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## Death in Hawai'i: The Epidemics of 1848–1849

A SUCCESSION OF DEADLY EPIDEMICS struck the Hawaiian Islands during the last four months of 1848 and the early part of 1849. Measles, whooping cough, dysentery, and influenza raged across the kingdom. An estimated 10,000 persons died from these causes, more than one-tenth of the population. In total mortality, the combined 1848–1849 epidemic toll was one of the most devastating in Island history. Curiously, many historians have paid relatively little attention to these tragic events.

### ONSET

The earliest published reference to the epidemics occurred in *The Polynesian*, the government newspaper, on October 14, 1848:

SICKNESS.—Much sickness prevails here at the present time. The measles and whooping cough have at length made their appearance here. The whooping cough made its appearance a few weeks since, and during the last week several cases of the measles have occurred in town. By an arrival from Hilo, we learn that the measles prevail extensively among the native population of Hilo. Both the measles and whooping cough are comparatively light, and no fears need be entertained if proper care be taken. Among the native population some cases have proved fatal, owing to exposure and improper treatment. The mumps

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prevailed here some years since, and we understand several cases have lately occurred. Pleurisy and bilious fever prevail to some extent among the native population. Several cases of influenza similar to that which occurred here in 1845 have lately occurred.<sup>1</sup>

In October and November 1848, a total of 679 deaths from all causes combined was reported for Honolulu District, an area which extended from Red Hill to Koko Head. This may have been a significant undercount; according to *The Polynesian*, "It is probable that the actual number exceeds even this. The sickness has somewhat abated here [in Honolulu], although accounts from other Islands represent the sickness as rather increasing than diminishing."<sup>2</sup>

The measles was brought from Mazatlan, Mexico, by an American naval frigate, the *Independence*, making a one-month visit to Hilo. Whooping cough arrived on a ship from California about the same time (some have claimed both diseases were aboard the same ship).<sup>3</sup> Other details regarding the onset of these diseases in Hawai'i—like the identities of the first victims, the total number of cases, death totals for each of the different diseases, and such—are unfortunately missing from the record.

A letter from the Sandwich Islands Mission, dated May 5, 1849 and published by the *Missionary Herald*, traced the progress of the epidemics:

During the last four months of 1848, several epidemics have swept over the Islands, some of them simultaneously, others following in quick succession. . . . The [measles] spread with great rapidity; so that in two months it had reached the utmost extremes of the Islands. . . . [W]hole neighborhoods, and even whole villages, prostrate at once with this disease, there not being persons enough in health to prepare food for the sick. Still, advice and medicines did much for the people. The measles soon passed off; and the mortality from this cause was not great.<sup>4</sup>

The same letter noted the presence of the whooping cough:

This also spread with some rapidity; but it had been in the Islands before. . . . [W]e soon saw it cutting down infants and little children in great numbers in some parts. . . . A large portion of the infants born in the Islands in 1848, even as large a proportion as nine-tenths in some parts, are supposed to be already in their graves.<sup>5</sup>

The next affliction was dysentery:

A diarrhea then succeeded the measles, which affected the great mass of the people. . . . It was caused by a too speedy indulgence in improper food, such as beef, pork, raw fish, and numerous other articles almost equally hurtful . . . and the epidemic raged for many weeks.

The dying multiplied around us; and from every part of the Islands, we heard only tidings of suffering and death.<sup>6</sup>

Although viewed at the time as a separate disease, the rampant diarrhea may have been in reality a symptom of the measles or some other disorder.

“In December, the influenza made a sudden attack upon the whole population of the Islands, not sparing the missionaries or their families,” continued the Mission’s letter. The very old as well as the very young suffered: “The aged have almost all disappeared from among us.”<sup>7</sup>

## BACKGROUND

Some infectious diseases are highly communicable and manifest themselves with varying degrees of intensity.<sup>8</sup> Since the Hawaiian people possessed no natural immunity to the bacterial and viral organisms that were brought to the Islands in the early 19th century, their resistance to foreign diseases was low. An illness that was considered to be relatively mild could cause severe or fatal consequences to the unprotected native population.

Measles is an acute viral infection spread by inhalation of infective droplets and by contact with articles freshly contaminated by nose and throat secretions of an infected person. While its highest incidence is found in young children, the disease can affect all ages, and especially the elderly of a non-protected population.

