

Reclaiming Native Hawaiian Knowledge Represented in Bird Taxonomies

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Abstract This paper examines three examples of native bird classification systems historically used by the aboriginal peoples of the Hawaiian Islands. The goal is to better understand Indigenous linguistic hierarchies in the taxonomic structure and nomenclature systems that were formerly utilized by these colonized peoples. Three specific manuscripts from two native historians and a foreign naturalist are analyzed to better ascertain how these systems may have worked, despite the dearth of data on the comprehensive knowledge of bird hunters and ritual specialists. The utilitarian basis of these systems is shown to have potential practical application for the ongoing cultural and linguistic revitalization of the native Hawaiian people. The perspectives and reasoning behind these systems could be used as a tool for reviving traditional relationships with the unique ecosystems of Hawai'i. Further research in the large but diffuse archives of Hawaiian language manuscripts may eventually expand our understanding of Hawaiian folk systematics.

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Introduction

Can an understanding of the folk classification systems and nomenclature of Indigenous peoples be reclaimed after a major language shift and Westernization? For decades the field of ethnobiology has strived to utilize folk taxonomy, classification, and nomenclature to provide insight into the social and cognitive similarities and differences between unrelated cultures (Berlin et al. 1973:214–215, 227). As presented in this study, folk taxonomies (or folk classifications) are defined as the ways people *categorize* and *classify* organisms in the world around them based on both perceived discontinuities and practical purposes (Atran 1999:316; Hunn 1982:831, 840). In addition, Berlin (1973:259) explains that nomenclatural studies are “devoted to the description of linguistic principles of naming the conceptually recognized classes of plants and animals in some particular language.” Folk nomenclature systems can therefore be seen as collective systems used by people for *naming* and *describing* different forms of life, in that context. Studies of traditional ecological knowledge (TEK) such as folk taxonomy and nomenclature can

lead to new understandings of natural phenomena. In a study of a Fijian fishing community on Vanua Levu, Golden et al. (2014:1–2, 11) found that information in that community regarding the use of resources, ecosystem change over time, and population dynamics of at-risk species held valuable potential to inform future management practices. For Indigenous peoples, TEK can also serve to record and document oral traditions. A study by Hidiyati et al. (2018:45) of Vaie language speakers in Malaysia found active practitioners of TEK had “greater language vitality” than community members who were not as involved in traditional practices. Such studies can assist as resources for cultural revitalization in Westernized Indigenous societies.

Study Location

The Hawaiian Islands, an archipelago found in the Pacific Ocean, is regarded as the most isolated high island archipelago on the planet and hosts an astonishingly unique biota. Of particular note is the native avifauna, which demonstrates a high level of endemism. While the Hawaiian avifauna is



represented by a depauperate number of taxonomic families, the specific diversity is unusually high. At least 74 of the 109 known endemic bird species are now extinct due to anthropogenic causes. Most of the remaining native bird species have declined drastically in numbers and are now rarely encountered by the majority of the local population (Reed et. al. 2012:881).

While in many remarkable ways the Indigenous human population (*kānaka maoli*) that historically interacted closely with the Hawaiian avifauna has maintained its traditions and strongly influenced the continual influx of foreigners to Hawai‘i, they have also acculturated to Western society in the 230+ years since their first contact with British Captain James Cook. Tremendous changes to Hawaiian religious, political, and educational systems, as well as diaspora, foreign immigration, and a history of depopulation via epidemics from foreign diseases have irrevocably altered the social structure of modern Hawai‘i. In addition, large changes to Hawai‘i’s ecological landscapes, especially in the inhabited lowlands, have destroyed habitat for most extant native birds, removing them from the human experience. As a result, few *kānaka maoli* now have a close working relationship with the native avifauna. The highly skilled bird hunters who possessed multi-generational cultural knowledge of native birds have all been dead for generations. This failure of TEK to be transmitted to the living generation of *kānaka maoli* is largely due to the historical factors given above, particularly the social and economic changes that may have made other occupations more practical for *kānaka maoli* to pursue, and the dramatic continuous decline of native birds. In modern Hawai‘i, most native forest birds have either become extinct or are in danger of extinction, and much of the traditional knowledge about them has not been utilized in living memory (Abbott 2012; Emerson 1895:111). Any modern study of *kānaka maoli* ethno-ornithology must therefore rely heavily on the few historic accounts that exist on the subject. Unfortunately, relatively little ethnographic work was done to specifically record *kānaka maoli* ethno-ornithological knowledge before the experts passed away. There are numerous diffuse references to TEK related to native Hawaiian birds in archival and 19th century Hawaiian language newspaper accounts, as well as in traditional chants, but very few of these sources are focused explicitly on Hawaiian birds, and many remain difficult for researchers to access and analyze.

Methods

Data Collection

The *kānaka maoli* are in the midst of a decades-long cultural and linguistic revitalization that began in the late 1960s largely through song and hula (dance), which eventually grew to include politics, celestial navigation, and many other traditional and modern subjects (Tachihata 1994:202). Birds in particular were historically utilized for food, feathers, and religious ceremony (Gomes 2015:1, 66, 230), something which is reflected in the folk taxonomy and nomenclature of native Hawaiian birds. As many *kānaka maoli* revive Indigenous ways of knowing and living, an examination of what perspectives people in previous generations had of native Hawaiian birds could prove valuable.

In this paper I examine three of the best remaining sources for this information. These accounts are among the most focused on TEK regarding native Hawaiian birds, and are notable for explicitly listing the different ethno-taxonomic categories to which these birds belong. The writings of early *kānaka maoli* historians, David Malo and Kepelino Teauotalani, are utilized to reconstruct their native bird folk taxonomies. The work of English naturalist Robert C. L. Perkins on native Hawaiian bird nomenclature and folk taxonomy is also examined and compared to the work of the aforementioned Indigenous scholars. While there were several foreign naturalists that studied native Hawaiian birds in depth during the 19th and early 20th centuries, Perkin’s account is unique for the depth to which he describes the avian nomenclature system of the *kānaka maoli* experts in his time.

David Malo

David Malo was born in Keauhou, Kona, Hawai‘i sometime around 1793 to *kānaka maoli* parents Aoao and Heone. While we do not know where Malo obtained his specific information on birds, one of Malo’s major mentors was Noa ‘Auwae, an *ali‘i* (nobleman) who was an expert in the old histories and genealogies. Malo was a student of the early Calvinist Christian missionaries at their school at Lāhaina, Maui, where he became literate and began recording Hawaiian history. He was a well-respected man in his time for his knowledge of Hawaiian history and service to his community (Emerson *in* Malo 1951 (1898):vii-xiii; Lyon 2012:67).

