5 The boat, the bay, and the museum

Significance of the 1905–1906 Galápagos expedition of the California Academy of Sciences

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Introduction

The 1905–1906 Galápagos scientific collecting expedition achieved its success through careful planning and organization and by selecting competent fieldworkers as expedition members (Figure 5.1). The California Academy of Sciences (CAS) in San Francisco, California organized this crucial expedition. It shaped the history of Galápagos and the history of evolutionary thinking, particularly Neo-Darwinism. The determined organizational efforts of museum director and ornithologist Leverett Mills Loomis (1857–1928) (Bishop 1929) resulted in meticulous and methodical advance planning for the expedition. Its clearly defined goals were to collect a comprehensive set of specimens in the Galápagos Islands and return to San Francisco. These ends were met and exceeded Loomis's scientific expectations.

Loomis had both personal and professional goals invested in the expedition and its eight field collectors who served as sailor-scientists. He and the governing board of the Academy in San Francisco wanted to increase the scientific prestige of their institution, the oldest museum west of the Rocky Mountains. They hoped to obtain a level of international prestige, perhaps rivaling the American Museum of Natural History in New York City. Their path to success involved conducting extensive collecting expeditions to build up the size of their biological and geological collections. These new and enlarged collections would form the basis of scientific monographs to be published by the senior curatorial staff. As one of those senior curators at the museum, Loomis desired particularly to expand their holdings of seabirds, his personal taxonomic specialty, and to collect the giant tortoises that he and others believed were "fast disappearing".

The purpose of this chapter is to address a little known aspect of Galápagos history: the 1905–1906 Galápagos expedition of the CAS and its subsequent impact on advancing science. In particular, I look at the history of the young men who participated in the expedition and their boat – one of the last in the era of sail. A hallmark of the 1905–1906 expedition is the approximately 78,000 specimens brought back to San Francisco, which by today's standard is considered excessive. I study the historical reasoning that justified these large collections and the change in scientific focus from *ex situ* preservation in museums to

in situ conservation and restoration over the last 100 years. Finally, I examine the significance of this vast collection of specimens in advancing Galápagos science over the last 100 years. This chapter extends current knowledge using reference to the original field notes, correspondence, and photographs taken during the expedition and housed in the CAS library and archives in San Francisco.

The title of this chapter, "The boat, the bay, and the museum", emphasizes three entities with strong Galápagos connections and all called "Academy". All three are part of or connected to the 1905–1906 Galápagos scientific collecting expedition of the CAS:

1 The CAS in San Francisco, California, founded in 1853, is the natural history museum that has become the center of specimen-based studies of Galápagos organisms, owing to the large collection of specimens brought back to San Francisco by the highly successful 1905–1906 expedition.
2 The 89-foot schooner *Academy*, which was named in honor of the museum, the CAS when it was rechristened in San Francisco on 27 June 1905, from the former U.S. Coast and Geodetic Survey and U.S. Navy vessel USS *Earnest.*

Figure 5.1 Members of the 1905–1906 California Academy of Sciences expedition to the Galápagos Islands, including the "eight young men" who served as sailor–scientists. From the left: Frederick T. Nelson, Alban Stewart, Ernest Samuel King, Rollo Howard Beck, Joseph Slayton Hunter, sitting J.J. Parker, Joseph Richard Slevin, Edward Winslow Gifford, Washington Henry Ochsner, Francis Xavier Williams. Not shown: James White, the expedition's cook (source: California Academy of Sciences, used with permission).

3 Academy Bay, the present-day port on the south coast of Isla Santa Cruz and location of the now-bustling town of Puerto Ayora, but which was completely uninhabited in 1905–1906. The bay was named by the crew of the schooner in honor of the schooner herself (not the museum), on 5 November 5 1905. In Spanish, the bay should be called Bahia Academy, not Bahia Academia, to preserve the original namesake.