The infection presents itself with fever and cold-like symptoms for three to five days. This stage is followed by a pink, blotchy skin rash with red patches of varying size for four to seven days that is replaced by desquamation for two to three days.<sup>9</sup>

Measles can produce secondary complications affecting the central nervous system, such as encephalitis; respiratory tract involvement,

including pneumonia; and increased susceptibility to other infections. In the late 20th century, the measles mortality rate of children in the U.S.A. was 0.2 percent, but it may be as high as 10 percent in children of developing nations, where the disease is associated with diarrhea.<sup>10</sup>

Whooping cough is a highly contagious, acute communicable infection caused by a gram-negative bacillus called *Bordella pertussis*.<sup>11</sup> After the patient experiences a two-week prodromal period of cough, sneezing, runny nose, and loss of appetite, a paroxysmal cough occurs with a characteristic high-pitched inspiratory “whoop” that may continue for two to six weeks.<sup>12</sup>

Complications from broncho-pneumonia may account for 90 percent of pertussis-related deaths. Whooping cough is a serious malady for the aged, since it may result in chronic bronchiectasis and occasional encephalitis.<sup>13</sup> Active immunization with pertussis vaccine today is advised for all infants. The disease is now effectively treated with antibiotics.

Influenza was another infectious disease that had a severe effect on the unprotected Hawaiian race. The “flu” epidemic in 1848–1849 spread rapidly and attacked broadly, transmitted by a filtrable virus. Patients experienced fever, chills, malaise, muscle aching, headaches, and nausea. The illness occurred in waves separated by intermissions. The first wave of three to six week duration was often mild; the second wave lasted longer; and the third bout of infection could continue eight to ten weeks with severe or fatal results.<sup>14</sup>

Secondary bacterial infections are common complications of influenza, manifested by acute sinusitis, otitis media, purulent bronchitis, and pneumococcal or staphylococcal pneumonia. Occasionally, there may be sequellae of heart disease or circulatory system injury.<sup>15</sup> Hawaiians often succumbed to the secondary effect of this devastating disease.

#### CONTRIBUTING FACTORS

A number of associated conditions made the 1848–1849 epidemics seem even worse than might have been otherwise expected.

For one thing, the climate perversely turned ugly, far worse than

was normal for the season. “Unfortunately the mortality occasioned by these two diseases was aggravated by the fact that the cold and stormy season commenced earlier than usual, and the rains poured down abundantly all over the Islands.” Medical opinion in Hawai‘i held that the heavy downpours greatly exacerbated the people’s health problems.<sup>16</sup>

As previously stated, the Mission doctors tended to blame the Hawaiian diet for the widespread diarrhea coursing through the population—“a too speedy indulgence in improper food,” as they described it.<sup>17</sup>

A more serious problem was the reckless reaction of many Hawaiians to their ailments. “Burning with fever, they would rush into the sea for relief, and died by the thousands.”<sup>18</sup>

Geography shared the blame as well, not only for the concatenation of physical complaints but likewise for the moral lapses, past and potential, of the Hawaiians:

Our proximity to the American coast has brought these diseases upon us. The Islands are now in closer connection with California, than they have ever before been with any foreign land. Vessels are constantly passing and repassing.

Many of the natives have gone to try their fortunes in the land of gold. Most of our foreign population has gone also. After a while we shall expect both classes to flock back in multitudes. . . . We fear that they will also bring the small pox, or other contagious diseases, to make a still wider desolation among the poor Hawaiians; or we may have an importation of California morals, more to be dreaded than the cholera or plague.<sup>19</sup>

The Mission was more prescient than they knew regarding the threat of smallpox, which arrived only four years later. Their fear of the new proximity of America was also well-founded. Before the late 1840s, most ships visiting Hawai‘i sailed from East Coast ports, and reached the Islands by a long, laborious voyage around South America. Any sick seamen were either dead or recovered by the time they sighted Diamond Head. Now they sailed directly from San Francisco in perhaps two weeks or less, fully capable of spreading the baleful diseases they had so recently picked up.

## MEDICAL TREATMENT

Treatment of measles, pertussis, dysentery, and influenza sufferers was limited by the lack of physicians and hospitals in Hawai'i, and even more so by the primitive state of medical science in the middle of the 19th century.

The small band of Mission doctors and their few non-Mission counterparts were swamped by the scale of the epidemics. The first sizable Island hospital, The Queen's, moreover was still a decade in the future.