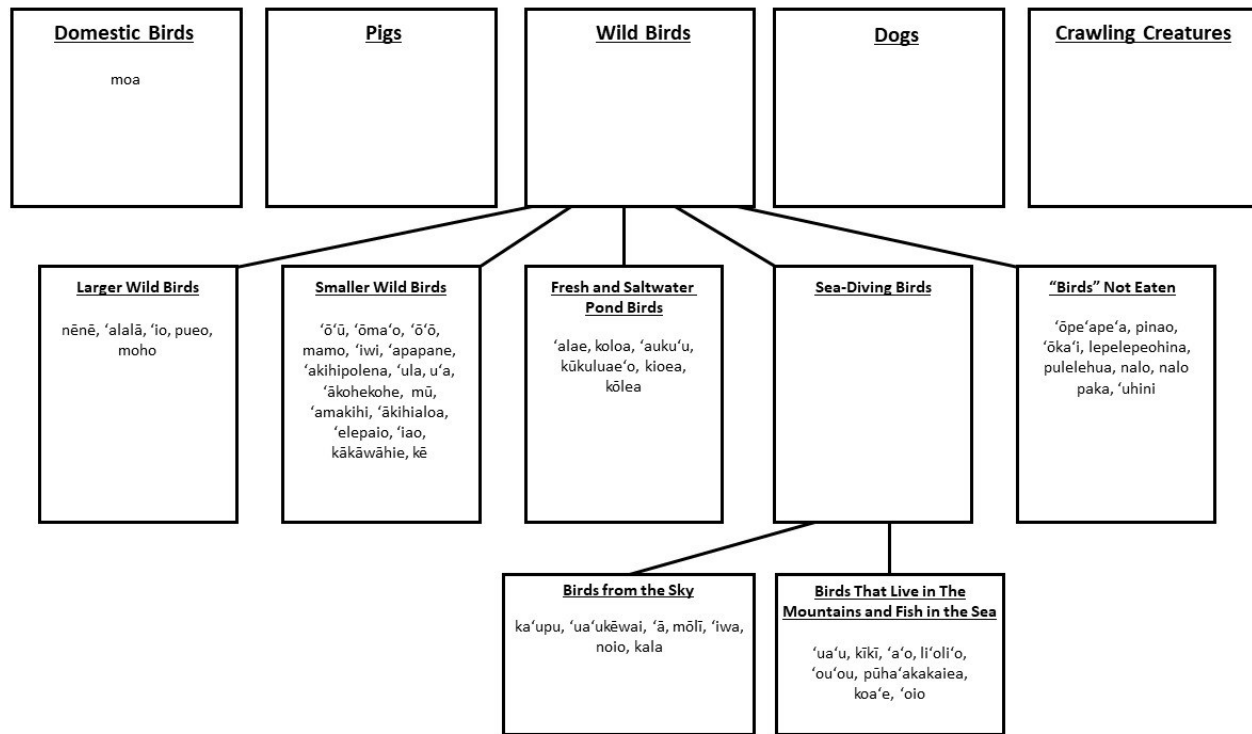


Figure 1 Malo’s Bird Folk Taxonomy.

Malo’s work, *Mo’olelo Hawai’i*, is considered one of the most important writings on classical Hawaiian culture and history that exists today and informs the reader on a variety of topics from religious ceremony and the traditional divisions of earth, sea, and sky, to traditional games and stories. Written sometime during the 1840s, it was published posthumously as an English translation by Dr. Nathaniel Emerson in 1903 (Lyon 2012:30–31; Murabayashi and Dye 2010:12). The original Hawaiian-language manuscript was not published until 1987 by Malcolm Nāea Chun (Lyon 2012:70, 72). For this paper, I have elected to use a soon-to-be-published version of Malo’s original Hawaiian-language manuscript edited by Kapali Lyon and Charles Langlas (2013 (1853)), which strives to further preserve the meaning of obscure Hawaiian-language terminology from an original hand-written manuscript located in the Bernice Pauahi Bishop Museum Archives.

Analysis of Malo’s Folk Taxonomy

Malo (2013 (1853):75–85) presents his information on Hawaiian birds in list form, which probably derives from the old *kanaka maoli* scholarly practice of listing lengthy amounts of information through chant. His descriptions are very brief, usually just giving the

name of the bird, its folk taxonomic class, some small note on its physical appearance and habits, whether or not the bird was palatable, and perhaps the name of the method used to hunt it. In spite of the lack of depth to Malo’s information, it is incredibly valuable as a rare legitimate and explicit source of Indigenous insight on this subject.

Table 1 and Figure 1 show birds described by Malo in the folk taxonomic classifications to which he has assigned them. I have arranged these classifications in their presumed taxonomic ranking according to his descriptions. There are three levels of ranking in this hierarchy, given from the largest and most general to the smallest and most specific. Each level of ranking may have multiple classifications within it. Some classifications have more than one synonymous title given by Malo. All given synonyms are included.

I have included the current Latin names for all identifiable folk species listed when possible. Many birds listed by Malo appear to be birds whose identity cannot be adequately determined at this time (as is the case for the seabirds *mōli* and *ka’upu*, which are often considered today to be synonyms for *Phoebastria immutabilis* but are clearly very different birds in both

