folder 8, AH, 40.
- <sup>2</sup> English translation of "Ka La Hanau o Kamehameha III, *Ka Elele Hawaii*, Aug. 18, 1847, 80, FO & Ex, Series 402, Box 20, Folder 435, AH.
- <sup>3</sup> David Malo, *Hawaiian Antiquities (Moolelo Hawaii)*, (Honolulu: Hawaiian Gazette, 1903) 19.
- <sup>4</sup> Privy Council Minutes, Mar. 16, 1846, vol. 1, 120, Series 421, AH.
- <sup>5</sup> "By Authority," *Polynesian*, Mar. 13, 1847, 175.
- <sup>6</sup> *Polynesian*, Mar. 20, 1847, 178.
- <sup>7</sup> English translation of "Ka La Hanau o Kamehameha III, *Ka Elele Hawaii*, Aug. 18, 1847, 80, FO & Ex, Series 402, Box 20, Folder 435, AH.
- <sup>8</sup> "Ka Helu Malama o Hawaii," *Ka Nupepa Kuokoa*, Oct. 12, 1895, 4.
- <sup>9</sup> J.M. Poepoe, "Moolelo Hawaii Kahiko," *Ka Na'i Aupuni*, Oct. 18, 1906, 1.
- <sup>10</sup> David Malo, 57.
- <sup>11</sup> Abraham Fornander, *Fornander Collection of Hawaiian Antiquities And Folk-Lore: The Hawaiians' Account of the Formation of their Islands and Origin of their Race, with the Traditions of their Migrations, Etc., as Gathered from Original Sources* (Honolulu: Bishop Museum Press, 1919) 331.
- <sup>12</sup> Samuel M. Kamakau, *The Works of the People of Old* (Honolulu: Bishop Museum Press, 1976) 16.
- <sup>13</sup> Samuel M. Kamakau, 17.
- <sup>14</sup> Yurii Lisianskii, *A Voyage Round the World in the Years, 1803, 4, 5, & 6* (London: John Booth, 1814) 118.
- <sup>15</sup> Yurii Lisianskii, 119.
- <sup>16</sup> Abraham Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore*, vol. 6 (Honolulu, Bishop Museum Press, 1916) 140.
- <sup>17</sup> Martha Warren Beckwith, ed., *Kepelino's Traditions of Hawaii* (Honolulu: Bishop Museum, July 1932) 106.
- <sup>18</sup> David Malo, 60.
- <sup>19</sup> David Malo, 60.
- <sup>20</sup> "Astronomy Events 2015," Bernice Pauahi Bishop Museum, <http://www.bishopmuseum.org/planetarium/highlights2015.html>

- <sup>21</sup> Letter from William Richards to Charles Wilkes, Mar. 15, 1841, M-126, Folder 8, AH, 40.
- <sup>22</sup> Valerio Valeri, *Kingship and Sacrifice* (Chicago: U. of Chicago Press, 1985) 197.
- <sup>23</sup> English translation of G.S. Keliumi, "Ka La Hanau o Kamehameha III," *Ka Elele Hawaii*, 99–101, FO & Ex, Series 402, Box 20, Folder 435, AH.
- <sup>24</sup> Ross H. Gast and Agnes C. Conrad, *Don Francisco de Paula Marin* (Honolulu: University of Hawaii Press, 1973) 208.
- <sup>25</sup> English translation of Davida Malo, "Ka La Hanau o K. III," *Ka Elele Hawaii*, Dec. 3, 1847, 132–133, FO & Ex, Series 402, Box 20, Folder 435, AH.
- <sup>26</sup> [Poster] Western Pacific Regional Fishery Management Council, *Hawaiian Moon Phase and Traditional Natural Resource Management*, n.d.
- <sup>27</sup> Ross H. Gast and Agnes C. Conrad, 214.
- <sup>28</sup> G.L. Kapeau, *Ka Elele Hawaii*, Honolulu, Oahu, December 15, 1847, Buke 3, Pepa 18, 141-142. Translated by Jason Achiu, AH.
- <sup>29</sup> "Birthday of Kamehameha III," *HAA for 1924*, 126.
- <sup>30</sup> Privy Council Minutes, Dec. 16, 1854, vol. 9, 19, Series 421, AH.
- <sup>31</sup> "Obituary," *Polynesian*, Jan. 6, 1855, 138.
- <sup>32</sup> William C. Parke, *Personal Reminiscences of William Cooper Parke* (Cambridge, Massachusetts: University Press, 1891) 71.
- <sup>33</sup> H.R. Hitchcock, *An English-Hawaiian Dictionary* (San Francisco: Bancroft Company, 1887) 245.
- <sup>34</sup> W.D. Alexander, *History of the Hawaiian People*, (New York: American Book Company, 1891) 158.
- <sup>35</sup> "Kenekuria Umi-kumamaiwa," *Ka Nūpepa Kuokoa*, Aug. 11, 1905, 4.
- <sup>36</sup> "Chronological Table of Events in Hawaiian History," *PCA*, Aug. 22, 1906, 6.
- <sup>37</sup> "Verifying a Royal Birthday," *HAA for 1914*, 1913, 196.
- <sup>38</sup> "Birthday of Kamehameha III," *HAA for 1921*, 1920, 126.
- <sup>39</sup> James Jackson Jarves, *History of the Hawaiian Islands* (Honolulu: Charles Edwin Hitchcock, 1847), 105.
- <sup>40</sup> *Ka Hae Hawaii*, Apr. 7, 1858, 3.
- <sup>41</sup> *Almanaka Keristiano*, (Honolulu: Paha E Ka Poe Hoolaha Bibala Me Na Palapala e Ae o Hawaii Nei, 1861) 11.
- <sup>42</sup> "Removal of the Kings to the Royal Mausoleum," *F*, November 1865, 86.
- <sup>43</sup> *Alemanaka* (Honolulu, 1885) xii.
- <sup>44</sup> Daniel Logan, "Memory of Kamehameha III Ever Will Be Dear, Unveiling of Bronze Tablet to Mark Centenary, *HSB*, Mar. 14, 1914, 9.
- <sup>45</sup> <http://pdfhost.focus.nps.gov/docs/NRHP/Text/78001018.pdf>
- <sup>46</sup> "Daughters of Hawaii Will Erect Tablet to Kamehameha III, *HSB*, Aug. 14, 1914, 3.
- <sup>47</sup> "Daughters of Hawaii Will Erect Tablet to Kamehameha III, *HSB*, Aug. 14, 1914, 3.
- <sup>48</sup> P. Christiaan Klieger, *Kamehameha III* (San Francisco: Green Arrow Press, 2015) 97.
- <sup>49</sup> Klieger, 97.

- <sup>50</sup> P. Christaan Klieger, *Moku'ula: Maui's Sacred Island* (Honolulu: Bishop Museum Press, 1998) 23.
- <sup>51</sup> Letter from William Richards to Charles Wilkes, Mar. 15, 1841, M-126, Folder 8, AH, 41.
- <sup>52</sup> Sheldon Dibble, "Hawaiian Ideas of Astronomy," *HAA*, 1881, 50.
- <sup>53</sup> Edwin Horace Byran, Jr., *Stars Over Hawaii* (Honolulu: Books About Hawaii, 1955) 46.
- <sup>54</sup> Gast and Conrad, 242.