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The Pacific Golden-Plover (*Pluvialis fulva*): Discovery of the Species and Other Historical Notes

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Knowledge of a species' discovery and nomenclatural chain along with associated people and events adds significantly to our appreciation of it. For most birds, these historical details are relatively obscure. Tracing the past of the Pacific Golden-Plover (*Pluvialis fulva*) touches on the remarkable endurance and accomplishments of several 18th-century ornithologists, the perils of not publishing promptly, and the work of an early systematist who became the recognized authority for the species without examining any specimens. This plover has a relatively "distinguished background" in that it was found and described by famous naturalists during Capt. James Cook's explorations of the Pacific. These extraordinary voyages yielded a wealth of zoological information, including major findings in the areas of bird systematics and distribution. Newly discovered Pacific birds figured prominently in the cyclopedic works of the time (Latham 1781-1801, Pennant 1785, Gmelin 1788-1789, Forster 1844); more recently, various discussions have emphasized the ornithological significance of Cook's expeditions (Stresemann 1949, 1950, 1975, Lysaght 1959, Wilson 1977, Medway 1979, 1981). Cook's three Pacific voyages present a fascinating array of characters and events that are thoroughly detailed in the monumental works of Beaglehole (1962, 1967-1969). From these chronicles and other sources I have extracted an historical perspective of the Pacific Golden-Plover's discovery, subsequent records and happenings, and the people involved. I include comments where the original findings can be clarified by current knowledge of *P. fulva* biology. With respect to geographic distribution of the species, most of Cook's travels were within the vast winter range of the Pacific Golden-Plover in the Central and South Pacific, and only the third voyage touched the arctic breeding grounds. Recent studies of breeding birds in western Alaska (Connors 1983, Connors et al. 1993) show that *P. fulva* is a full species separate from the American Golden-Plover (*P. dominica*). This separation has been widely accepted (see Johnson et al. 1989), and is under consideration by the AOU. For more complete information on the species (including taxonomy, migration, plumages, and behavior), see Connors (1983), Connors et al. (1993), Johnson et al. (1981, 1989), Johnson and Johnson (1983), and Johnson (1985).

The first specimens ever recorded were collected by the naturalists accompanying Cook's first voyage (1768-1771). Joseph Banks wrote on 8 October 1770 (see Beaglehole 1962) that he and Daniel Solander

shot "4 plovers exactly like our English golden plover" (now Eurasian Golden-Plover, *Pluvialis apricaria*) on a small island off the northwestern coast of Java. In his journal *Animalium Javanensia*, an unpublished work held by the British Museum (Natural History), Solander compared the birds to *P. apricaria*, stating "agrees with the description by Brisson and Linnaeus, except belly is white sprinkled with a few black spots [these were birds in prebasic molt showing remnants of breeding plumage] and perhaps the spots on the tail are more in the shape of bars." Although Solander seemed aware of differences between these specimens and *P. apricaria*, he evidently did not recognize that this plover was a new species. Neither Solander's notes nor the first voyage specimens (none are known to have reached England) have any nomenclatural or type status.

The first specimens of taxonomic significance were collected by Johann Reinhold Forster, George Forster (Johann's son), and Anders Sparrman. This illustrious team of naturalists sailed aboard HMS *Resolution* during Cook's second voyage (1772-1775), an expedition that involved enormous sweeps of the South Pacific and circumnavigation of Antarctica (for full account, see Beaglehole 1969). Collection of the type specimen can be fixed almost to the hour. The bird was collected at Matavai Bay, Tahiti on the afternoon of 26 August 1773 by J. R. Forster. Forster's log indicates that the type was shot during the first few hours of 27 August, but this was based on "ship's time," where the day runs from noon to noon and begins 12 h before the civil day. In relation to civil time, early on 27 August is equivalent to the afternoon of 26 August. His journal contains the simple notation "shot a new *Charadrius*" (Hoare 1982). From this specimen, Forster described the species *Charadrius glaucopus*. Although the description apparently was written at the time of collection, the original account remained unpublished for many years. It finally appeared well after Forster's death (1798) in *Descriptiones Animalium* (1844).