Much of the burden of care fell on the *kahuna lapa'au la'au*, the native practitioners. Although viewed with disdain by the foreign doctors, these practitioners were not noticeably inferior to their foreign colleagues in treating most disorders and accidents. However, the *kahuna* lacked experience with such diseases as now threatened the Islanders.<sup>20</sup>

Dwight Baldwin, the missionary doctor at Lahaina, was one of the most dedicated workers. In a letter sent December 15, 1848, he described his efforts in behalf of "this poor & dying people," and added:

I was in all parts of the place, where I had time to go, giving advice, & medicine where needed, to help the people through with measles. And we had the satisfaction of seeing all go well—people every where blessing us for good advice wh[ic]h had saved them pain & trouble & death. But here satisfaction ended. My work through Nov. in trying to stem the diarrhea of our thousands I can compare to nothing but a raging battle, with all its turmoil & its sad scenes of death & carnage. Never was I driven so to distraction, week after week, & month after month, with no respite—& probably never did I lie down at night, without the sad remembrance of some suffering individual or families, who had requested me to visit them—but whom I c'd not reach before night overtook me, or c'd not find, owing to a large part of Lahaina being without roads. . . .<sup>21</sup>

Medicines used in the treatment of the epidemic diseases included a number of standard nostrums and remedies. Amos Starr Cooke's journal, for example, noted that Dr. Seth Andrews recommended calomel and ipecac powders ("1 in 3 hours") for Mary Annis' measles.

“After Dr. left & she grew no better, Mrs. C. ventured to give her some calomel, Ipecac & Magnesia powder & she slowly improved by it.”<sup>22</sup>

The missionaries freely dispensed drugs to the natives, soon depleting their meager supplies. On November 13, for example, Amos Cooke recorded:

After dinner John Ii & I went out to administer medicine & advice to the sick. Most of them were afflicted with a diarrhoea. . . . [S]ome one was sick in almost every home. . . .

November 14—This afternoon I . . . helped Bro. Rogers make pills for the diarrhoea, of 1 part calomel, 3 opium & 4 ipecac. After dinner visited nearly all that we visited yesterday, and gave out 15 doses of Dover’s powders. Some [patients] were made better by my *pia* [Polynesian arrowroot, *Tacca leontopetaloides*] yesterday, some refused my medicine entirely. Sent *pia* to some who were destitute.<sup>23</sup>

The doctors seemed to have great confidence in their medicines, but no evidence from the 1840s either confirms or refutes their efficacy. A modern reader should be skeptical.

Members of the Sandwich Island Mission combined their confidence in drugs with a strong belief in the role of God in matters of health. This faith was evident in the king’s promulgation of a Public Fast, as it was termed. “On account of the prevailing sickness and mortality throughout the Islands,” read the royal announcement, “the King, in council, has been pleased to appoint Wednesday, Dec. 6th, as a day of fasting, humiliation, and prayer to Almighty God, for the Island of Oahu; and has ordered the governors of the several islands to appoint such days, as they may deem most convenient for the same purpose, in their respective islands.”<sup>24</sup>

Dr. Baldwin shared this deference to God. In the midst of the epidemics, he wrote:

But never before, since the mission came here, has God laid his hand so heavily on this people. He is calling on us & on the whole nation to humble ourselves before him for our sins. This we have endeavored to do. We kept a day of fasting & prayer some weeks since. . . . I w[oul]d hope too, that, in all the dwellings of the pious, there is much calling upon God, in behalf of the nation, that it perish not. We need such a fast every week.<sup>25</sup>

## STATISTICS

Statistics on the 1848–1849 epidemics—such as number of cases, number of deaths by cause of death, and age, sex, and race of victims, on a month-by-month basis—are either unreliable or totally lacking.

On March 1, 1849, toward the end of the epidemics (which, incidentally, no one has precisely dated), *The Friend* ran a brief article titled “Decrease of Polynesian Races.” This article stated, “By the epidemics (whooping cough, measles, and influenza), which have raged among the Hawaiians, during the last 12 months, it is estimated that not less than 10,000 have been swept away or about one-tenth of the population.”<sup>26</sup> No source for this estimate was cited.