Two notes of irony leading to success

To begin the story of the expedition, I would like to start at the end. Irony operates at several levels for the 1905–1906 Galápagos expedition, with two particularly ironic twists contributing to the ultimate success of the expedition. First, for nearly a year in 1904–1905, museum director Loomis could not charter or purchase a suitable sailing vessel on which to send the collecting party, headed by Rollo Howard Beck (1870–1950). Being unable to secure a suitable vessel meant that Loomis delayed departure for nine months from San Francisco from his original date of October 1904 until the actual departure date of late June 1905. Had the expedition departed as Loomis originally planned, they would have returned to San Francisco (after 17 months) in March of 1906. However, on 18 April 1906, a great earthquake devastated San Francisco and other cities in the greater San Francisco Bay Area (Fradkin 2005; Klett 2006; Winchester 2006). Thousands of Galápagos specimens that would have been stored in wooden museum cabinets would have all been destroyed. The three days of unstoppable fires that raged through San Francisco, and not the earthquake itself, would have demolished the specimens along with the building and other contents of the CAS (Gifford 1908).

The second irony, or perhaps near irony, occurred on the very last day of the expedition as the schooner full of specimens approached the then bridgeless entrance to San Francisco Bay on Thanksgiving Day, 29 November 1906. All the crewmembers were overjoyed about getting into harbor and having Thanksgiving dinner with their families. After sailing up to the entrance in light winds, the wind died and they were becalmed. Slowly they drifted through the headlands separating San Francisco from Marin County, and narrowly missed colliding with the pilot boat *Lady Mine*, another becalmed ship. Instead of their much-anticipated Thanksgiving family dinners, they settled for another tiresome meal of canned Alaska salmon. With insufficient leeway to come about without grounding on the rocks, they put out the ship's boat and attempted to row the schooner's bow around, away from the rocks. Unsuccessful in this sailing maneuver, they hailed a passing crab fisherman in his fishing smack, the *Louisa*, and for ten dollars the schooner hitched a tow to the quarantine station by 10:15 p.m. The trip had ended. The expedition party and boatload of specimens were safe. They had sailed non-stop for 65 days from their last Galápagos landfall at Culpepper Island, for a total of 519 days of the voyage (Slevin 1931).

The eight young men

For background on the expedition, I present in the list below the age of each of the sailor-scientists at the start of the expedition after their expedition title. Each man's age at death is given following his place of death. Names are presented in the same order as Slevin (1931: 6). The personnel aboard the schooner *Academy* consisted of 11 members, three crewmembers in addition to the "eight young men" who served as sailor-scientists, as follows:

Rollo Howard Beck, chief of party and master of the vessel, 34 years old. Born: 26 August 1870, Los Gatos, California. Died: 22 November 1950, Planada, California, 80 years old. Beck went on to lead several multi-year collecting expeditions and was widely viewed as *the* collector of his day (Pitelka 1986).

Washington Henry Ochsner, conchologist and geologist, 22 years old. Born: 4 July 1882, Wisconsin. Died: 11 April 1927, Portland, Oregon, 44 years old. Ochsner returned to Stanford University after the expedition and eventually found oil in the Kettleman Hills of central California, the fortune from which came in after his death.

Francis Xavier Williams, entomologist, 22 years old. Born: 6 August 1882, Martinez, California. Died: 16 December 1967, Chula Vista, California, 85 years old. Williams went on to a long career as an entomologist, which included many years working for the Hawaiian Sugar Planters Association.

Edward Winslow Gifford, ornithologist, 17 years old. Born: 14 August 1887, Oakland, California. Died: 16 May 1959, Paradise, Butte County, California, 71 years old. Was the last person in the US to become a full professor without even earning a bachelor's degree; he became director of the Lowie Museum of Anthropology and contributed to knowledge of migration in the Pacific through analysis of Lapita pottery.

Joseph Slayton Hunter, mammalogist, 25 years old. Born: 9 August 1879, Lincoln, Nebraska. Died: 20 January 1972, San Mateo, California, 92 years old. Hunter spent the next 42 years working for the California Fish and Game Commission and he became the head of the California State Bureau of Game Conservation.

Alban Stewart, botanist, 30 years old. Born: 14 January 1875, Wellington, Missouri. Died: 31 May 1940, Tallahassee, Florida, 65 years old. Stewart obtained his Ph.D. in botany in 1911 at the Gray Herbarium at Harvard University; until his death, he taught in the Department of Bacteriology at the Florida State College for Women, which later became Florida State University, in Tallahassee.

