FEATHER EVIDENCE HELPS CLARIFY LOCALITY OF ANTHROPOLOGICAL ARTIFACTS IN THE MUSEUM OF MANKIND

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Species of birds used on ethnographic artifacts collected during the eighteenth century and stored at the Museum of Mankind (British Museum) were identified by using microscopic and whole-feather characters. One of the objects (VAN 345), labeled as having been collected on Vancouver's voyage to Tahiti, was a feather pendant made of long strands of chicken feathers with small red feathers at the base. The small red feathers were examined microscopically, compared with museum study skins of all possible species, and identified as *Vestiaria coccinea* ('I'iwi). Since this species is known only from the Hawaiian Archipelago, it was determined that the locality data on the object was in error. This study presents the procedure for feather identification and discusses the possible explanations for the discrepancies in the locality data. The identification of the 'I'iwi on this object supports previous speculation on the validity of locality data on these Polynesian artifacts and that some objects attributed to the Vancouver collection may have been collected on Cook's expedition to Hawai'i.

Introduction

THE ARTIFACTS from Captain Cook's voyages and other early expeditions that are stored in the Oceania collection at the Museum of Mankind are one of the most important and extensive collections in the British Museum's Ethnography Department. However, it is well known that the provenance of many items in this collection is imprecise or erroneous, which has been an impediment to the proper study of early expeditions. Kaeppler has described in detail the reasons for these misattributions and the possible history of many of the items (1979).

Pacific Studies, Vol. 21, No. 3—September 1998

Since the historically known avifauna of Polynesia is well documented, identification of bird species from the feathered artifacts was undertaken in hopes of clarifying locality data on some items in this collection. Once the species of birds were identified from feathers on the artifacts, geographic distributions were used to help determine the provenance of the objects.

Species identification made using whole and fragmentary feathers is based on Chandler's study of feather microstructure (1916) and has applications in various disciplines including anthropology. Identification of feather fragments has been applied to archaeological digs by Messinger (in Hargrave 1960). Oakes recently described bird-skin clothing used by indigenous arctic peoples, identifying species of birds by comparing whole-bird specimens on clothing to ornithological museum collections (1991).

In this study of artifacts from early voyages, species of birds represented on nine feathered ethnographic artifacts stored at the Museum of Mankind were identified by examining feather characters. The object of special interest was a feathered pendant (101 cm) made of long whiplike strands of chicken feathers with small red, passerine-like (perching birds) feathers decorating the long base (27 cm). This item (British Museum, VAN 345) was supposedly collected on Vancouver's voyage to Tahiti (Figure 1). Red-colored passerines were not known to occur on Tahiti at that time; therefore, feather identification was used for possible species confirmation.

Methods

Although the basic identification technique described by Messinger (1965) remains the same, feather cleaning and microslide preparation techniques have been improved by Laybourne and Dove (1994) and Sabo and Laybourne (1994). In this study, microslides were prepared at the Museum of Mankind from nine ethnographic artifacts stored in the Oceania collection and then compared with museum bird specimens at the British Museum of Natural History and the Smithsonian Institution. In cases where microscopic analysis was necessary, individual barbs rather than whole feathers were removed from discrete locations on most artifact specimens. Microslides were examined using a comparison light microscope at low (40×), mid (200×), and high (400×) power. Feather terminology is given in Figure 2.

This process of identification involved matching whole-feather characters with museum specimens and microcharacters with a known reference collection of microslides. All possible species with comparable feather characters that were known to occur in Polynesia were examined (Pratt, Bruner, and Berrett 1987). In the examination of VAN 345 this included comparing

