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## Palmer's chickens on Kaua'i, Hawaiian Islands

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When Lionel Walter Rothschild (1868–1937) sent Henry Charles Palmer (1866–1920) out to the Hawaiian archipelago to collect specimens for his ever-growing bird collection, approximately 2,000 bird specimens were collected by Palmer and his assistants George Campbell Munro (1866–1963) and Edward (Ted) Basil Wolstenholme (1864–1926) during December 1890 and August 1893. Several bird species proved to be new to science while others were more familiar (Rothschild 1893–1900). Perhaps the most familiar species was Red Junglefowl ('chicken') *Gallus gallus*, of which five specimens were collected by Palmer and Munro on Kaua'i during January and February 1891. Both men kept notes in their diaries but, unfortunately, only those of Munro still exist (stored in the Archives collection at the Bernice P. Bishop Museum, Honolulu; BPBM). Being unfamiliar with the avifauna of the Hawaiian archipelago, Munro's notes about the fowl are those of admiration and fascination. As part of our research into discovery, description and distribution of Hawaiian endemic songbirds, we examined Munro's notes describing peculiarities of landscape, wildlife and people, but also describing each and every fowl. From previous studies (e.g. Paterson & Brisbin 2005), we deduced that the specimens still existed and, furthermore, might differ in plumage colouration and other characteristics. We therefore wondered if their plumage could be matched to the descriptions in Munro's diaries. Furthermore, we wondered if this matching process could yield or correct information that is currently attached to the existing specimens which in turn can assist further studies into the avifauna of the Hawaiian Islands in general and of the Kaua'i avifauna in particular of that time period.

The American Museum of Natural History, New York, USA (AMNH) contains many specimens of the Rothschild's collection (Anonymous 1935), including the majority of the existing Palmer specimens. These include five specimens of fowl from Kaua'i, for which the original labels that Palmer and Munro attached to in the field still exist (Figure 1). On 26 September 2024, all five were photographed by Said Robles Bello, including the labels, and were matched by us to the descriptions of fowl in Munro's diary. Furthermore, other diary notes by Munro about fowl on Kaua'i were extracted by us.

### RESULTS

Munro mentioned at least 14 fowl that were shot during their stay on Kaua'i of which he gave descriptions of (parts of) their plumage of at least 11 in his diary (Table 1). We presume that only a few fowl were prepared as specimens and instead many formed parts of their dinner (as mentioned for two specimens shot on 21 January 1891). Four of the 14 specimens

Table 1. Match of descriptions of 14 specimens of fowl (from Munro's diaries) with plumage of five specimens collected by Palmer and Munro in AMNH\*

spm	collection date	sex	general	neck/hackles	back	wing coverts	secondaries	underparts	(under?) tail	primaries	spurs	Palmer-number
1	13-jan	m	?	golden tipped with white & black	?	?	light rusty	spotted shining steel blue & white	?	?	inch	587
2	16-jan	m	more white than #1	?	?	?	?	?	?	?	?	616
3	21-jan	f	rusty with white spots	?	?	?	?	?	?	?	?	655
4	21-jan	m	?	?	?	?	?	?	?	?	?	-
5	22-jan	f	?	golden	?	?	?	?	?	?	?	-
6	22-jan	f	?	slatey bluish grey	?	?	?	?	?	?	?	-
7	27-jan	m	?	silver	golden	golden	?	slate blue	?	?	inch	705
8	27-jan	m	?	blood-red	?	?	?	blue-black	blue-black	?	not grown	-
9	27-jan	m	?	?	?	?	?	?	?	?	?	-
10	5-feb	m	?	silver	brick red&gold	?	?	?	?	?	1.5 inch	-
11	6-feb	f	?	light gold	brown with light line down centre of most feathers	?	?	rusty	?	?	?	-
12	7-feb	m	?	gold	red band	red band	steel gray with rusty patch	steel gray	black & white	mostly white	1.8 inch	749
13	26-mar	m	spotted white	?	?	?	?	?	?	?	?	-
14	1-apr	m	?	?	?	?	?	?	?	?	?	-

\* A question mark (?) means that no information was available for that body part.

described by Munro are females, and the remainder were males (Table 1). Of the five specimens still in existence, one is a female, and the four others are males (Table 2).

Comparison of the descriptions of the 14 specimens with the plumage of the five specimens in AMNH resulted in five matches (Table 2). Based on these matches, we established that the collection date as currently associated with the five specimens was correct in two specimens. In another two specimens the collection date differed by one day. For the fifth specimen, we now know that the collection date was 11 days earlier than the date currently associated with it (Table 2).