**Table 1** Malo's Bird Folk Taxonomy.

Category	Folk Species in this Category
Unique Beginner	
Terrestrial animals (<i>Holoholona</i>)	
Life Forms	
Pigs (<i>puaʻa</i>)	puaʻa (domestic pig; <i>Sus scrofa domesticus</i>)
Dogs (<i>ʻīlio</i>)	ʻīlio (dog; <i>Canis familiaris</i>)
Crawling Creatures (<i>Nā mea kolo</i>)	Non-volant invertebrates and small vertebrates such as: ʻiole (polynesian rat; <i>Rattus exulans</i>) moʻo kaʻalā (skinks; <i>Emoia impar</i> and <i>Cryptoblepharus poecilopleurus</i>) moʻo kāula (Gekoes; <i>Lepidodactylus lugubris</i> , <i>Hemiphyllodactylus typus typus</i> , and <i>Hemidactylus garnotii</i>) moa (domestic chicken; <i>Gallus gallus domesticus</i>)
Domestic birds (<i>nā manu laka</i>)	All other birds
Wild birds (<i>nā manu hihiu</i>)	All other flying animals are considered a kind of “bird” (<i>manu</i>) as well. These are specifically mentioned: ʻōpeʻapeʻa (Hawaiian hoary bat; <i>Lasiurus cinereus semotus</i>) pinao (dragonflies and damselflies; order <i>Odonata</i>) ʻōkaʻi (a large, nocturnal moth in Suborder <i>Heterocera</i>) lepelepeohina (an insect in either Suborder <i>Rhopalocera</i> or <i>Heterocera</i> , perhaps a butterfly such as <i>Vanessa tameamea</i>) pulelehua (Suborder <i>Rhopalocera</i> or <i>Heterocera</i> , perhaps a butterfly such as <i>Vanessa tameamea</i>) nalo (various flies; order <i>Diptera</i>) nalo paka (family <i>Evaniidae</i>)
“Birds” not eaten (<i>nā manu ʻāi ʻole</i>)	The <i>Juhini</i> (grasshoppers and relatives; family <i>Acrididae</i>) is included in this classification, though Malo notes that it was actually eaten.
Genera under the life form <i>nā manu hihiu</i>	
Sea-diving birds (<i>nā manu luʻu kai</i>)	All birds in the categories “Birds that live in the mountains and fish in the sea,” and “Birds from the sky/Birds from the sea.”
Small birds that only dwell in the forest / Smaller wild birds (<i>manu liʻiliʻi noho ma ka nāhelehele wale nō / Manu hihiu liʻiliʻi iho</i>)	ʻōʻū (<i>Psittirostra psittacea</i>), ʻōmaʻo (<i>Myadestes obscurus</i>), ʻōʻō (<i>Moho sp.</i>), mamo (<i>Drepanis pacifica</i>), ʻiwi (<i>Drepanis coccinea</i>), ʻapapane (<i>Himatione sanguinea</i>), ʻākihipōlena (unknown), ʻula (unknown), uʻa (unknown), ʻākohekohe (<i>Palmeria dolei</i>), mū (unknown), ʻamakihī (<i>Chlorodrepanis virens</i>), ʻākihialoa (<i>Akialoa sp.</i>), ʻelepaio (<i>Chasiempis sp.</i>), ʻiao (unknown), kākāwahie (<i>Paroreomyza flammea</i>), kē (unknown), nēnē (<i>Branta sandvicensis</i>), ʻalalā (<i>Corvus hawaiiensis</i>), pueo (<i>Asio flammeus sandwichensis</i>), ʻio (<i>Buteo solitarius</i>), moho (<i>Porzana sandwichensis</i>)
Larger wild birds (<i>manu hihiu nui ʻāe</i>)	ʻalae (<i>Gallinula chloropus, sandvicensis, Fulica alai</i>), koloa (<i>Anas wyvilliana</i>), ʻaukuʻu (<i>Nycticorax nycticorax</i>), kūkuluʻaeʻo (<i>Himantopus mexicanus knudseni</i>), kioea (<i>Numenius tahitiensis</i>), kōlea (<i>Pluvialis fulva</i>)
Fresh and salt water pond birds (<i>manu loko wai a loko kai</i>)	
Sub-genera under the genera <i>nā manu luʻu kai</i>	
Birds that live in the mountains and fish in the sea (<i>manu noho mauna a lawaiʻa kai</i>)	ʻuaʻu (<i>Pterodroma sandwichensis</i>), kīkī (unknown), ʻaʻo (<i>Puffinus newelli</i>) liʻoliʻo (unknown), ʻouʻou (<i>Bulweria bulwerii</i>), pūhaʻakakaiea (unknown), koʻāe (<i>Phaethon sp.</i>), ʻoio (unknown, perhaps <i>Anous sp.</i>)
Birds from the sky / birds from the sea (<i>manu mai ka lewa mai/manu mai ke kai mai</i>)	kaʻupu (unknown), ʻuaʻukēwai (unknown), ʻā (<i>Sula sp.</i>), mōlī (unknown), ʻiwa (<i>Fregata minor</i>), noio (<i>Anous minutus</i>), kala (<i>Onychoprion lunatus</i>)



Malo and Teauotalani's respective descriptions), or are birds which have not been attributed to any species described by ornithologists. It should be noted that Indigenous epistemologies do not always align with Western epistemologies (Helmreich 2005:115), and so some of these mystery birds might be names for different genders or stages of development for known bird species. These unidentified birds are simply labeled "unknown" in parentheses. All names in Table 1 and Figure 1 appear as printed in the edited text by Lyon and Langlas (2013 (1853)). I have chosen not to include English names for the birds in the tables and figures of this paper. The Latin and Hawaiian names provided are less likely to cause confusion on the identity of the birds, since these are the names normally used by ornithologists familiar with these species. Many of these species also have no English name.

Berlin et. al. (1973:260–261)—and also later Atran (1999:316)—detailed the classic five-level hierarchy of folk taxonomy. The folk taxonomies given by Malo and Teauotalani do not correspond exactly to the classic system (mainly because they include an additional level I have opted to call "sub-genera"), but I have included the classic hierarchy here as a reference to further understand how folk taxonomies are ordered. In the classic hierarchy of folk taxonomy there are five taxonomic levels. These are:

1. Unique Beginner: the taxon that includes all other taxa. Classifications like "plants and animals" or "living things" are examples of such a category.
2. Life Form: the broadest classification with easily recognized groups based on broadly recognized morphological characteristics. Taxa such as "tree," "bird," "herb," "mammal," and "fish" are this type of classification.
3. Generic: a broad classification that begins to distinguish organisms by smaller discontinuities in nature that can still be easily recognized. Examples of folk genera in American English culture include "maple," "deer," and "duck."
4. Specific: taxa that are distinguished by relatively few, specific features. Examples of this might be silver maple," "mule deer," or "mallard."
5. Varietal taxa: distinguished by characteristics not readily apparent to most uneducated observers. Varietal taxa are not common in

folk taxonomies. In American English culture good examples of varietal taxa are unique crop varieties.

The Hawaiian folk taxonomy given by David Malo provides a unique beginner in the form of *holobolona* (terrestrial animals). This includes all terrestrial vertebrates and invertebrates. *I'a*, or fresh and salt water life (including algae and corals), appear to be considered part of a completely separate taxonomy. It is not clear if there is an all-encompassing Hawaiian concept of "living thing," inclusive of both land and aquatic life. Inanimate objects also may have spirits and thus, "life" in traditional Hawaiian belief. Certain rocks are believed to be capable of reproduction and even independent motility under specific circumstances (Beckwith 1970 (1940):88; Handy and Pukui 1972:28).