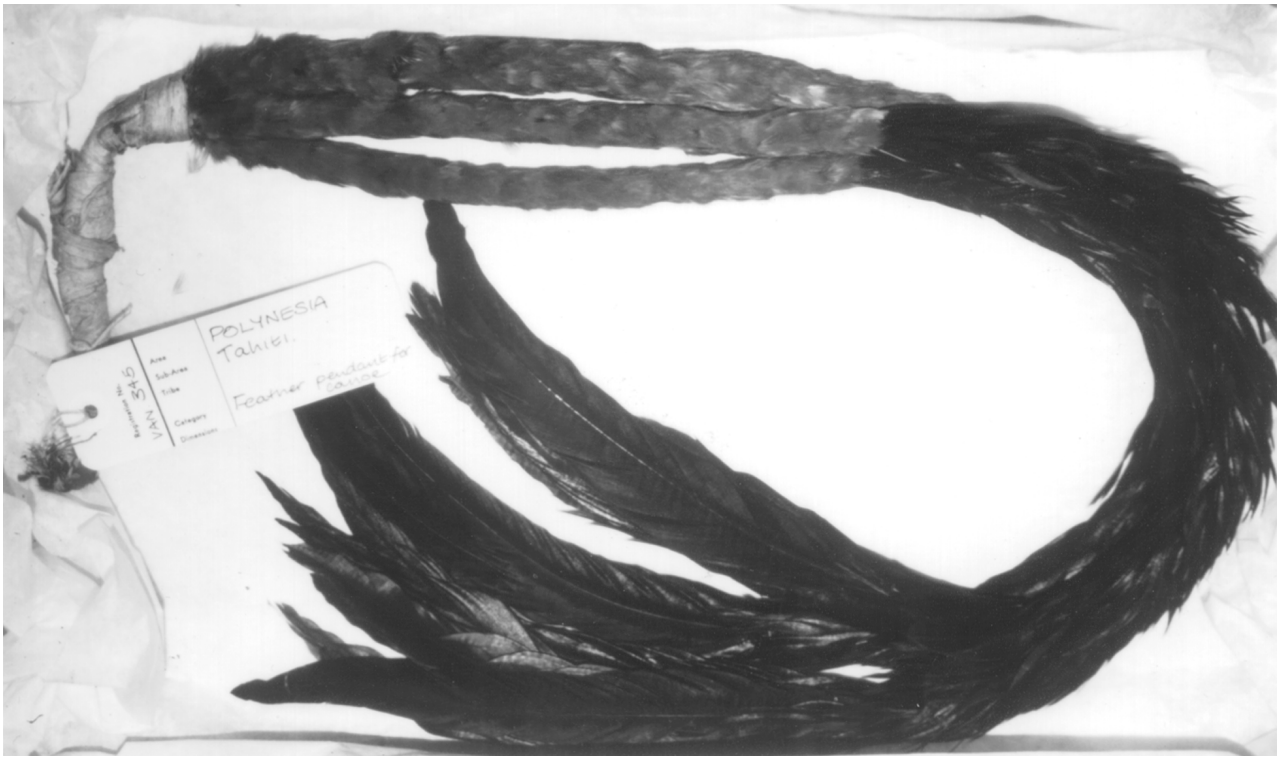

FIGURE 1. **Feather pendant (British Museum, VAN 345).**

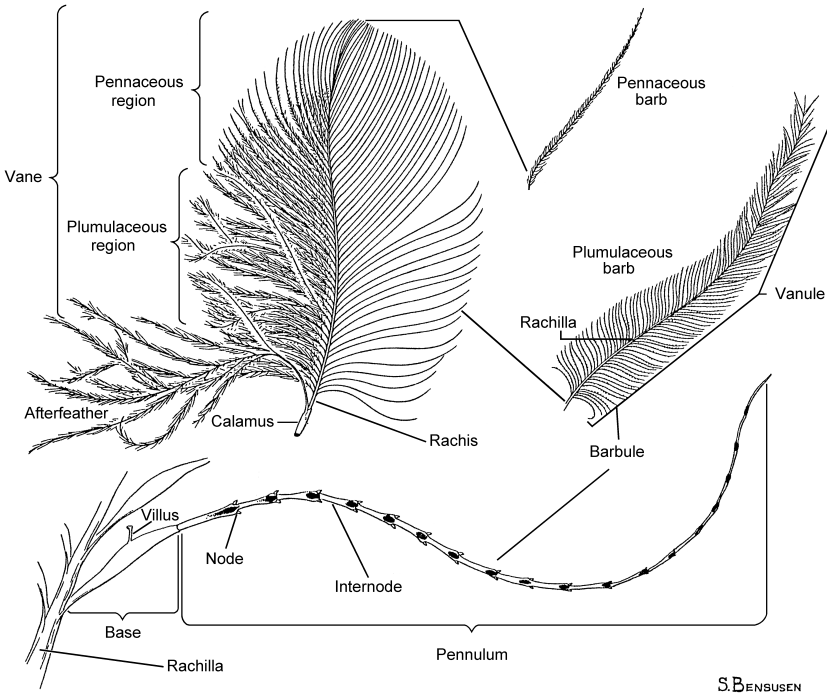

FIGURE 2. **Topography of a feather.** (Drawing by S. Bensusen)

all passerines with red feathers (Cardinal Honeyeater, *Myzomela cardinalis;* ʻApapane, *Himatione sanguinea;* Molokaʻi Creeper, *Paroreomyza flammea;* ʻIʻiwi, *Vestiaria coccinea*) and extinct species of parrots (Raiatea Parakeet, *Cyanoramphus ulietanus;* Black-fronted Parakeet, *C. zealandicus*). Feather identification was first made by comparing whole-feather characters of color, pattern, shape, size, and texture. Further comparison of down characters was made on nodal morphology, internode distance and width, pigmentation patterns, and barbule length.

Results

Table 1 lists artifact descriptions and all avian identifications made in this study. Microscopic examination of small red feathers on item VAN 345 revealed the presence of villi on the basal cells of the barbules. Villi are small, transparent projections (knobbed or pointed) on the base of the barbule and are mostly unique to passerines, hummingbirds, and woodpeckers.

TABLE 1. **Avian Identifications of Ethnographic Artifacts in the Oceania Collection, British Museum of Natural History**

British Museum No.	Description of Article	Feather Identification	Common Name	Locality
LMS 85–1885	Feather girdle with streamers	*Gallus gallus*	Chicken	Tahiti
VAN 344	Feather gorget of glossy-blue and brown-orange feathers	*Ducula aurorae* *Cyanoramphus zealandicus*	Polynesian Pigeon Black-fronted Parakeet	Society Islands