The *Resolution* departed from Tahiti on 17 September 1773 and reached Tonga on 2 October. While en route, J. R. Forster recorded several sightings of plovers (Hoare 1982). On 26 September he wrote: "The birds have quite forsaken our Ship. However, one Landbird, a kind of Sandpiper, such as was seen on the 22 & 23d was in the Afternoon hovering about the Ship, & settled twice on it, being quite tired & spent: it flew afterwards away. It is of the same kind of Plover as we observed in Otahaitee (*Charadrius glaucopus*)." Based on the chronology of migration, the

plovers observed during this period were probably juveniles. Additional plovers were collected at Tonga on 4 October 1773, and at New Caledonia on 6 September 1774 (Hoare 1982). George Forster rendered paintings of the species at these two sites (Lysaght 1959), but there is no known painting of the type specimen from Tahiti. The fate of the type specimen and the specimens collected subsequently is unknown. Most likely they were inadequately preserved and either did not survive the voyage or perished shortly thereafter.

Descriptiones Animalium was essentially complete when the expedition returned to England in July 1775 (Hoare 1982), but various postvoyage disagreements with the British Admiralty prevented its publication (for discussions of this troubled period in Forster's life, see Stresemann 1975, Hoare 1976, 1982). Forster, frustrated in his efforts to publish, unfortunately lost much of the early recognition that was rightfully his. Meanwhile, John Latham was writing the *General Synopsis of Birds* (1781–1801) and incorporated therein most of Forster's findings. Thus, Latham published the first account of the Pacific Golden-Plover, which he referred to as the "Fulvous Plover" (*General Synopsis*, vol. 3, 1785). Since the type specimen was unavailable and there was no painting of it, Latham based his description of the type on information "communicated by Dr. Forster." As to what was "communicated," one finds great similarity between Latham's description and Forster's (in *Descriptiones Animalium* 1844), suggesting that Forster provided Latham access to his original notes. The type specimen was an individual wearing traces of breeding plumage: its breast and belly were "spotted with black." Such feathering is consistent with the date of collection and represents an adult bird in prebasic molt.

Forster's personal assistance in Latham's project appears to have been only transitory (Hoare 1976). Much of Forster's collection had by then passed into the famous private museums of Joseph Banks and Ashton Lever to which Latham had free access. Banks and Lever eventually held most of the skins and paintings from the three Cook expeditions (Sharpe 1906, Lysaght 1959, Stresemann 1975, Medway 1979, 1981). It is probable that Latham gained insight as to the features of *P. fulva* by viewing one or more of four paintings: two by George Forster (mentioned above), and two from the third voyage (see below). All of these works were then owned by Banks (Lysaght 1959). Also, Latham examined a specimen (date and place of collection unrecorded) in the Leverian Museum, which he termed "var. A" of the "Fulvous Plover." However, not all of its features matched the type specimen: the bird was relatively small ("Length eight inches") and its legs were of the wrong color ("pale yellow"). Forster measured his type specimen at 12½ inches "from tip of bill to end of claw of middle toe" (this is an accurate dimension based on personal examination of freshly collected specimens), and de-

scribed its legs as "blue" (*P. fulva* has grayish-black legs, but such coloration might well be considered as a shade of blue by some observers). Presumably, Latham used the same reference points when measuring "var. A" as he commented that it was "considerably less in size" when compared to the type. While it appears that "var. A" was too small to be *P. fulva*, this single measurement would be inconclusive since Latham's specimen may have been poorly preserved (possibly it was shrunken or otherwise distorted) and not comparable to Forster's freshly collected bird. Leg color, however, is a less subjective criterion and "pale yellow" is reasonably good evidence that "var. A" was, in fact, not *P. fulva*.

Perhaps "var. A" was the single plover specimen from Cook's third voyage, which appears in the catalog of the Banks collection (Medway 1979). Although records of this bird indicate that it was a Pacific Golden-Plover, the identification may have been incorrect. It appears that Banks gave various specimens to Lever (Medway 1979); thus, the bird could have been in Lever's possession when Latham examined it. Questions concerning the exact identity of "var. A" and whether it was the same or a different bird than the specimen in Banks' collection are unlikely ever to be resolved. Almost all of the museum specimens from Cook's voyages eventually perished (victims of neglect and crude procedures), and only a very few are extant (Sharpe 1906, Medway 1981). Other plover skins may have been collected on Cook's third expedition, but only the questionable specimen mentioned above is known to have survived the voyage. Given such paucity of specimens and the fact that Latham used only "var. A" to supplement Forster's description, it is entirely possible that Latham never saw an actual specimen of *P. fulva*.