At the life form level, Malo's taxa include *pua'a* (pigs), *'ilio* (dogs), *nā mea kolo* ("crawling creatures," non-volant invertebrates, rats, skinks, and geckos), *manu hibiu* (wild flying creatures, including birds and arthropods), and *manu laka* (domestic flying creatures, a monotypic taxa consisting solely of the chicken [*Gallus gallus domesticus*]). While all of these taxa are interesting to examine, the life form taxa of *manu hibiu* and *manu laka* are of greatest concern to this study.

It is from the next level of the folk generic that Malo (and also Teauotalani) diverge from the classic folk classification hierarchy. Here we find folk generic and what I call "folk sub-generic" categories either descriptive of major obvious natural discontinuities, or of the function of the folk bird specifics that fall underneath them. While most of these categories are based on the utilitarian function of the bird to humans (such as palatability, use of feathers for garments, etc.), they may also be inclusive of the function that the bird has to the greater *ao holo'oko'a* (the world), that is to say, the function the bird has in the ecosystem.

Below the folk generic and sub-generic categories are the various folk species of birds which roughly correspond to Linnean taxonomy for Hawaiian bird species. Malo does not give varietals, though Teauotalani does in his respective taxonomy.

Kepelino Teauotalani

Kepelino Teauotalani was born in Kailua, Kona, Hawai'i around the year 1830 to Namiki and Kahulilanimaka. His parents were early Catholic converts and Teauotalani was educated by Catholic



priests. He later wrote letters and articles for the Catholic newspaper, *Hae Katolika*. Though his full given name appears to have been “Zepherin Kuhopu Kahoalii Kameeiamoku Kuikauwai” he signed his writings under the name “Zepherin Teauotalani” (“Kepelino Keauokalani” in modern Hawaiian orthography). Teauotalani’s work on birds, *Huli-Toa Manu Hawaii*, appeared as part of his *Hoiiilii Hawaii* series in *Hae Katolika* between 1859 and 1860. In this work Teauotalani explicitly provides the folk taxonomic category of each bird he lists. Though it is a primary source well known to some researchers, *Huli-Toa Manu Hawaii* has never been officially translated into English or published in its entirety (Beckwith in Teauotalani 2007 (1932):1–7).

Analysis of Teauotalani’s Folk Taxonomy

Teauotalani’s (1859) brief descriptions in *Huli-Toa Manu Hawaii* are perhaps the most detailed accounts that we have from a *kanaka maoli* scholar about Indigenous perspectives on birds. While Malo spends just four pages describing Hawaiian birds, Teauotalani’s treatise is 22 pages long. Later authors would base their work largely on Teauotalani’s writings. Unfortunately, many of Teauotalani’s descriptions are still tantalizingly short and often difficult to understand from the perspective of a modern reader. Like Malo, some of his bird descriptions also appear to be of birds that cannot be clearly reconciled with those described by the early Western naturalists who visited Hawai‘i. Also similar to Malo’s work, Teauotalani’s writings usually list the birds by name, give a description of their physical appearance and habits, palatability, and the methods by which they were caught. Occasionally he provides additional information.

Teauotalani and Malo provide a similar number of bird folk categories. Teauotalani gives eight and Malo gives nine, though their classifications are not exactly the same. Teauotalani’s categories are arguably more anthropocentrically utilitarian than Malo’s. For example, his categories *nā manu ‘aina* (birds which are used for meals), and *nā manu ali‘i* (royal birds, in reference to the use of these birds’ feathers by Hawaiian royalty) both clearly reference the utilitarian importance of birds. Teauotalani does not explicitly give a unique beginner category for this taxonomy, though it can be understood that the unique beginner is *manu*, all flying creatures. He describes three categories at the life form level, *nā manu o ka uka* (birds of the uplands), *nā manu ‘ano ‘elepaio* or *nā manu*

lavai‘a (‘*elepaio* (*Chasiempis* sp.) nattered birds or “fishing birds”), and *nā manu o ka ‘āina* (birds of the land). He has three main genus level categories that he names, and one sub-genus category. Unlike Malo, the only non-avian *manu* he lists is ‘*ōpe‘ape‘a* (the bat), which, along with the enigmatic and unidentified *aukuu pili aina*, is not categorized.

A brief explanation must be given for the name of the category *nā manu ‘ano ‘elepaio*. The ‘*elepaio* are a group of endemic old-world flycatchers whose diet mainly consists of various forest invertebrates. The reason why a category entirely composed of seabirds and shorebirds would be named after a small forest bird is because in *kanaka maoli* tradition, one of the more common calls of the ‘*elepaio* sounds like the phrase, ‘*ono ka i‘a!* (fish is delicious!), which implies that the ‘*elepaio* is asking the listener to give the bird some fish to eat. To the listener, it is as if the ‘*elepaio*, a bird of inland forests, is too lazy to go down to the sea and get some fish for itself. Instead it asks the listener to do it for them. The name of this category references that all birds listed within it eat aquatic organisms.

Table 2 and Figure 2 give Teauotalani’s Hawaiian bird folk taxonomic system. I have refrained from adding glottal stops (‘*okina*) and macrons (*kahakō*) to Teauotalani’s given bird names. ‘*Okina* and *kahakō* are standard in modern Hawaiian orthography but I do not want to be presumptuous of the possible pronunciations and meanings of some of these names, especially for birds that remain unidentified. Each folk bird species is only listed in every classification to which it has been specifically assigned. If a bird appears in a lower ranking but Kepelino does not specifically name it in the higher ranking that it also falls under, I do not list that bird in the higher ranking. Other than these changes I have followed the same rules in providing information on Teauotalani’s system as in Table 1 and Figure 1 for Malo’s system given above.