Joseph Richard Slevin, assistant herpetologist and second mate, 24 years old. Born: 13 September 1881, San Francisco, California. Died: 15 February 1957, San Francisco, California, 75 years old. Slevin went on to a long and distinguished career as the head herpetologist at the CAS until his death.

Ernest Samuel King, assistant herpetologist, 18 years old. Born: 16 December 1886, San Jose, California. Died: 1 July 1948, San Jose, California, 61 years old. King did not pursue science as a career, working for Kaiser Aluminum and Chemical Corporation until his death.

***Additional crew on the schooner* Academy**

Frederick T. Nelson, first mate, 28 years old. Born: 7 April 1877, Denmark. Died: 17 April 1938, Alameda, California, 61 years old. Nelson went on to a long career as a sea captain, remaining life-long friends with Ochsner.

Little biographical information is known about the expedition's navigator, J.J. Parker (who was put off the boat for incompetence late in the mission) or about the cook or steward, James W. White.

The boat: the schooner Earnest/Academy

The *Academy* was originally built as the schooner *Earnest* in 1875 in Baltimore, Maryland, in the William E. Woodall boatyard for the United States Coast Survey, founded by Congress in 1807 as the maritime equivalent of the Lewis and Clark expedition (1804–1806). She sank off Isle Au Haute, Maine in 1876, but was repaired and sailed around the Horn non-stop to San Francisco in 1878, passing 200 miles west of the Galápagos Island through one of the largest El Niño events on record (James 2003). The schooner *Earnest* remained in service with the Coast Survey (which became the U.S. Coast and Geodetic Survey in 1878) until 1901 and served in the San Juan Islands, Washington, and into Alaskan waters. While in a new role as a U.S. Navy training vessel in San Francisco Bay in March 1904, the most violent storm to hit San Francisco Bay in over a dozen years tossed the schooner ashore on Yerba Buena Island. She was beyond repair for the Navy, and was sold to the CAS for use as a scientific research vessel. She spent 17 months on the 1905–1906 Galápagos expedition of the CAS, and ultimately disappeared from maritime records on December 31, 1915, in Balboa, Panama, when sold after tragic events unfolded during an ill-fated gold-hunting expedition to Tierra del Fuego at the southern tip of South America.

The bay: Academy Bay

On the grounds of the Charles Darwin Research station, near the souvenir shop (tienda) at the little snack bar, a brass plaque was installed in 2005 by the CAS and the Charles Darwin Foundation "Commemorating 100 years of research and collaboration". Academy Bay, on the southern shore of Santa Cruz Island, was named on 5 November 1905 by crewmembers of the schooner *Academy* in honor of the schooner herself. The bay was uninhabited in 1905, but is today the location of the largest town in Galápagos, Puerto Ayora, and the headquarters of the Charles Darwin Foundation and the Galápagos National Park Service. The brass plaque reads,

> Near this site on November 5, 1905, members of the California Academy of Sciences' first Galápagos research expedition came ashore. Academy Bay is named for their ship, the *Academy*. This plaque celebrates the continued

collaboration between the Academy and the people of Ecuador to understand and conserve the islands' irreplaceable biological and historical treasures for humankind, now and forever. 3 June 2005.

The Museum: the California Academy of Sciences

The CAS began as a scientific organization in April 1853, during the flush years of the California Gold Rush. Seven prominent San Francisco gentlemen met under the dim glow of tallow candles in a poorly furnished room on Montgomery Street, near the heart of today's financial district, to form a fledgling society for the study of natural history. Their stated intention on 4 April 1853 was to organize "an association for the development of the natural sciences" (Hittell 1997). Their goal was accomplished, but it took many years to become a world-class museum, through strife and tragedy.

For most people familiar today with the city of San Francisco, the CAS is the big natural history museum in Golden Gate Park, right across from the de Young Museum of Art. Few visitors know that the Academy was not always located in Golden Gate Park, and fewer still know much about the early years of this venerable San Francisco institution. As people wander about the impressive museum building designed by Italian architect Renzo Piano, enjoying the Steinhart Aquarium, the Morrison Planetarium, and the numerous exhibits on natural history, there is little indication that over 150 years ago the Academy had a very modest beginning in downtown San Francisco. Few visitors know about the Academy's tumultuous history in the late nineteenth and early twentieth centuries. Despite its humble and unpretentious beginnings as a small, under-funded institution, the California Academy of Natural Sciences (as it was first called) proved ultimately to be one of the dominant forces in San Francisco's cultural history.