Neither Forster nor Latham emerged as the recognized authority for the species. Instead, the distinction went to Johann Friedrich Gmelin by default. Forster lost out because his findings were not published promptly, Latham because of the format he chose for *General Synopsis*. The latter was written in English without adherence to the Linnaean method—an approach which was unacceptable to the international scientific community. Gmelin, then editing the 13th edition of *Systema Naturae* (1788–1789), included Latham's work by simply translating the material into Linnaean Latin. At that moment, the "Fulvous Plover" became *Charadrius fulvus*. Thus, as others have noted (Mathews 1931, Stresemann 1949, 1975, Medway 1981), Gmelin achieved nomenclatural recognition for *P. fulva* and many other bird species with minimal effort and no direct knowledge of the specimens.

Cook's third and last voyage (1776–1780) was primarily for exploration of the North Pacific and Bering Sea. The expedition produced an immense array of new information including discovery of the Hawaiian Islands (for detailed treatment, see Beaglehole

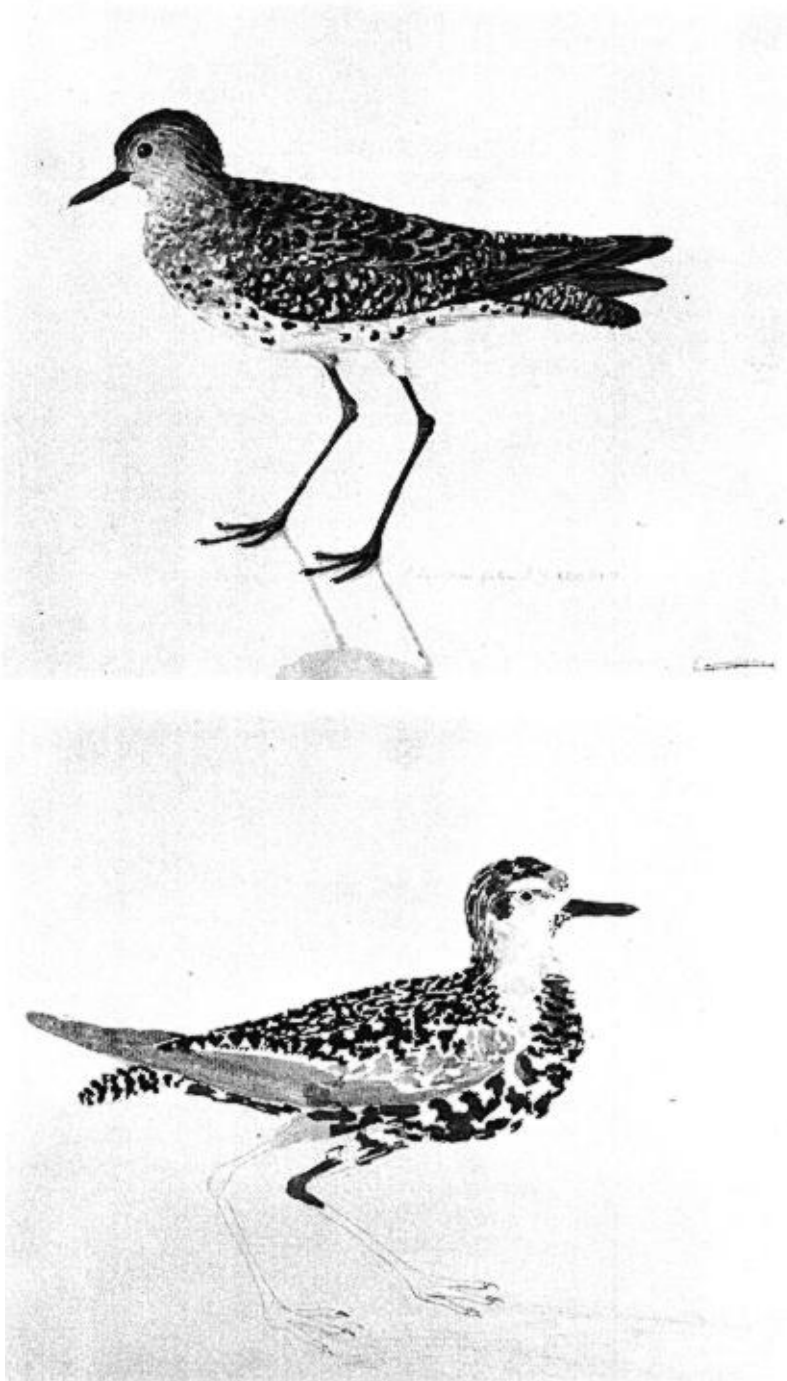


Fig. 1. George Forster's two paintings of the Pacific Golden-Plover. *Upper panel:* Bird collected 4 October 1773 at Tonga; individual nearing completion of prebasic molt and had only a few flecks of dark breeding plumage remaining on breast and belly. *Lower panel:* Collected 6 September 1774 at New Caledonia; prebasic molt less advanced than in other bird and considerable breeding plumage still in place. Both works have been cropped so as to emphasize the birds. In the process, notations by Forster (faded on originals and mostly illegible in my photographs) were removed. For information concerning these notations, see Lysaght (1959).