Similar estimates appeared elsewhere. The 1849 census report noted: “It should be borne in mind that last year was the ‘*annum mortuum*’, the year of death! Measles, whooping cough and influenza combined, seemed to sweep the islands with the besom of death. Ten thousand would probably be a low estimate for 1848 and 1849, which those epidemics took away.”<sup>27</sup> Thos. G. Thrum’s *Annual* later reported, “It was estimated that the population of the islands were [sic] reduced over ten thousand by this siege of epidemics.”<sup>28</sup>

Samuel M. Kamakau, the native historian, reported an even higher death rate. “In September, 1848, an American warship brought the disease known as measles to Hilo, Hawaii. It spread and carried away about a third of the population.” Kamakau further noted that mortality was especially great among old people, and that the epidemic “spread during 1849 until July when it increased twofold.”<sup>29</sup>

As recently as 1949, M. A. Taff, Jr., then head of the Territorial Health Department’s vital statistics office, stated that “the [1848–49] measles epidemic alone killed off one-quarter of the native population.”<sup>30</sup>

Data on total deaths in Hawai‘i, epidemic and non-epidemic combined, can be found in official census reports, beginning with January 1849 and repeated for January 1850. Ralph S. Kuykendall has damned the 1849 count as “wholly unreliable,” but, since both the population and vital events were probably underreported in approximately the same degree, crude birth and death rates by islands may be reasonably close to reality. (The failings of the 1849 count were attributed to its timing: “It was then taken at a time of general sickness. The



measles and whooping cough prevailed throughout the islands, and it is propable [sic] that the [enumerators] were unable, in many cases, to attend properly to their duty."<sup>31</sup> Annual estimates of population, births, and deaths (including non-epidemic mortality), 1846–1855, appear in Table 1. Data by islands from the 1849 census are shown in Table 2.

These tables reveal some striking trends. Total population of the kingdom fell from 93,500 at the beginning of 1848 to 84,200 only 24 months later. Deaths from all causes combined numbered 7,943 (as noted, an obvious undercount) in 1848 and 4,320 in 1849. The crude death rate was 88.0 per 1,000 inhabitants in 1848 and 50.5 the following year. Deaths outnumbered births by wide margins in both years. Most of the dead presumably were epidemic victims.

Statistics for individual islands vary widely. The 1848 crude death rate ranged from 60.9 per 1,000 population on Ni'ihau to 100.2 on the Big Island, 104.1 on O'ahu, and 120.2 on Moloka'i—all appal-

Table 1. Estimated Population, Births, and Deaths: Annually, 1846 to 1855

Year	Est. population		Births	Deaths	Rates <sup>a</sup>	
	Jan. 1	July 1			Birth	Death
1846	95,900	95,300	(NA)	(NA)	(NA)	(NA)
1847	94,700	94,100	(NA)	(NA)	(NA)	(NA)
1848	93,500	90,300	1,478	7,943	16.4	88.0
1849	87,100	85,600	1,422	4,320	16.6	50.5
1850	84,200	83,900	(NA)	(NA)	(NA)	(NA)
1851	83,700	82,000	2,424	5,792	29.6	70.6
1852	80,300	80,000	1,852	2,822	23.2	35.3
1853	79,600	76,400	1,513	8,026	19.8	105.1
1854	73,100	73,000	1,381	1,439	18.9	19.7
1855	72,900	72,900	1,642	1,685	22.5	23.1

Note: Births and deaths are registered totals, and have not been adjusted for under-reporting. Death totals include both epidemic and non-epidemic mortality.

NA Not available.

<sup>a</sup> Per 1,000 population.

Source: Robert C. Schmitt, *Demographic Statistics of Hawaii: 1778–1965* (Honolulu: U Hawaii P, 1968) 165, 223, and *Historical Statistics of Hawaii* (Honolulu: U P Hawaii, 1977) 9, 43–45.

lingly high, even by the dismal standards of the mid-19th century. Birth rates were far lower, ranging from Lana'i's 9.5 to 22.2 on Kaua'i and 24.9 on Ni'ihau.

Compared with other Hawai'i epidemics, the three that assailed the Islands in 1848 and 1849, as a group, surpassed all but the legendary *ma'i 'oku'u* of 1804 (the "squatting disease," which took possibly 15,000 lives). Even the smallpox epidemic of 1853, with a loss of life estimated at 5,000 to 6,000, was less calamitous.<sup>32</sup>

The question of the degree of differential mortality between the natives and foreign population remains unresolved. Juliette Montague Cooke contended that "the immediate cause of so many [native] deaths is the want of care. I have not yet heard of the death of one of the missionaries' children, tho' nearly all have had the measles and whooping cough."<sup>33</sup> Not quite. Dr. James Smith in Koloa, Kaua'i, for example, lost his third child to the complications of whooping cough.<sup>34</sup> But whether the foreign segment of the population, making up only 1,787 (or 2.2 percent) of the 80,641 persons enumerated in the 1849 census, constituted a proportionate share of epidemic deaths, is unknown.<sup>35</sup>