TAH 57	Feather gorget of glossy-blue, red, yellow and orange feathers	*Ducula aurorae* *Vini australis* *Ptilinopus purpuratus* *Cyanoramphus zealandicus*	Polynesian Pigeon Blue-crowned Lorikeet Gray-green Fruit Dove Black-fronted Parakeet	Society Islands
1946 NIUE	Head plume of long white, red, and yellow feathers	*Phaethon lepturus* *Vini australis* *Ptilinopus porphyraceus*	White-tailed Tropicbird Blue-crowned Lorikeet Purple-capped Fruit Dove	Niue
EP39	Headdress with white and dark feathers	*Phaethon lepturus* *Gallus gallus*	White-tailed Tropicbird Chicken	Tahiti
VAN 348	Neck ornament of dark bluish and yellow-green feathers	*Ducula aurorae* *Cyanoramphus ulietanus*	Polynesian Pigeon Raiatea Parakeet	Society Islands
VAN 345	Feather pendant of dark and red feathers	*Gallus gallus* *Vestiaria coccinea*	Chicken ʻIʻiwi	Tahiti
VAN 352		*Ducula aurorae*	Polynesian Pigeon	Tahiti
Q82.Oc.199	Feather whip of long white and red feathers	*Phaethon lepturus* *Vini australis*	White-tailed Tropicbird Blue-crowned Lorikeet	Niue

However, passerine villi are morphologically different from woodpeckers and microcharacters of hummingbirds differ from passerines. The villi of the unknown feather sample conformed with those of passerines.

After whole-feather comparisons eliminated species of Estrildidae, Eopsaltriidae, and some Meliphagidae, microscopic analysis was conducted on those species that exhibited whole-feather characters similar to those from VAN 345 or on species probable for that geographic region (Cardinal Honeyeater, ʻApapane, Molokaʻi Creeper, ʻAkepa, and ʻIʻiwi).