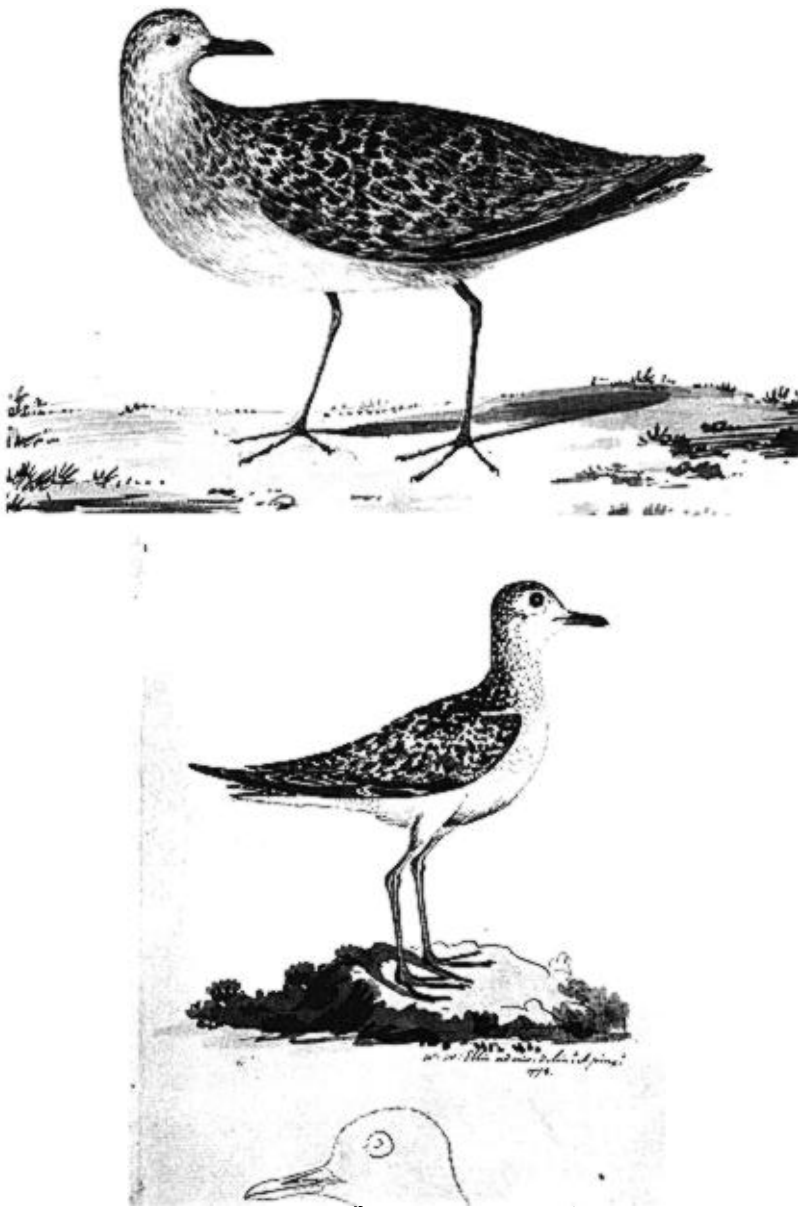


Fig. 2. Watercolors from third voyage. *Upper panel*: Webber's painting of a plover in basic plumage. Bird could be either a juvenile or an adult. After completion of prebasic 1 molt and loss of juvenile body feathering (see below), age determination is difficult without the bird in hand. Locality given by artist was "Sandwich Islands, 1777"; however, this is incorrect since the expedition did not sight Hawaii until 18 January 1778. *Lower panel*: Ellis' rendering of a plover from Christmas Island. Based on voyage's itinerary, bird collected between 25 December 1777 and 2 January 1778. It appears that specimen had barred flanks, which would indicate juvenile plumage. Although collection period is somewhat late for such feathering, it is possible that the bird was a young individual in its first wintering season. For additional information on these paintings, see Lysaght (1959) and Medway (1981).