In 1873, as the Academy celebrated its twentieth year with a major windfall that propelled it toward permanent success. Mr James Lick (1796–1876), a San Francisco real estate mogul, entrepreneur, and philanthropist with land holdings dating from before the Gold Rush, contacted the Academy about a gift of land for a permanent museum. Lick donated a plot of land at the corner of Market and Fourth Streets in order to "promote the diffusion of Science and the prosperity and perpetuity of the Academy". With the Lick bequest, the Academy's star was certainly rising and it had become one of the wealthiest scientific societies in the United States. As a scientific institution, their future was secure and the Lick bequest ultimately allowed the Academy to build in 1891 a museum and an income-generating office building on Market Street, between Fourth and Fifth Streets, where it would remain for 15 years.

In the latter part of the nineteenth century, the CAS grew into a mature scientific institution: they acquired the museum building, built a respectable research collection of specimens and library, and employed a competent and energetic scientific staff. They were poised to expand, to flex their muscles, if you will, and the Galápagos Islands were the ideal agents of expansion. In those exotic

isles, made famous half a century earlier by Charles Darwin, the Academy could obtain abundant specimens of rare plants and animals at minimal cost to boost the prestige of their collections. The Galápagos was their ticket to success. Little did they know it would also be their key to their survival.

Preservation in 1905 before modern-day conservation

Perhaps one of the surprising (and I would argue, incorrectly interpreted) aspects of this scientific expedition is the large number of Galápagos specimens collected (see Table 5.1) and the apparent disregard for conservation exhibited by the field collectors. In a historical context, however, their actions were scientifically justified. Their actions as field collectors cannot be judged by modern conservation standards, whose origins come from the 1950s. The reader must instead understand both the mindset of the state of scientific conservation in the early years of the twentieth century and the state of governmental protection of the Galápagos Islands in those same years (which was virtually nil).

To analyze this collection–conservation conundrum in greater depth I use the Galápagos example. The CAS and director Loomis decided on the Galápagos Islands because they were "made famous to every naturalist by Charles Darwin, whose account of the voyage of HMS *Beagle* has become a classic amongst students of nature" (See Grant and Estes 2009; Keynes 1979; Larson 2001). Loomis was further motivated by information he received from Rollo Howard Beck about the status of giant tortoises in the islands. Beck was a participant in an expedition to the islands in 1897–1898 financed by Walter Rothschild (1868–1937) of Tring, England, who wrote in 1899 in a letter to herpetologist Albert Günther (1830–1914), who was at the time President of the Linnaean Society: "It was lucky they went last year; in 3 years' time there will not be a

Table 5.1 Numbers of specimens collected of broad taxonomic groups on the CAS expedition of 1905–1906

Taxonomic group	*Number of specimens (based on Gifford, 1908; and B. West, pers. comm., 2011)*
Vertebrates	Reptiles 5,000 Birds 8,688 Eggs 2,000 Mammals 120 Sum = 15,808
Invertebrates	Land snails 29,975 Marine shells 8,967 Fossils *c.* 1,000 Insects *c.* 13,000 Sum = 52,942
Vascular plants	Plants *c.* 10,000
Expedition total	78,750

living giant Land Tortoise of any kind on the Galápagos Islands, 'What a damnable shame' is it not?" As a member of this Rothschild-financed expedition, Rollo Beck took a particular photograph (see Figure 9 in Fritts and Fritts 1982: 98; and Figure 1 in Dumbacher and West, 2010) that showed numerous tortoises on Albemarle (Isabella) Island that had been killed and their bodies boiled and rendered for oil, in much the same way whales were rendered for oil. The photograph itself showed, and the wider implications of current slaughter were, that extirpation of the tortoises was inevitable. This motivated Loomis and the CAS, which financially backed the 1905–1906 expedition to "make a thorough study of the status of the gigantic land tortoises and secure specimens of the various species before it proved too late" (Slevin 1931: 5; Van Denburgh 1914). The notion that time was running out gave a sense of urgency in San Francisco to organizing the expedition, arranging for a suitable schooner, hiring the eight young men to serve as sailor-scientists and, while in the islands, collecting as much as possible. If the organisms, especially the giant land tortoises, were on a collision course with extinction due to human depredation, then, the logic goes, the remaining tortoises were better off dead and preserved in a museum for scientific study than be killed for food or boiled for oil and lost forever to science.