Whole-Feather Examination

The unknown feather sample appeared to have the shape, size, and texture of a flank feather. The color was orange-red as opposed to true red and overall feather size was small (23.7 mm long × 14.1 mm wide). The plumulaceous area (approximately 15.4 mm) was greater than the orange-red pennaceous area (approximately 4.5 mm). A small (approximately 1 mm wide) but distinct white "transitional region" was noted between the medium-gray colored downy barbs and the orange-red pennaceous barbs. Closer examination revealed that the bases of these pennaceous barbs had white barbules that cumulatively appeared as a white stripe separating the two barb types. Feather characters that eliminated some species from further consideration are presented in Table 2.

Microscopic Examination

Microslides were made of breast and flank feathers of the following museum specimens: *Vestiaria coccinea, Myzomela cardinalis, Paroreomyza flammea, Himatione sanguinea,* and *Loxops coccineus.* Microscopic analysis of a female specimen of *Paroreomyza* was examined because a red male specimen was not available for whole-feather comparisons.

In all respects, the unknown sample matched the feathers of ʻIʻiwi *(Vestiaria coccinea)* in comparisons of nodal morphology and pigmentation patterns (Table 3 and Figures 3, 4), barbule length, density of pigmented nodes, and overall micromorphological structure. Other species that were eliminated on the basis of microstructural analysis are listed in Table 3.

Discussion

From the foregoing analysis, it was concluded that the red feathers on VAN 345 were from the Hawaiian bird known as ʻIʻiwi *(Vestiaria coccinea),* one of the so-called Hawaiian Honeycreepers (Drepanididae).

TABLE 2. **Macroscopic (Whole-Feather) Examination of Passerines with Red Feathers from Polynesia**

Macroscopic Examination
UNKNOWN SAMPLE — VAN 345
Medium dark gray plumulaceous region fading to a distinct, tiny white stripe before orange-red pennaceous region.
MELIPHAGIDAE – HONEYEATERS
Cardinal Honeyeater — *Myzomela cardinalis*
Medium dark gray plumulaceous region with black stripe below a very red pennaceous region. Even specimens with more "orange-red" plumages and females did not fit the macroscopic pattern of having a white stripe below the pennaceous feather region.
Micronesian Honeyeater — *Myzomela rubratra*
Medium dark gray plumulaceous region with black stripe below very red pennaceous region. Considered by some sources to be a race of *M. cardinalis.*
Rotuma Honeyeater — *Myzomela chermesina*
Same macroscopic pattern as other *Myzomela* spp.
Orange-breasted Honeyeater — *Myzomela jugularis*
Upper tail coverts and head feathers examined. Feathers too small and did not match macroscopic pattern of unknown.
ESTRILDIDAE – PARROTFINCHES
Blue-faced Parrotfinch — *Erythrura trichroa*
Upper tail coverts. Feather size much too small, light gray plumulaceous region with a green stripe below a red pennaceous region.
Red-headed Parrotfinch — *Erythrura cyaneovirens*
Head and upper tail coverts. Medium dark plumulaceous region with a green stripe below a red pennaceous region. Some feathers do not have a stripe.
EOPSALTRIIDAE – AUSTRALIAN ROBINS
Scarlet Robin — *Petroica multicolor*
Breast feathers. Very dark gray-black plumulaceous region. Wide, very distinct white stripe below a pinkish-red pennaceous region.
DREPANIDIDAE – HAWAIIAN HONEYCREEPERS
ʻApapane — *Himatione sanguinea*
Medium dark gray plumulaceous region with a more dusky red stripe below a dark red pennaceous region. *H. s. freethi,* Laysan race, is more orange in color. Flank pattern without white stripe. Some back feathers on some specimens have white stripe below an orange-red pennaceous region but the pattern is not comparable to the unknown sample. There is a much narrower band of red with the white stripe more distal on the feather.
Molokaʻi Creeper — *Paroreomyza flammea*
No male specimen available for study. Microanalysis of female specimen.
ʻAkepa — *Loxops coccineus*
Pennaceous feather more pure orange, not red-orange.
ʻIʻiwi — *Vestiaria coccinea*
Flanks and all other contour feathers with medium dark gray plumulaceous region. White stripe below an orange-red pennaceous tip. Texture, size, color, and shape match unknown specimen.