Robert Cyril Layton Perkins

R. C. L. Perkins was born in Badminton, Gloucestershire, England on the 15th of November, 1866, to Charles Mathew Perkins, an Anglican priest, and Agnes Martha Beach Thomas. As a boy Perkins had a strong interest in entomology, which was encouraged by his family. They did however also encourage him to join his father’s profession as a minister. He went to college for a degree in Classics at Oxford. After his education Perkins eventually

**Table 2** Teauotalani's Bird Folk Taxonomy.

Classification	Folk Species in this Classification
Life Forms	
Birds of the Uplands (<i>nā manu o ka uka</i>)	<i>akihialoa</i> (<i>Akialoa</i> sp.), <i>ula</i> (1) (unknown), <i>hoe</i> (unknown), <i>omao</i> (<i>Myadestes obscurus</i>), <i>moho</i> (<i>Porzana sandwichensis</i>), <i>mamo</i> (<i>Drepanis pacifica</i>), <i>iiwi</i> (<i>Drepanis coccinea</i>), <i>amakihī</i> (<i>Chlorodrepanis</i> sp.), <i>alokele</i> (unknown), <i>elepaio</i> (<i>Chasiempis</i> sp.)
' <i>Elepaio</i> Birds / Fishing Birds/Birds of the sea (<i>nā manu 'elepaio / nā manu lawai'a / nā manu o ke kai</i>)	<i>aa</i> (unknown), <i>iwa</i> (<i>Fregata minor</i>), <i>olokele</i> (unknown), <i>kioea</i> (<i>Numenius tahitiensis</i>), <i>ula</i> (1) (unknown), <i>ula</i> (2) (unknown), <i>ao</i> (<i>Puffinus newelli</i>), <i>aukuu</i> (<i>Nycticorax nycticorax</i>), <i>uvau</i> (<i>Pterodroma sandwichensis</i>), <i>koae koo ula</i> (<i>Phaethon rubricauda</i>), <i>noio</i> (<i>Anous</i> sp.), <i>kolea</i> (<i>Pluvialis fulva</i> , <i>Arenaria interpres</i> , <i>Tringa incana</i>), <i>kala</i> (<i>Onychoprion lunatus</i>), <i>kone</i> (unknown), <i>kaupu</i> (unknown), <i>akihikee-hiale</i> (unknown)
Birds of the land (<i>nā manu o ka jāina</i>)	<i>io</i> (<i>Buteo solitarius</i>), <i>pueo</i> (<i>Asio flammeus sandwichensis</i>), <i>nene</i> (<i>Branta sandvicensis</i>), <i>koloa</i> (<i>Anas wyvilliana</i>), <i>alala</i> (<i>Corvus hawaiiensis</i>), <i>alae</i> (<i>Gallinula chloropus sandvicensis</i> , <i>Fulica alai</i>), <i>hulimaia</i> (unknown), <i>moa</i> (<i>Gallus gallus domesticus</i>), <i>kolea</i> (<i>Pluvialis fulva</i> , <i>Arenaria interpres</i> , <i>Tringa incana</i>)
[Birds not assigned a category]	<i>aukuu pili aina</i> (unknown), <i>opeapea</i> (<i>Lasiurus cinereus semotus</i>)
Genus under the life form <i>nā manu o ka uka</i>	
Birds that eat lehua flowers (<i>nā manu ļai pua lehua</i>)	<i>akihialoa</i> (<i>Akialoa</i> sp.), <i>ula</i> (unknown), <i>akakane</i> (<i>Himatione sanguinea</i>), <i>mamo</i> (<i>Drepanis pacifica</i>), <i>ou</i> (<i>Psittirostra psittacea</i>)
Genus under the life form <i>nā manu o ka jāina</i>	
Birds of fresh water / Duck-natured birds (<i>manu o ka wai / nā manu 'ano koloa</i>)	<i>alae</i> (<i>Gallinula chloropus, sandvicensis, Fulica alai</i>), [probably also <i>koloa</i> (<i>Anas wyvilliana</i>) due to the name of the category]
Birds which are used for meals (<i>nā manu ļaina</i>)	<i>hulimaia</i> (unknown), <i>uvau</i> (<i>Pterodroma sandwichensis</i>), <i>nene</i> (<i>Branta sandvicensis</i>), <i>koae koo ula</i> (<i>Phaethon rubricauda</i>), <i>koloa</i> (<i>Anas wyvilliana</i>)
Genus under the life form <i>nā manu o ka ļaina</i> and <i>nā manu ļelepaio</i>	
Owl Natured Birds (<i>manu ļano pueo</i>)	<i>pueo</i> (<i>Asio flammeus sandwichensis</i>), <i>iwa</i> (<i>Fregata minor</i>), <i>io</i> (<i>Buteo solitarius</i>)
Sub-genus level under the genus <i>nā manu ļai pua lehua</i>	
Royal Birds (<i>nā manu aliļi</i>)	<i>mamo</i> (<i>Drepanis pacifica</i>), <i>oo</i> (<i>Moho</i> sp.), <i>iivi</i> (<i>Drepanis coccinea</i>)

answered a request for applicants to journey to the Hawaiian Islands to do zoological surveys, posted by the Sandwich Islands Committee of the British Association for the Advancement of Science (Evenhuis 2007:27–30, 49–51). Though his personal interests were mainly entomological, much of the survey work in Hawai'i involved bird collecting. Perkins also at least occasionally hired *kānaka maoli* guides to assist him into the deep and still wild Hawaiian forests (*ibid.*:293–300). He undoubtedly gained some skill in 'ōlelo Hawai'i (the Hawaiian language) through his work, though exactly how fluent he was is uncertain.

We are fortunate that years after his zoological

surveys Perkins published some of the ethno-ornithological knowledge that he possessed in the *Aves* section of his work *Fauna Hawaiiensis*. Most important to this paper is the organized analysis Perkins gives on Hawaiian bird classification and nomenclature.

Analysis of Perkin's Folk Nomenclature

Perkins was a keen observer, and we owe much of our knowledge of the historical ecology of Hawai'i to his writings. This aptitude for noticing detail led him to develop a theory of what he believed to be a Hawaiian "...crude, and often erroneous, classification." (Perkins