Commenting on the large numbers of specimens that were taken by the *Academy* collectors during their year in the islands (especially the 266 giant tortoises), the entomologist Howard Evans cast their activity in a positive, if not with hindsight an illuminated, light. "This seems a considerable slaughter, but it should be remembered that at this time tortoises and other native animals were being devastated by visiting whalers and by the settlers, and goats and other introduced animals were destroying habitats rapidly. The work of the expedition provided basic knowledge on the fauna that ultimately led to successful conservation efforts" (Evans 1985: 207–208). It would take another generation, and a new perspective on conservation, before concrete efforts were made to preserve the biota of the Galápagos.

The small, uninhabited Barrington (Santa Fé) Island serves as a showcase, or microcosm, of the larger problems facing Galápagos organisms in 1905 when the *Academy* visited, and of the serious problems that continue today. In addition to the devastated land iguana colony, the tortoises of Barrington tell a parallel story. During the expedition, Slevin and the other men on the *Academy* met a fellow named Captain Thomas Levick (Latorre 1999: 137) who ran a schooner between the islands. Levick frankly informed them that "30 years ago tortoises were found scattered all over Barrington and that he had taken them off of there". (Fritts and Fritts 1982: 66) Rarely does one meet the actual person responsible for the extinction of a species, but the *Academy* crew seems to have crossed paths with one.

In terms of the mindset of scientists of the day, one can easily turn to the most prominent ornithologist at the end of the nineteenth century, whose influence extended into the early twentieth century, Elliott Coues (1842–1899) (last name is pronounced "cows"). After he died, the influence of his 1872 book *Key to North American Birds* was described in an obituary (Anonymous 1900) as

having "probably done as much to advance the interests of ornithology in this country as any other work". In this landmark book on North American birds, which was very likely known to Rollo Beck, Joseph Hunter, and Edward Gifford (the field collectors whose primary emphasis was ornithology), Coues gives basic directions to amateur and professional ornithologists about how to conduct fieldwork and how to build a bird skin collection for personal or professional study. Coues opens the first section of the book with a description of "Field Ornithology: Being a Manual for Collecting, Preparing, and Preserving Birds". Coues begins this section (Coues 1894: 1) by proclaiming, "The double-barreled shotgun is your main reliance". Few birders today would even know how to use a shotgun, let alone want to use one.

Today, both amateur birders and professional ornithologists consider a good pair of binoculars as their "main reliance". So much so that a strong culture and market has developed about the relative merits of different specifications and brands. Coues recommended to birders over 100 years ago that they might possibly trap or snare birds to collect them, but such practices were "exceptions to the rule that you will shoot birds, and for this purpose no weapon compares to the one just mentioned [double-barreled shot gun]" (Coues 1894: 1). Coues' recommendation on how much to spend on a shotgun echoes what birders today consider when making a binocular purchase, "Get the best one you can afford to buy; go the full length of your purse in the matters of material and workmanship" (Coues 1894: 1).

Another series of statements by Coues is particularly insightful about the state of conservation thinking at the end of the nineteenth and early twentieth centuries. These statements aid in understanding why the 1905–1906 expedition field party collected so many specimens in general, and so many birds in particular. Coues advised birders to collect "all you can get", for example, "say fifty or one hundred of any but the most abundant and widely diffused species". His logic was that the widely diffused or common species could be collected at a later date. Coues went on to comment, "With a few possible exceptions ... enough birds of all kinds exist to overstock every public and private collection in the world, without sensible diminution of their numbers" (Coues 1894: 13). Nature, as an inexhaustible source of specimens, removes restraint from the collector's mindset. For Coues, collecting did not permanently damage a species or the environment (Barrow 2000).

Coues was further convinced that collecting birds in the manner he recommended was actually good for the mental and physical health of the bird collector. He explained that, "It is Unnecessary to speak of the Healthfulness of a pursuit that, like the collector's occupation, demands regular bodily exercise, and at the same time stimulates the mind by supplying an object, thus calling the whole system into exhilarating action" (Coues 1894: 19). After a hard day of shooting specimens, the bird collector would be rejuvenated in mind, body, and spirit. Coues depicted field ornithology of the day as tantamount to an overall health regimen. Ornithology was good for what ailed you.