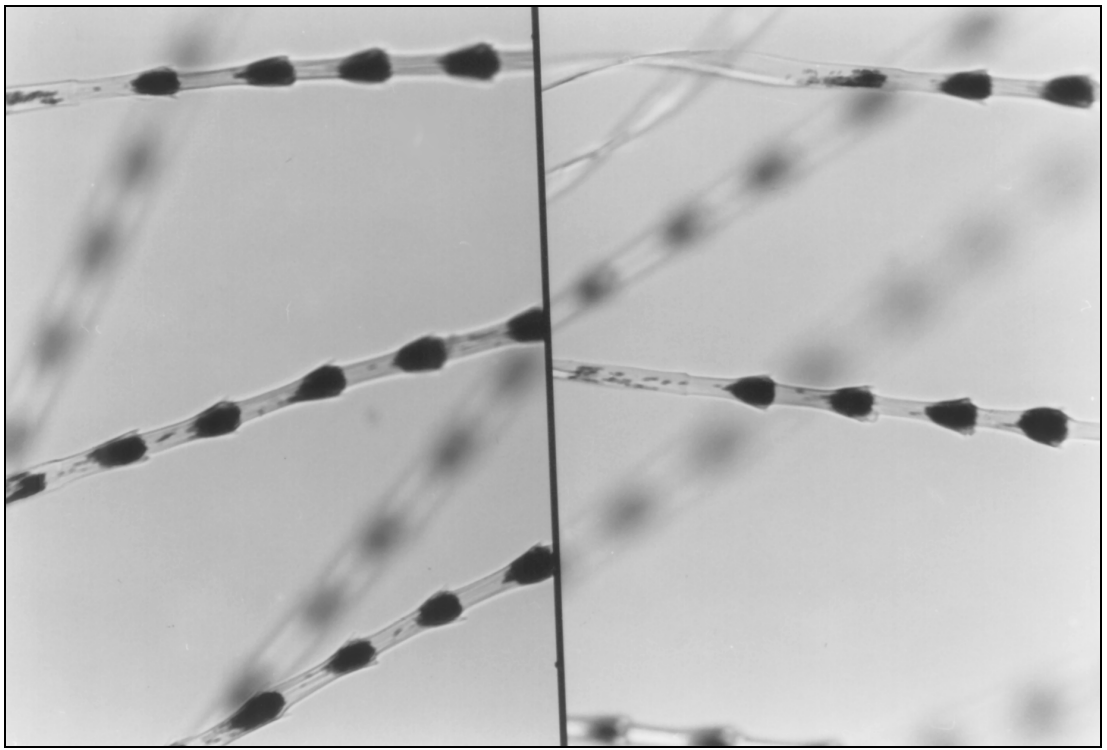

FIGURE 3. **Photomicrographs (400×) showing microscopic similarities of basal nodes on downy barbules of VAN 345 (left) and ʻIʻiwi (right).**