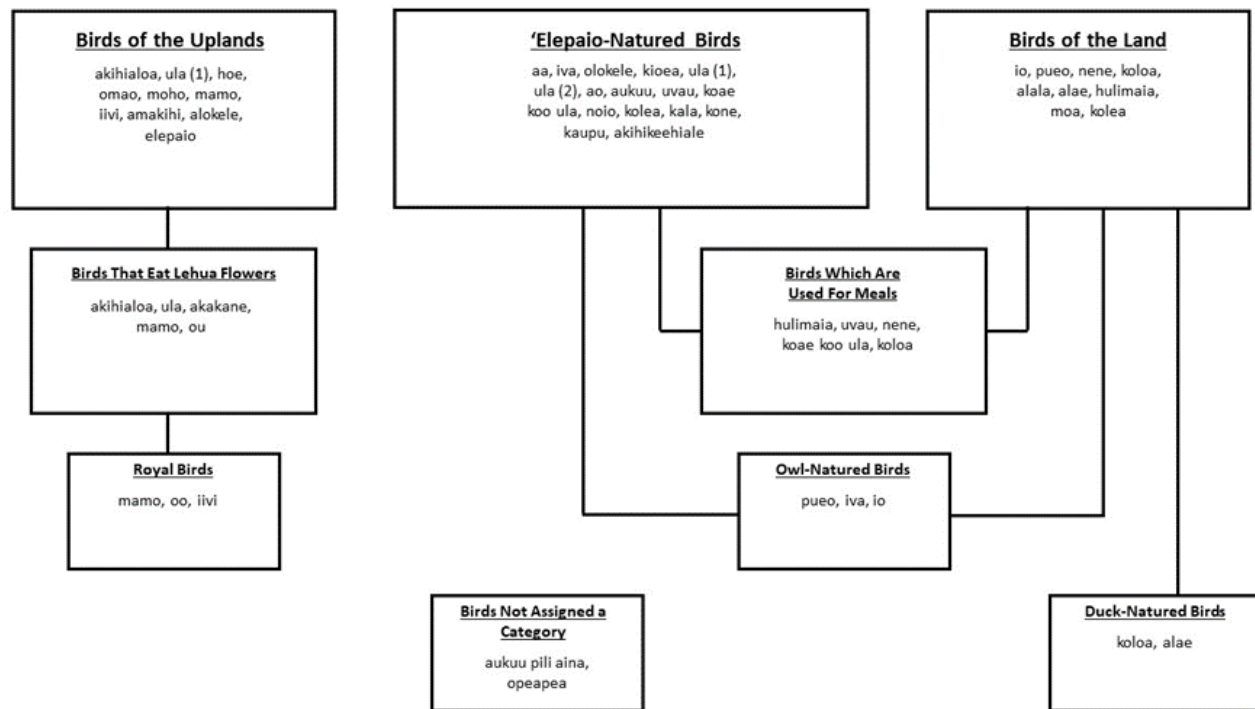


Figure 2 Teauotalani's Bird Folk Taxonomy.

1903:394). Though he considered his system of bird name categories to be a taxonomic one, today we would more properly term this system as one of folk nomenclature. Though a system of naming conventions is not outright described by Teauotalani, Malo, and other Hawaiian writers, Teauotalani does make mention of the reasons why several particular birds were named (Teauotalani 1859:11–12, 14, 16, 18–19, 22, 24, 26–29). These reasons align perfectly with some of the classifications that Perkins proposes. For example, Teauotalani (1859:14) gives an explanation for the naming of the 'alalā (*Corvus hawaiiensis*), “A o tona inoa ua tapania mamuli o te ano o tana tani,” “And as for its name, it is called so because of the nature of its call.” Certain others of Perkins' classifications are not mentioned as naming conventions by any *kānaka maoli* authors, but this does not mean that they do not necessarily still exist. The specific classifications, with explanations in Perkins' (1903:394–395) own words, are as follows:

(1) Names given from peculiarities of structure or plumage, e.g. Akihialoa (*Hemignathus*) [now *Akialoa* sp.] from its long, sharply-pointed beak; Nukupuu (*Heterorhynchus*) [now *Hemignathus* sp.] from its

hill-like (i.e. strongly rounded) bill; Palila from its aberrant grey plumage. Such names are often compounded with a beak (lit. jaw) e.g. Akekee [“crooked beak”], Amakihi [“bent beak”], Akohekohe [“beak with a tuft”]

(2) Onomatopoeic names, e.g. Alala (*Corvus*), Elepaio (*Chasiempis*), and Oo (*Mobo* or *Acrulocercus*). Such names may have an applicable meaning as well as imitating the cry of the bird, e.g. Kioea (*Numenius*), which is onomatopoeic and at the same time refers to the height at which the bird stands from the ground.(3) Names derived from [read: *descriptive of*] the nature of the sounds uttered by the bird, e.g. Apapane (*Himatione*), Akikeke (*Oreomyza bairdi*) [now *Oreomystis bairdi*], Kakawahie (*O. flammea*) [now *Paroreomyza flammea*], &c.

(4) Called after a person, Amaui (*Phaeornis*) [now *Myadestes* sp.] Maui's bird.

(5) After colour of plumage and habits, Ula-ai-hawane (*Ciridops*), the red bird that feeds on the hawane (*Pritchardia*).

Further analysis of additional Hawaiian bird

**Table 3** Examples of Perkins' System of Naming Conventions.

Category	Hawaiian Name (<i>Latin Name</i>)
1	a. <i>lākiapōlājau</i> (<i>Hemignathus munroi</i>), <i>ākihialoa</i> (<i>Akialoa</i> sp.), <i>ʻiʻiwi</i> (<i>Drepanis coccinea</i>), <i>ʻalae nūkea</i> (<i>Fulica alai</i>), <i>ʻalae ʻula</i> (<i>Gallinula chloropus sandvicensis</i>), <i>ʻamakihi</i> (<i>Chlorodrepanis</i> sp.), <i>nukupuʻu</i> (<i>Hemignathus affinis</i> , <i>H. hanapepe</i> , <i>H. lucidus</i>), <i>ʻākohekohe</i> (<i>Palmeria dolei</i>), <i>ʻākekeʻe</i> (<i>Loxops caeruleirostris</i>), <i>ʻākepa</i> (<i>Loxops</i> sp.) b. <i>mamo</i> (<i>Drepanis pacifica</i>), <i>kioea</i> (<i>Numenius tahitiensis</i>), <i>palila</i> (<i>Loxiodes bailleui</i>), <i>ʻulaʻaihāwane</i> (<i>Ciridops anna</i>), <i>hunakai</i> (<i>Calidris alba</i>)
2	a. <i>ʻelepaio</i> (<i>Chasiempis</i> sp.), <i>ōʻō</i> (<i>Moho</i> sp.), <i>kioea</i> (<i>Numenius tahitiensis</i>), <i>ʻalalā</i> (<i>Corvus hawaiiensis</i>), <i>ʻuaʻu</i> (<i>Pterodroma sandwichensis</i>), <i>ʻio</i> (<i>Buteo solitarius</i>), <i>nēnē</i> (<i>Branta sandvicensis</i>) b. <i>lālālā</i> (<i>Corvus hawaiiensis</i>), <i>ʻākiikeke</i> (<i>Oreomyzta bairdi</i>), <i>kākāwahie</i> (<i>Paroreomyza flammea</i>), <i>ʻakakani</i>
3	<i>ʻāmāui</i> (<i>Myadestes woahuensis</i> ; <i>Myadestes myadestinus</i>), <i>Manuokū</i> (<i>Gygis alba</i>)
4	<i>ʻaukuʻu</i> , <i>ōmaʻo</i> (<i>Myadestes obscurus</i>), <i>kūkuluāeʻo</i> (<i>Himantopus mexicanus knudseni</i>), <i>kioea</i> (<i>Numenius tahitiensis</i>), <i>hunakai</i> (<i>Calidris alba</i>), <i>ōʻōnukuumū</i> (<i>Drepanis funera</i>), <i>ʻākepa</i> (<i>Loxops</i> sp.), <i>ōʻū</i> (<i>Psittirostra psittacea</i>)

names suggests that this basic model of Hawaiian bird naming conventions should be further modified. As Perkins himself mentioned, many birds whose names are derivative of their physical characteristics have names specifically in reference to their “jaws” (“*ā*” in Hawaiian), that is to say, their beaks. There are a large enough number of birds with these kinds of names to merit the categorical recognition of this type of naming. Additionally, Perkins redundantly lists bird plumage as being criteria for both his first and fifth categories. With this in mind I propose the following modifications to his system of folk naming conventions:

- His category 1 should be further divided into two sub-categories, one for birds named in relation to their beak (subcategory “a”), and one for birds named in relation to their plumage or other body characteristics (subcategory “b”).
- His categories 2 and 3 should be lumped into a single overarching category of “names for calls,” with the original two categories still respectively represented as subcategories. Onomatopoeic names are identified as subcategory “a,” while names descriptive of the sounds birds make are now identified as subcategory “b.”
- Category 4, though rarely encountered, should remain the same.
- Category 5 should be changed strictly to encompass names related to bird habits, as plumage is now included as a sub-category

under category 1. Placing plumage in two separate categories would obviously be redundant.

The modified system of naming conventions can now be read as follows (note there are now only four categories):

- (1) Names given from peculiarities of appearance.
 - (1a) Names given from peculiarities of a bird’s beak.
 - (1b) Names given from peculiarities of a bird’s plumage or other body characteristics.
- (2) Names given from sounds birds make.
 - (2a) Names onomatopoeic to sounds a bird makes.
 - (2b) Names descriptive of sounds a bird makes.
- (3) Names given after a person, whether historic, legendary, or holy in nature.
- (4) Names given after particular habits a bird has.

Table 3 classifies several known kinds of Hawaiian birds according to the categories and sub-categories proposed above for this system of naming conventions. This is not an exhaustive list, but serves to illustrate examples of this system. Note that many birds have names that fall into multiple categories or subcategories. There are also many birds whose names do not clearly fall into any particular category, but this



may simply be due to a modern lack of understanding of the birds, their names, and the intricacies of the Hawaiian language. This is particularly true of the many birds that became extinct long ago, about which we have very little information.

Discussion

Evidence of Diverse Taxonomies and a Unified Nomenclature

Given the brief and limited nature of the information that Malo and Teauotalani provide in their writings on birds, the fact that they both thought that it was important to include the utilitarian taxonomic categories of the birds in their work is evidence that utility is important to the *kanaka maoli* worldview on birds. In spite of this apparent agreement between both authors, there are a number of differences in the way they each chose to categorize birds in their writings.

It is difficult to explain the differences in the way Malo and Teauotalani chose to categorize their respective taxonomies. Unfortunately, neither author cites a source for his knowledge. Both authors were born in districts that were within just a few miles of each other (Keauhou, Kona and Kailua, Kona respectively, on Hawai'i island), but it is not clear if their bird knowledge came from informants within their own families or from elsewhere. Malo was considerably older than Teauotalani, so it is possible that the differences could be inter-generational, but it seems unlikely that the understanding of bird taxonomy among Hawaiians would have changed that radically in such a short period of time. It is very possible that there were simply a wide variety of opinions on the matter of the relationships that different types of *manu* had with each other due to differing levels of expertise according to descent group and other affiliations or levels of access to traditional knowledge. In his treatise on Hawaiian bird hunting, Nathaniel Emerson (1895:103) noted:

The methods used by one hunter in the capture of the birds differed from those used by another. They also varied somewhat, no doubt, in different districts, on the different islands, at different seasons of the year and even in the different hours of the day.

One could probably say that other general traditions related to birds were similarly diverse.

While the different bird classification systems given by Malo and Teauotalani indicate diversity of thought, there appears to have been something of a

consensus on the general ideas of a Hawaiian bird nomenclature. The nomenclature proposed by Perkins aligns with Teauotalani's information. Though not every one of his classifications can be corroborated by Teauotalani's treatise, what information does exist on the naming of birds within it supports Perkins' conclusions on *kanaka maoli* bird nomenclature. For example, according to Teauotalani (1859:21, 28) '*ākīhialoa* (*Akialoa* sp.) is named for its long, curved beak. Likewise, the *keōlea* (*Pluvialis fulva*) has an onomatopoeic name deriving from its call.

It seems doubtful that Teauotalani would have directly influenced Perkins' proposal, since Teauotalani died in 1878 and Perkins did not arrive in Hawai'i until 1892 (Beckwith in Teauotalani 2007:vi–viii; Evenhuis 2007:31–39, 49–52). It is also unlikely that Perkins would have read or even come across Teauotalani's work, which was published in Hawaiian language newspapers first in 1859–1860, and then in an edited form in 1863 by G.W. Kahiolo. It seems more likely that at least some of Perkins' knowledge came from the *kānaka maoli* bird hunters that he mentions working with in his journals.

Historical Utility

The system of nomenclature proposed by Perkins shows, among other things, the importance of onomatopoeia in the names of some birds. Forth (1998:189) emphasized the importance of onomatopoeic names in his study of the Nage, an Indigenous people from Indonesia. Ibarra et al. (2020:90, 95) did an extensive study of the use of onomatopoeia in bird names around the world. They found that the widespread use of onomatopoeia in bird names may allow people in many cultures to "see" birds that normally would not be readily physically observable. As many birdwatchers around the world could tell you, it is often much easier to detect a bird by sound than by sight, simply because birds often don't want to be seen. Additionally, Berlin and O'Neill (1981:259), in their study on onomatopoeic bird names used in the folk taxonomies of the Aguarana and Huambisa peoples of Peru, have previously hypothesized that onomatopoeic names serve as mnemonic devices in recognition of vocal animal species among non-literate populations. The system of Hawaiian naming conventions proposed by Perkins supports the idea of mnemonics as a learning strategy, showing other practical mnemonic methods of naming that an oral society may utilize to easily memorize the organisms in their environment.