Table 2. Population, January 1849, and Births and Deaths, 1848, by Islands

Island	Population	Births	Deaths	Rates <sup>a</sup>	
				Birth	Death
All islands	80,641	1,478	7,943	18.3	98.5
Hawaii	27,201	586	2,726	21.5	100.2
Oahu	23,145	396	2,409	17.1	106.1
Maui	18,671	267	1,619	14.3	86.7
Kauai	6,941	154	686	22.2	98.8
Molokai	3,429	52	412	15.2	120.2
Niihau	723	18	44	24.9	60.9
Lanai	528	5	47	9.5	89.0

*Note:* Not adjusted for underenumeration, deemed to have been sizable in this census. Deaths include both epidemic and non-epidemic mortality.

<sup>a</sup> Per 1,000 population.

*Source:* "Census of the Hawaiian Islands—From Official Documents—Taken January, 1849," F, Nov. 15, 1849, p. 79.

## EFFECTS OF THE EPIDEMICS

The epidemics eventually ended, some time in 1849. What did they leave behind?

For one, they left a decimated Hawaiian population far smaller than it had been for many centuries. The 1850 census—a more accurate count than its 1849 predecessor—found only 82,035 unmixed Hawaiians and 558 part Hawaiians, compared with 107,354 natives in 1836 and perhaps 300,000 in 1778. By 1960, the last time the census included separate data for unmixed Hawaiians, only 11,294 remained.<sup>36</sup>

The greatly diminished population base in turn left many empty church pews and underutilized classrooms. The 1849 general meeting of the Sandwich Islands Mission, for example, noted sharp declines in church attendance; a typical lament, voiced by one participant, was, “More than one tenth of the members of this church have died the past year.” Another said, “Almost the whole population were stricken down by pestilence, which carried off 120 members of this church.” Punahou School suspended classes, and was open only 23 weeks in the entire year. In Kane‘ohe, the population fell from 4,987 in 1832 to 2,813 in 1849, and in 1848 deaths outnumbered births, 368 to 51.<sup>37</sup> Overall public school enrollment in the kingdom declined 3,408 between January 1848 and December 1849, “due to the great mortality occasioned by the measles and whooping cough.”<sup>38</sup>

The epidemics seriously disrupted the Hawaiian economy, at best a fragile thing. “Hence there were fewer hands available for work on the plantations just at a time when more laborers were needed.”<sup>39</sup> The 1848–1849 epidemics were a major stimulus to the organized immigration that began in 1852 and peaked toward the end of the century.

The heavy death toll did however make work for some occupational groups. “All the carpenters are constantly employed in making coffins, but the majority [of victims] are buried without coffins,” wrote Juliette Cooke.<sup>40</sup>

These epidemics are largely forgotten today. An unsigned article in the *Hawaiian Gazette* in 1867 briefly recalled the epidemics, drawing largely on missionary writings from the late 1840s.<sup>41</sup> In 1897, Thos. G. Thrum published a summary article on “Hawaiian Epidemics.”<sup>42</sup> Kuykendall’s *Hawaiian Kingdom* offers only a brief mention, however,

and Gavan Daws' *Shoal of Time* makes no reference at all to the 1848–1849 epidemics.<sup>43</sup> Bushnell treats them only in broad, general terms.<sup>44</sup> But the magnitude of these epidemics and their grim impact argue for their undeniable relevance to the history of Hawai'i.

## NOTES

The authors gratefully acknowledge the help of the staffs of the Hawaiian Mission Children's Society Library and the Hawaiian Historical Society Library in uncovering many of the sources cited here.

<sup>1</sup> *P* Oct. 14, 1848: 86.

<sup>2</sup> *P* Dec. 9, 1848: 119.

<sup>3</sup> Dr. Dwight Baldwin, letter to Edward B. Robinson, Nov. 17, 1848, HMCS; Francis John Halford, M.D., *9 Doctors & God* (Honolulu: U Hawaii P, 1954) 193–194; *HG* Nov. 13, 1867: [2].

<sup>4</sup> *MH* October 1849: 359–360.

<sup>5</sup> *MH* October 1849: 360.

<sup>6</sup> *MH* October 1849: 360.

<sup>7</sup> *MH* October 1849: 361.

<sup>8</sup> Philip C. Jeans, Winifred Rand, and Florence Blake, *Essentials of Pediatrics*, 4th ed. (Philadelphia: J. B. Lippincott Co., 1946) 386–387.

<sup>9</sup> Henry K. Silver, C. Henry Kempe, and Henry B. Bruyn, *Handbook of Pediatrics*, 14th ed. (Los Altos, CA: Lange Medical Publications, 1983) 583.