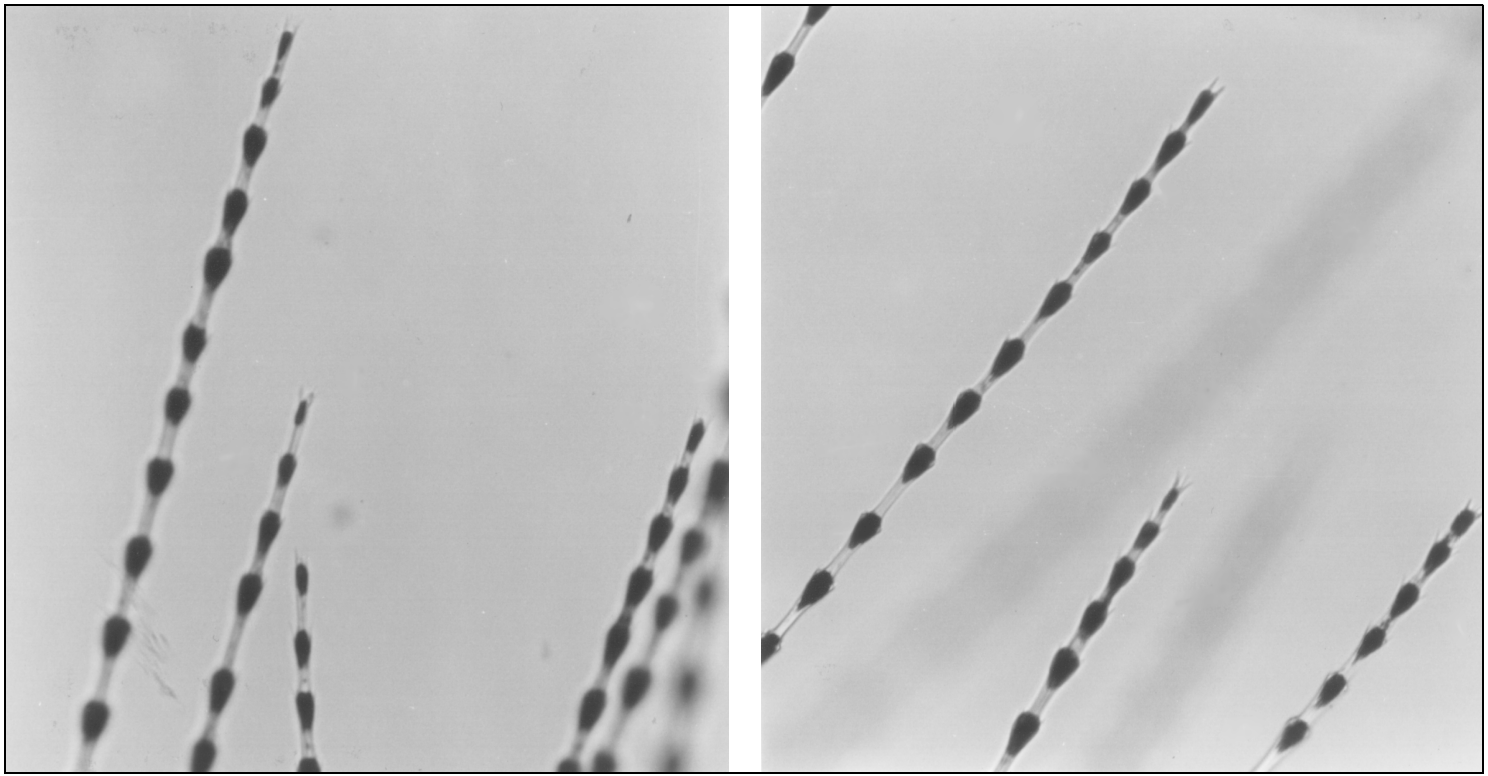

FIGURE 4. **Photomicrographs (400×) showing microscopic similarities of distal nodes on downy barbules of VAN 345 (left) and ʻIʻiwi (right).**