1967). Although there were no official naturalists aboard, extensive collections, drawings, and records of birds were obtained by several individuals possessing scientific skills. Particularly notable were William Anderson (ship's surgeon) and William Ellis (assistant surgeon). Anderson demonstrated remarkable abilities in ornithology (Iredale 1938, Stresemann 1950). Regrettably, he died during the voyage and his loss was "very much to the disadvantage of zoological success" (Stresemann 1949).

Within the journals from the third expedition (most have been published and/or examined in detail; see Ellis 1782, Beaglehole 1967, Medway 1979, 1981) there are a number of references to plovers. While these sightings seem reliable, confusion with other species of shorebirds cannot be ruled out in every instance. James Cook recorded plovers at Sledge Island near present day Nome, Alaska on 5 August 1778, and saw flights of "birds like Plover" (probably adult *P. fulva* in migration) from mid- to late August 1778 on the Bering Sea. During this period, Cook pondered the southward movements of birds and speculated: "Does not this indicate that there must be land to the North where these birds retired in the proper season to breed and were now returning to a warmer climate." Cook's insight is perhaps the first recorded statement concerning migration in the northern Pacific region. There is a notable discrepancy as to the number of plovers observed at Sledge Island. James King (one of the expedition's officers) wrote in his journal that he and Cook had walked together over the area. Whereas Cook noted "a few Plover," King recorded "flocks of Plovers." William Anderson observed birds which "seem'd to be of the Plover kind" on 20 March 1777 between New Zealand and the Cook Islands (these may have been spring migrants; northward movements from the far Southern Hemisphere start relatively early in the year; see Lane 1987, Alcorn 1988, Barter 1988), noted plovers at Palmerston Atoll on 17 April 1777, and described a plover "spotted with yellow" at Tonga on 11 July 1777 (most likely an overwintering individual). William Ellis recorded plovers on Christmas Island in late December to early January 1778, at Nootka Sound (on Vancouver Island) in late April 1778 (the location might indicate birds from California wintering grounds rather than transoceanic migrants), on Unalaska Island in late October 1778 (migrating juveniles), and on the island of Hawaii in the early months of 1779. During the 1779 stay in Hawaii, Charles Clerke (who assumed command of the *Resolution* following Cook's death on 14 February 1779) also noted the occurrence of plovers. Latham's (1785) remark that "our last voyagers" observed plovers "at Owhyhee" was evidently based on Ellis' 1779 records (Medway 1981). Since the context of Latham's comment had to do with golden-plovers in general, he apparently was unaware that his "Fulvous Plover" from Tahiti and the plover in Hawaii were of the same species.

In addition to the various third-voyage sightings described above, *P. fulva* was further documented through the artistry of William Ellis and John Webber (a landscape artist aboard the *Resolution*). Each produced a single watercolor of the bird. The Ellis work and the two paintings by Forster (from the second voyage) are in the collections of the British Museum (Natural History), Webber's painting is held by the British Museum (Lysaght 1959). All four works are shown in Figures 1 and 2. This is the first time they have been reproduced.

I am grateful to David G. Medway who generously shared his extensive knowledge of ornithology in the Cook era and supplied copied material from the unpublished Solander manuscript. Alan Knox provided early guidance in locating the paintings by Forster, Ellis, and Webber. Officials at the British Museum (Natural History) and the Trustees of the British Museum kindly allowed these materials to be reproduced. Peter G. Connors and C. Stuart Houston provided helpful comments on the manuscript. This investigation was done in association with other studies of the Pacific Golden-Plover funded mostly by the National Geographic Society. Additional support was provided by the Hawaii Audubon Society and Moorhead State University (Minnesota) through a faculty research grant program.

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Comparison of Rod/Cone Ratio in Three Species of Shorebirds Having Different Nocturnal Foraging Strategies

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Nocturnality, the habit of being active during darkness, is a characteristic of some aquatic birds, particularly those in the shorebird families (McNeil and Robert 1988, Robert and McNeil 1989, Robert et al. 1989; for detailed review concerning aquatic birds,

see McNeil 1991, McNeil et al. 1992, 1993). Two basic types of foraging techniques are used by shorebirds: visual searching for prey or indications of their presence, on or near the surface (e.g. *Pluvialis* and *Charadrius* plovers); and probing with the bill for buried prey that are detected by tactile and taste cues (e.g. Short-billed Dowitcher, *Limnodromus griseus*). Some species feed exclusively with the same foraging technique both by night and by day (e.g. visual searching by *Pluvialis* and *Charadrius* plovers, or tactile probing

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