<sup>10</sup> Lawrence M. Tierney, Jr., Stephen J. McPhee, and Maxine A. Papadakis, *Current Medical Diagnosis and Treatment* (Norwalk, CT: Appleton and Lange, 1994) 1106–1107.

<sup>11</sup> Silver et al. 621–623.

<sup>12</sup> Tierney et al. 1139–1140.

<sup>13</sup> Charles P. Emerson, Jr., and Jane E. Taylor, *Essentials of Medicine*, 15th ed. (Philadelphia: J. B. Lippincott Co., 1946) 536–537.

<sup>14</sup> Emerson and Taylor 569.

<sup>15</sup> Tierney et al. 1118–1119.

<sup>16</sup> *MH* October 1849: 361; *HG* Nov. 13, 1867: [2]; *HAA* 1897: 95–97.

<sup>17</sup> *MH* Oct. 1849: 360.

<sup>18</sup> Halford 193–194. See also Mary Atherton Richards, comp., *The Chiefs' Children's School* (Honolulu: privately printed, 1937) 317–318.

<sup>19</sup> *MH* October 1849: 362.

<sup>20</sup> For a comprehensive and insightful discussion of *kahuna* medicine, see O. A. Bushnell, *The Gifts of Civilization, Germs and Genocide in Hawai'i* (Honolulu: U Hawai'i P, 1993).

<sup>21</sup> Dr. Dwight Baldwin, letter to Edward B. Robinson, Dec. 15, 1848. HMCS.

<sup>22</sup> Amos S. Cooke Journal, Vol. 8, ts., HMCS, entries for Nov. 6, Nov. 7, Nov. 14, and Nov. 16, 1848, pp. 207, 208, 210, 211.

- <sup>23</sup> Richards 316.
- <sup>24</sup> *F* Dec. 1, 1848: 93. See also Privy Council Records, Vol. 3A, July 1, 1847/Dec. 28, 1849, pp. 147-148.
- <sup>25</sup> Baldwin to Robinson, Dec. 15, 1848.
- <sup>26</sup> *F* Mar. 1, 1849: 20.
- <sup>27</sup> *F* Nov. 15, 1849: 79.
- <sup>28</sup> Anon., "Hawaiian Epidemics," *HAA* 1897: 97.
- <sup>29</sup> Samuel M. Kamakau, *Ruling Chiefs of Hawaii (Revised Edition)* (Honolulu: The Kamehameha Schools P, 1992) 236-237, 410-411.
- <sup>30</sup> M. A. Taff, Jr., "The Vanishing Race of the Pacific," *PP* November 1949: 21.
- <sup>31</sup> Robert C. Schmitt, *Demographic Statistics of Hawaii: 1778-1965* (Honolulu: U Hawaii P, 1968) 52.
- <sup>32</sup> Robert C. Schmitt and Eleanor C. Nordyke, "Influenza Deaths in Hawai'i, 1918-1920," *HJH* 33 (1999): 114.
- <sup>33</sup> Richards 319.
- <sup>34</sup> Halford 193-194.
- <sup>35</sup> *F* Nov. 15, 1849: 79.
- <sup>36</sup> Schmitt 43, 120. For 1990 estimates of the "pure" and part Hawaiian populations, see Robert C. Schmitt, "How Many Hawaiians Live in Hawai'i?" *Pacific Studies* 19, no. 3, Sept. 1996, pp. 31-35.
- <sup>37</sup> *Extracts from the Minutes of the General Meeting of the Sandwich Islands Mission, Held at Honolulu, April and May, 1849* 11, 12, 14.
- <sup>38</sup> *Report of the Minister of Pub. Instruction [April 1850]* 20.
- <sup>39</sup> Ralph S. Kuykendall, *The Hawaiian Kingdom, Vol. I, 1778-1854, Foundation and Transformation* (Honolulu: U Hawaii P, 1938) 328.
- <sup>40</sup> Richards 317-318.
- <sup>41</sup> "The Great Epidemics amongst Hawaiians in 1848," *HG* Nov. 13, 1867:[2]; "The Epidemics Again," *HG* Nov. 20, 1867: [2].
- <sup>42</sup> "Hawaiian Epidemics," *HAA* 1897 95-101.
- <sup>43</sup> Kuykendall 328; Gavan Daws, *Shoal of Time* (Honolulu: U Hawaii P, 1968).
- <sup>44</sup> Bushnell 269.