**Table 2. Summary of details of five specimen of fowl collected by Palmer and Munro on Kauai in Jan-Feb 1891.**

AMNH-label	sex	Palmer-number	Registration AMNH date	True collection date
skin-543358	m	587	13 Jan. 1891	13 Jan. 1891
skin-543360	m	616	16 Jan. 1891	16 Jan. 1891
skin-543362	f	655	22 Jan. 1891	21 Jan. 1891
skin-543359	m	705	28 Jan. 1891	27 Jan. 1891
skin-543361	m	749	18 Feb. 1891	7 Feb. 1891

## DISCUSSION

After Palmer and Munro had arrived on Kauaʻi, they were told by Francis Gay (1852–1928), a sugar planter on Kauaʻi with his own small collection of Hawaiian birds, that the fowl were native and that members of the third circumnavigation (1776–1780) captained by James Cook (1728–1779) had found them already when arriving in the archipelago in 1779 (BPBM Archives, MS SC Munro Box 1.1; entry 10 January 1891). Another inhabitant, judge Christopher Blom Hofgaard (1859–1931) told a similar story about the fowl: *“the chickens were native right enough, as the natives had legends of historical events where the chiefs were supposed to have had these birds at their feasts, hundreds of years before white men saw the islands”* (BPBM Archives, MS SC Munro Box 1.1; entry 30 January 1891). This is true of course: the first colonisers of the remote archipelagos and islands in the Pacific, including Kauaʻi, brought with them many animals including fowl (Kirch 1982, Pyle 1995, Moulton *et al.* 2001a, Gering *et al.* 2015). On Kauaʻi, some probably escaped and, in the eyes of Munro, formed a wild population. Munro (1944) stated: *“During the course of their migrations they undoubtedly changed from wild to at least semi-domestic, finally reverting here in Hawaii to their original wild state”*. Whether the fowl on Kauaʻi can be considered self-sustaining is still debated, with opponents and proponents of such status. Munro (1944) was not certain that junglefowl were established in the Hawaiian archipelago outside of Kauaʻi, although Moulton *et al.* (2001b) later stated that populations considered wild are present on both Oʻahu and Kauaʻi.

The five fowl collected by Palmer and Munro constitute the first collection of fowl from the Hawaiian archipelago. They were overlooked by Ball (1933) in his study of Pacific fowl specimens. Others however included them in their studies into ancestry of and phenotypic variation in Pacific fowl, leading to the conclusion that the Kauaʻi birds of Palmer and Munro were genetically mixed with domestic fowl (Paterson & Brisbin 2005). As we



**Figure 1.** Ventral views of five fowl specimens collected by Palmer and Munro on Kaua'i in Jan-Feb 1891. From left to right: AMNH-skin 543362, 543359, 543360, 543361 and 543358 (Said Robles Bello © American Museum of Natural History, New York).

also demonstrate, the four males collected by Palmer and Munro considerably differed in colour. The colour variability in fowl occurring in the Pacific region is thus confirmed (Ball 1933, Paterson & Brisbin 2005). As is clear from our study and those of others (e.g. Paterson & Brisbin 2005), the birds of Kaua'i do not however confirm to a separate colour variety for many Pacific islands (contra Ball 1933). Note that genomic research on the current Kaua'i populations may result in different results because of admixture due to for instance (deliberate and accidental) releases since the 1930s (Martin Cerezo *et al.* 2023, Gering *et al.* 2024).

It is not often that individual variation within a bird species allows for an attempt to link diary descriptions of collected individuals to the very same existing specimens. The domesticated fowl is one of these species. In our research, we were lucky to have access to Munro's diary with his descriptions but also that he had a more than average interest in these fowl. His annotations in his diary are testimony to this. For several dates in his diary, Munro expressed his almost admiration about the Kaua'i fowl, as exemplified by the entry for 20 January 1891: "*The male chickens vary a good deal in color; in full plumage they are usually beautiful birds, the hackles are generally golden varied more or less, combs & wattles large, spurs very sharp, & with fine syckle feathers in their tails, Mr. Kirk had one that died when we were there, it was taken when a chick, he said it was a demon to fight...*" (BPBM Archives, MS SC Munro Box 1.1).

Attempts to reconstruct expedition results such as those of Palmer and Munro on Kaua'i rely heavily on specimen information available from income books and the specimen itself. Our ability to match the five fowl specimens with original Palmer label num-

bers to Munro's diary descriptions of fowl should help us to reconstruct the expedition with more certainty. Furthermore, by matching described plumage in Munro's diary with the plumage of specimens, we were able to correct information currently attached to the specimens with respect to exact collection date. Especially, AMNH-skin-543361, which was not collected on 18 February 1891 as formally registered, but on 7 February. Such corrections will enable us to reconstruct the timeline of the expedition of Palmer and Munro much better.

Specimen collections often place much value on the originally occurring species. Palmer's collection illustrates the value of collecting obvious introduced species. Not only is the Hawaiian archipelago known for its many extinct endemic species, but it is also known for its many species that were introduced since the 1930s. Thanks to the efforts of Palmer, we also have information of several species that were introduced before this period. Apart from the fowl, he for instance also collected several specimens of Northern Bobwhite *Colinus virginianus*, Scaly-breasted Munia *Lonchura punctulata* and House Finch *Haemorhous mexicanus*. He also caught two swamp-hens *Porphyrio* on O'ahu, which were either identified as *melanotus* (Rothschild 1893–1900, Henshaw 1902, Pyle & Pyle 2017) or *poliocephalus* (data AMNH). Interestingly, both the bobwhite and the swamp-hen are now not considered to be established in the Hawaiian archipelago, unlike the fowl and both songbird species (Pyle & Pyle 2017). Finally, Gering *et al.* (2015) showed that Kaua'i fowl contain an ancient haplogroup (D) that “*either persisted on Kauai into the present day or was subsequently repopulated from a closely related source population.*” Ancient specimens of introduced species may thus provide information on history and evolution of species and may represent reservoirs of ancient lineages.

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