TABLE 3. **Species Compared Microscopically to the Unknown Feather Sample**

Microscopic Examination
Unknown Feather VAN 345. Average barbule length 1.3–1.5 mm; average nodes per barbule, 57. Nodes uniformly swollen and distributed along pennulum. Pigment mostly confined to nodes with some internode pigment stippling between basal nodes. Pigment round or teardrop shaped. Spines more visible on distal nodes of pennulum. Distal pigment well confined at node. Base of pennulum infrequently stippled with pigment. Internode appears narrow, nodes appear wide.
Cardinal Honeyeater *Myzomela cardinalis* USNM 461506. Average barbule length 1.0–1.1 mm; average nodes per barbule, 49. Nodes uniformly swollen and distributed along pennulum. Pigment not well confined to nodes throughout pennulum and often "trailing" or extending from node into internode at basal and mid nodes. Distal nodal pigment is very heavy and connected throughout distal part of pennulum. Pigment is teardrop shaped. Spines are visible all along pennulum but especially on distal nodes. Base of pennulum is heavily pigmented on distal vanule.
ʻApapane *Himatione sanguinea freethi* USNM 189459. Average barbule length 0.70–0.90 mm; average nodes per barbule, 37. Nodes uniformly swollen and distributed along pennulum. Pigment not well confined to nodes throughout pennulum. Distal nodal pigment is somewhat confined but there is some internodal stippling of pigment. Spines are more apparent on distal nodes. Internodal length appears shorter than other species. Base of pennulum is moderately stippled with pigment on distal vanule.
Molokaʻi Creeper *Paroreomyza flammea* Female specimen only, USNM 331466. Average barbule length 1.1–1.2 mm; average nodes per barbule, 53. Nodes less swollen but uniformly distributed along pennulum. Pigment not well confined to nodes, internodal pigment stippling is common. Pigment is teardrop shaped. Distal nodes are very densely packed with much internodal pigment. Spines apparent at nodes along pennulum but more so on distal nodes. Since nodes are not as swollen as other species, the internode appears wider. Base of pennulum is infrequently stippled with pigment.
ʻAkepa *Loxops coccineus* USNM 169326. Average barbule length 1.2–1.3 mm; average nodes per barbule, 53. Nodes swollen and uniformly distributed along pennulum. Pigment not well confined at nodes, especially distally. Pigment is stippled internodally at basal nodes. Distal pigmentation is very heavy and combined throughout distal part of pennulum. Spines are more obvious at tip of barbule than at the base. Base of pennulum infrequently stippled with pigment.
ʻIʻiwi *Vestiaria coccinea* USNM 371377. Average barbule length 1.3–1.5 mm; average nodes per barbule, 56. Nodes uniformly swollen and distributed all along pennulum. Pigment at nodes is round and teardrop shaped. Pigment is well defined at nodes with little internodal stippling at basal nodes. Internode appears narrower and nodes appear wider. Distal nodes are well confined and spined. Spines are more apparent distally. Base of pennulum is infrequently stippled with pigment. Microstructures match unknown sample (see Figures 3 and 4).

The possibility that this information provided evidence of trade between the Hawaiian Islands and Tahiti was rejected because these island archipelagoes are more than a thousand miles apart and, despite technical feasibility, Finney (1977) and Kirch (1985) do not believe that voyages between these localities were common. Furthermore, such trade as may once have existed between these islands had ceased by the time of Cook's (1778–1779) and Vancouver's (1792–1794) voyages.

Because Hawaiian Honeycreepers are not known to occur anywhere outside the Hawaiian Islands (Scott et al. 1986) and fossils of this group of birds have not been reported outside Hawai'i (Steadman 1989, 1995), it is not likely that the 'I'iwi was ever widespread in Polynesia. Thus, the most probable explanation for the presence of 'I'iwi feathers is that the object came from Hawai'i and not from Tahiti. This corroborates Kaeppler's study of the provenance of certain artifacts in the Museum of Mankind. According to Kaeppler (1979), some of the items included in the Vancouver collection were actually purchased from an estate auction of Hawaiian artifacts that had been collected during Cook's voyage (1778–1779). Many of the traceable items from that auction also have "VAN" catalog numbers (e.g., VAN 235, VAN 237, VAN 253a, b, VAN 258). Kaeppler also confirms that the VAN 345 feather pendant is not typical of Tahitian native work but appears more like Hawaiian artifacts (pers. com., 1997).

Two other items (Q80.Oc.1052 and 1053) in the British Museum Oceania collection are also suspected to be from Hawai'i based on feather identifications. Although the labels on these items read "Marquesas(?)," they are probably from Hawai'i because they contain yellow and red passerine feathers. Due to their fragile condition, these pieces were not studied in great detail.

This study exemplifies the importance of ornithology, and especially feather identification, to anthropological studies and shows that "ethno-ornithology" can be an aid in the study of historical artifacts and cultures.

NOTE

This study was instigated by S. L. Olson. Many thanks to D. Starzecka, R. Prys-Jones, and M. Walters for kindly providing access to specimens at the British Museum. A. Kaeppler provided anthropological information and R. C. Laybourne critiqued the manuscript. This article was presented as a poster at the 1997 Wilson Ornithological Meetings and the 1997 Smithsonian Institution Congressional Open House. D. Deedrick assisted with the photomicrographs and Smithsonian Institution Photo Services reproduced the photographs. Travel to the British Museum was funded by an interagency agreement between the Smithsonian Institution and the U.S. Air Force HQ AFSA/SEFW Bash Team.

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