Mnemonic devices are a common learning strategy in other aspects of Hawaiian culture besides nomenclature. Other authors have discussed the use of mnemonics in traditional Hawaiian poetry style (Kimura 2002:40), and others still have recognized the importance of place-names in maintaining cultural and historical knowledge (Oliveira 2009:1–3). Yet the *kanaka maoli* use of mnemonics in the categorization of living things is something that appears to have not yet been recognized by modern academics.

An argument can also be made that the utilitarian names of the categories in Malo and Teauotalani's folk taxonomies can also serve as learning devices that remind the learner about the general behaviors of the birds within those categories. While the names of Malo's categories are rather obvious, such as *nā manu bibiu* (literally "wild birds"), Teauotalani's are interesting because they are often arguably more anthropocentric and poetic. For example, the category of *nā manu ali'i* (royal birds) not only records that these are birds whose feathers are important for creating feather garments for the *ali'i*, but also that these birds were dominant over other forest birds, much like the *ali'i* were to their fellow humans. The *manu ali'i* were all primarily nectarivorous and would directly compete with each other for flower nectar. A natural pecking order developed where the *mamo* (*Drepanis pacifica*) was the most dominant species, chasing the others away from its preferred feeding territory. Next in line was the *'ō'ō* (*Moho* sp.), which in turn would chase away the *'i'iwi* (*Drepanis coccinea*) from preferred flowering trees. The *'i'iwi* would lord over the smaller and less brilliantly colored *'amakihī* (*Chlorodrepanis* sp.) and *'apapane* (*Himatione sanguinea*), who were at the bottom of the pecking order. It is interesting that this order of dominance mirrors the perceived value of the feathers of these species to the *kanaka maoli*, with the *mamo* being the most valuable and also the rarest naturally occurring species, and the *'amakihī* and *'apapane* the least valuable and also the most commonly occurring species in the forest (Emerson and Iwaiwa 1894; Teauotalani 1859:22).

Similarly, the category of *nā manu 'ano pueo* includes birds grouped together because of their shared quality of stealing prey from humans or other birds, and because of their excellent long distance eyesight. Categorizing birds together based on multiple factors like this perhaps could have helped a young novice bird hunter to retain key information about his quarry.

Potential for Cultural and Linguistic Revitalization

Can an understanding of Hawaiian perspectives in folk taxonomy and nomenclature be reclaimed through these three primary sources? Though there are many pieces of information that are missing from these writings that leave a number of questions, a degree of understanding of the classical Hawaiian ideas on these subjects can and should be revived from these and other primary sources. Reviving these ideas is beneficial to the *kanaka maoli* community as a whole and can lead to better stewardship practices of natural resources such as birds by both *kanaka maoli* and non-native conservationists.

In Hawai'i today, many *kanaka maoli* are still aware of the importance of onomatopoeia in bird naming conventions, but the other naming conventions identified here are usually less well known or forgotten by most people outside of academic circles. Likewise, I have only very rarely heard reference to any of the folk taxonomic categories given by Malo and Teauotalani, and again only from a handful of scholars.

It is notable that the official new Hawaiian language names given to certain bird species whose original Indigenous names were lost have incorporated some of the less widely known naming conventions. The *po'ouli* (*Melanerpes formicivorus*) was given a name by Mary Kawena Pukui in reference to the dark mask-like plumage on its head. Likewise the modern name of the *kiwīkiu* (*Pseudonestor xanthophrys*) given by the Hawaiian Language Lexicon Committee refers to the peculiar parrot-like shape of its beak, as well as its call. I am also a native Hawaiian cultural practitioner who has been involved in the naming of a few species of Hawaiian birds and the revival of the old names of other Hawaiian bird species, particularly the old name *'alawi* for *Loxops mana*, an endangered species from Hawai'i island. The fact that these conventions are still being used in the naming of certain birds is a hopeful and important one. As noted by Hidiyati et al. (2018:45), practitioners of traditional arts (in this case traditional naming) are more likely to have stronger cultural and linguistic vitality.

Developing the community understanding of the lexicon of the Hawaiian language as it relates to the peculiar environment and ecologies of Hawai'i is likely to contribute to the continued success of the ongoing Hawaiian cultural renaissance. *Kanaka maoli* have occupied the Hawaiian archipelago for approximately a thousand years (Athens et al.

2014:144–155). The collective experiences of the ancestors of the *kanaka maoli* have always been molded by the unique ecosystems of Hawai‘i. Revitalization of not only the traditional names and categorizations of the native avifauna, but the perspectives and reasoning behind the origin of those names provide an opportunity to reclaim a piece of the *kanaka maoli* ancestral heritage that can inform future actions and decisions for them as a people. If anything, a deeper understanding of folk taxonomy and nomenclature justifies *kanaka maoli* conservation of and access to the dwindling endemic biota of Hawai‘i. As these systems show, there is potentially great value in the utility of native Hawaiian birds for cultural revitalization and sustainability.

The linguistic and cultural revitalization of the *kanaka maoli* also benefits efforts to conserve natural resources in Hawai‘i. Practical knowledge of ecosystem management that has been developed over generations can provide scientists with valuable data, though the importance of Indigenous spiritual practices should also not be discounted. Lyver and Moller (2010:259–261) explain that removing non-ecological components from Indigenous knowledge systems effectively dumbs down the effectiveness of Indigenous natural resource management strategies. Long-term human commitment to sustainable resource use requires Indigenous values of reciprocity, mutual responsibility, and the agency of Indigenous peoples to steward their own resources.

While this study focuses largely on the utility of native Hawaiian birds, other authors have demonstrated the significant spiritual, sacred, and kinship relationships that *kanaka maoli* have with birds. In particular, Amante-Helweg and Conant (2009:59–79) as well as Conant (2005:278–284) give several examples of birds in legendary lore, as ancestral guardians, and the sacred importance of featherwork in *kanaka maoli* society.

Though this paper has laid out the beginnings of an understanding of these folk taxonomic and folk nomenclature systems, further research and analysis of the diffuse array of Hawaiian language archival material may eventually yield more insight than can be concluded from these three important sources of information at this time. Since this paper focuses largely on the utilitarian aspect of Hawaiian folk taxonomy, it would be especially exciting to continue research in folk taxonomy from a more symbolic and spiritual perspective in the future. It would also be

interesting to study similar naming and taxonomic conventions for other kinds of organisms in Hawai‘i and it would be worthwhile to compare the use of mnemonics in organisms to the use of similar learning conventions in place names, poetic style, and the naming of other aspects of the *ao holo‘oko‘a*. Such a comparative study may reveal further inferences about *kanaka maoli* philosophy and worldview that are not readily apparent.

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