In summary, it is important to note that the field collectors on the 1905–1906 expedition (James 2010) were adhering to standard practice recommended by the most respected ornithologist of the day, and shared by contemporary

prominent scientists. Even if today we do not agree with that perspective, it was in fact standard operating procedure at the time. Fortunately, museum specimens, such as those collected by the 1905–1906 expedition, are actively used for a variety of scientific studies, thus establishing the enduring legacy of the expedition. Recent examples of studies using century-old museum specimens are provided here (Beissing and Peery 2007; Desrochers 2010; Hofkin *et al.* 2004).

Immortalizing Darwin's finches

A measure of the expedition's success was an acknowledgement by ornithologist David Lack (1910–1973) that his statistical analysis of Darwin's finches was made possible by the extensive collection of specimens made during the 1905–1906 expedition (Lack 1945, 1961). Lack's first major publication on these birds was in 1945 through the CAS. Lack dedicated his book *Darwin's Finches* to the staff of the CAS. Arguably, without this large collection, Lack's work might have had a different outcome.

Another success of the large number of specimens collected during the 1905–1906 expedition was the taxonomic revision of the giant tortoises by John Van Denburgh (1872–1924) (Jennings 1997; Van Denburgh 1914). By having a large number of specimens at hand, and reference to other material, Van Denburgh was able to create a "family portrait" of the giant tortoises for the first time. His monograph on the group was the first treatment of all the extant and extinct species, and stands as a landmark achievement (Pritchard 1996). Without a complete suite of specimens in one museum, Van Denburgh would have needed to travel to numerous museums before completing his taxonomic work. Having the Galápagos study series under one roof afforded him the luxury of knowing from which island most specimens were collected and he figured them at standardized angles (Pritchard 1996).

Recent use of CAS specimens and observations

The specimens and observations from the 1905–1906 expedition have been an invaluable baseline for science and conservation in Galápagos, and have been used extensively. Examples include tissue samples collected from three tortoises on Pinta being used to determine evolutionary relationships of taxa in the *Geochelone nigra* group. This information has been used as guidance in finding a potential mate for Lonesome George (Caccone *et al.* 1999). Bollmer *et al.* (2006) used a single specimen of the now extinct population of the Galápagos hawk (*Buteo galapagoensis*) collected in San Cristóbal to describe phylogenic relationships and their colonization history. Specimens have also been used to help understanding animal responses to environmental variables over time. Based on a mechanistic understanding of individual performances of marine iguanas (*Amblyrhynchus cristatus*), Wikelski and Romero (2003) predicted an evolutionary increase in maximum body size caused by global warming trends. Comparing modern specimens with those collected during 1905 validated this prediction.

Published observations from the expedition have also been used to reconstruct extinction events. Grant *et al.* (2005) show that the warbler finch (*Certhidea fusca*) was uncommon in 1905–1906, and searches since 1979 have been unable to detect their presence. Published observations and samples have been used to reconstruct the history of introduction of invasive species under current management including feral donkeys (*Equus asinus*) and feral pigs (*Sus scrofa*) (Carrion *et al.* 2007; Cruz *et al.* 2005). Patton *et al.* (1975) used allozyme analysis of a number of specimens, including those collected by CAS, to show that the black rat (*Rattus rattus*) had been introduced to the archipelago in at least three separate events between 1600 and 1945. Parker *et al.* (2011) used samples from CAS and the Zoologisches Staatssammlung Muenchen to reconstruct the introduction of avipoxvirus into Galápagos. Using histopathology and viral genotyping they concluded that this virus was introduced late in 1890s and was dispersed among islands by a variety of mechanisms, including regular human movements among colonized islands. Changes in the endemic land snail fauna, a more extensive diversification of species than Darwin's finches, has been documented by Parent and Crespi (2006) and Parent *et al.* (2008) using specimens from the CAS collections.

In summary, "the boat, the bay, and the museum" have great significance to Galápagos science: the specimens are long dead but their legacy continues.

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http://www.darwinfoundation.org/english/_upload/symposium-proceedings-final.pdf